

Aerial and Vessel Dispersant Preparedness and Operations Guide

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Glossary

AAR	After Action Report
AC	Area Committee
ACP	Area Contingency Plan
API	American Petroleum Institute
ASTM	ASTM International
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
CGA	Clean Gulf Associates cooperative
Cmd Post	Command Post
COTP	Captain of the Port, U.S. Coast Guard
DADAP	Daily Aerial/Vessel Dispersant Application Plan
DG	Dispersant Group
DMP2	Dispersant Mission Planner 2
DOR	Dispersant to Oil Ratio
DWH	Deepwater Horizon
EDRC	Effective Daily Recovery Capacity
EPA	Environmental Protection Agency
EU	Environmental Unit
FBO	Fixed Base Operator
FOSC	Federal On-Scene Coordinator
FOSCR	Federal On-Scene Coordinator Representative
GIS	Geographical Information System
GPA	Gallons Per Acre
IAP	Incident Action Plan
IC	Incident Commander
ICS	Incident Command System
IMT	Incident Management Team
ISB	in-Situ Burning
JIC	Joint Information Center
JITF	Joint Industry Task Force
MSDS	Material Safety Data Sheet
NOAA	National Oceanic and Atmospheric Administration
NOTAM	Notice to Airmen
NPREP	National Preparedness Response Exercise Plan
NRT	National Response Team
Ops	Operations
OSHA	Occupational Safety and Health Administration
OSRL	Oil Spill Response, Ltd.
OSRO	Oil Spill Response Organization
OSRP	Oil Spill Response Plan
OSRV	Oil Spill Response Vessel
PIC	Pilot-In-Charge
PIO	Public Information Officer
PPE	Personal Protective Equipment
PREP	Preparedness for Response Exercise Program
QI	Qualified Individual
RP	Responsible Party
RRT	Regional Response Team
SIMOPS	Simultaneous Operations
SMART	Special Monitoring of Applied Response Technologies
SSC	Scientific Support Coordinator
TFR	Temporary Flight Restriction
VMD	Volume Median Diameter
VOC	Volatile Organic Carbon

Aerial and Vessel Dispersant Preparedness and Operations Guide

Purpose and Description

A. Purpose

Pre-planning and preparedness as well as the preparation of a comprehensive operations plan are critical in conducting effective aerial and/or vessel dispersant operations in the event of any offshore oil spill and especially for significant continuous releases of oil. The guidance in this document is designed for use in the United States and discusses in detail response processes within the U.S. regulatory framework. However, the dispersant response guidance, assets and processes described are fundamental and can be easily modified for international operations.

The procedures and processes presented are applicable for all sizes of spills and those of any duration. However, the personnel and assets activated will need to be scaled accordingly for the specifics of the spill and/or the geographical response area, e.g., Tier II and III monitoring may not be possible for a dispersant operation only lasting a day or two. The full ICS based dispersant structure and procedures are explained so that the users of this guidance can have a complete picture of operations to better structure the dispersant response to the spill situation presented.

The purpose of this document is to provide guidance and examples on:

- Preparedness – the planning, organization, training, exercising, and other activities that can be conducted prior to a spill occurring to ensure adequate readiness for dispersant application, and
- Operations – response objectives and checklists, operational plans, procedures, meetings and forms that can be used to aid in obtaining regulatory approval and to effectively manage the dispersant application to a spill.

The guidelines in this document can be used to develop a stand-alone dispersant preparedness and/or operations plan generally following the structure of the guidelines. This information can also be incorporated into applicable oil spill response plans (OSRPs).

The aerial and vessel dispersant guidance, procedures, forms, and other materials represent best practices developed during Deepwater Horizon (DWH) response for safely and successfully applying dispersants to surface oil slicks. Companies may adapt the forms and templates in this document to better fit their company's response organization, operations, and their geographical areas. Nothing herein should be considered a requirement. Although this document has been developed for operations in the United States, most of the sections are equally applicable to aerial and vessel dispersant operations throughout the world.

B. Description

Consistent with the above stated Purpose, this document is divided into two sections: 1) Preparedness Section and 2) Operations Section. A brief description of each section is provided below.

Part 1 – Preparedness

The Preparedness Section provides guidance, templates and information to ensure that all of the components of an effective dispersant response are in place and properly functioning prior to a spill. Key components of an effective dispersant application system include:

- Designating an Aerial and Vessel Dispersant Group that is integrated into the Incident Command System (ICS) based response Incident Management Team (IMT)

- Establishing activation procedures
- Identifying adequate dispersant application assets and dispersant stockpiles
- Assessing Oil Spill Removal Organization (OSRO) dispersant capabilities
- Developing a training and exercise program to maintain proficiency and readiness.

Part 2 – Operations

The Operations Section provides response processes and procedures to establish a dispersant operations program in the event of a spill which includes:

- Activation checklist
- Standardized operational forms
- Identification of potential staging airports
- Developing a generalized concept of operations and associated objectives
- Daily activity flow charts and information on developing the daily application plan
- Documenting and reporting activities and the results of the operations.

C. Systems Approach

Although described in two sections, the Aerial and Vessel Dispersant Preparedness and Operations program covered in these guidelines generally treats aerial and vessel dispersant operations as a “Dispersant System.” This will ensure that each component of the system is in place, properly functioning and integrated with the other components. Failure of any one component can significantly reduce the ability to apply dispersants.

The major components of a “Dispersant System” are:

- Application aircraft and vessels and trained crews
- Spotter/air control aircraft and trained crews
- IMT Dispersant Group management/coordination team
- Dispersant Monitor/Observer/Surveillance aircraft
- Trained dispersant observers and monitoring equipment
- Approved dispersant stockpiles in sufficient quantity
- Dispersant stockpiles effectiveness testing procedures
- Communication systems (satellite, marine, aviation) in all spray assets (spray, spotter and observer aircraft and spray vessels) and at staging bases. Communication equipment should allow aviation assets to directly communicate with marine assets.
- Flight tracking systems on spray and spotter aircraft and spray vessels
- Spray pass documentation and report systems on spray aircraft
- Spray system testing and calibration data

- Staging airport/port ground support and management
- Logistics equipment and plans
- Dispersant transfer systems
- Dispersant operations plans, forms and data bases
- Health and Safety Plans
- Spray and support equipment maintenance plans
- Training and exercise program for all personnel and equipment.

PART 1 – PREPAREDNESS SECTION

1-1 Introduction

This portion of the guidance document covers the types of preparedness activities that can be conducted to ensure adequate measures are in place to rapidly and effectively implement an aerial and/or vessel dispersant application response should an oil spill occur.

1-2 Dispersant Operations Incident Management Team Organization

A. Dispersant Operations Group Purpose and Scope

The surface dispersant group organizational structure should be integrated into the overall Incident Management Team prior to a spill to ensure a timely and effective dispersant application response. Descriptions of the dispersant group positions, including their duties and responsibilities, should also be provided to ensure members know who they report to and what specifically they need to accomplish. Setting the organizational structure and position descriptions also aids in determining who can best fill these roles. A primary and at least one alternate should be pre-designated for each position to ensure availability and that they receive the training needed to perform their duties.

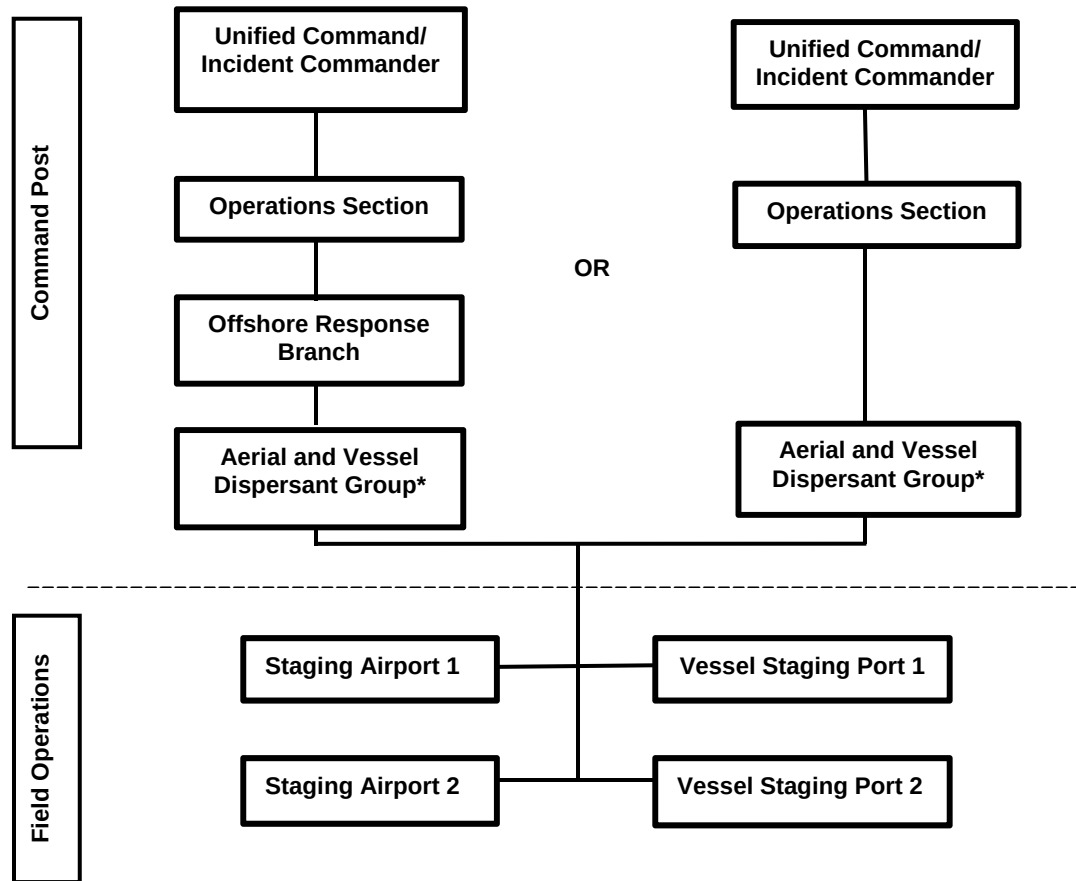
Information provided in this section should be used as guidance in developing a dispersant operations organization, its integration into the overall IMT and the breakdown of functions between the Command Post and various field locations. These recommendations and organizational charts are largely based on what was successfully used during the DWH response.

B. Aerial and Vessel Dispersant Group

Aerial and vessel dispersant application requires a management team in the command post and an operational support team at each aerial and vessel staging base. The recommended organizational structure for each of these teams is described in the following paragraphs and subsections. The responsibilities for each position are described in Appendix A.

The Aerial and Vessel Dispersant Group manages and coordinates all surface dispersant operations and generally reports directly to the Offshore Response Branch as shown in Figure 1-1 and as published in the USCG Incident Management Handbook for the oil spill response. Other IMT structures, such as having the Dispersant Group report directly to the Operations Section Chief or Deputy are equally valid. Plan Holders may use other ICS structures depending on their company policies, spill specifics and the personnel activated. Descriptions and more detailed organizational charts for the Dispersant Group Command Post and the Staging Base components are provided in the following subsections.

Dispersant operations are fast paced. Direct access to the IMT Operations Section Chief is critical for obtaining timely government approval to apply dispersants and to safely coordinate dispersant operations. If the Aerial and Vessel Dispersant Group is placed many levels below the Operations Section Chief, it is difficult to timely obtain operations approvals and make operational adjustments. Because dispersants and their application are very technical and aircraft operations are unique, the Operations chain of command will require the Dispersant Group Supervisor to brief them on dispersant operations and to assist in developing the operational assignments.



* The Aerial and Vessel Dispersant Group coordinates their activities and operations most importantly with the Air Operations Branch and with a number of other ICS branches, groups and units. The organization diagram does not show these interactions as they are numerous. The coordination for aviation safety is more fully described in Section 1-5 C.

Figure 1-1 – Example IMT Organization Chart for Aerial and Vessel Dispersant Group

C. Command Post Aerial and Vessel Dispersant Group

When responding to an oil spill, it is best to over respond by activating all of the response assets that may be needed. Initial reports may not correctly capture the scale of the issue and oil spill situations often change rapidly during the initial stages revealing the need for more personnel and equipment. Therefore, it is important to have a robust dispersant management team in the Command Post to:

- Generate relevant documents for the Incident Action Plan (IAP),
- Provide dispersant technical expertise to the IMT/Unified Command,
- Assist in preparing the dispersant application approval request,
- Develop a daily dispersant operations plan,
- Coordinate dispersant aerial/vessel operations, and
- Document and report on what was accomplished each day.

The number of daily or near daily information requests, technical studies and data needs, asset allocations, etc., made during any spill response cannot be predicted, and are often demanding and time intensive. Successful operations require experienced, knowledgeable experts in the Command Post to keep-up on the response issues including public/risk communications. The Aerial and Vessel Dispersant Group Command Post organizational chart is designed to meet these needs, has been validated during actual response operations and is shown in Figure 1-2.

The “Red” positions are those that should be activated for every spill response involving dispersant application. The other positions should be activated based on the magnitude and needs of the spill response. The roles and responsibilities for each position are provided in Appendix A and a template for listing the names and contact information for each member are provided in Appendix B.

Some of the positions in the Aerial and Vessel Dispersant Group may appear out of place, such as the Dispersant Science Coordinator and the Dispersant Information and Risk Coordinator. However, these positions should be made part of the Dispersant Group because they need to be dedicated to their responsibilities within the group and require close access and collaboration for coordinating their activities and obtaining resources to perform their duties. These two positions also coordinate closely with the Environmental Unit, Public Information Officer (PIO) and Joint Information Center (JIC), and may, as the response progresses, be transferred to these units.

The Aviation Operations Coordinator, Aviation Consultant, GIS Coordinator, and Documentation Coordinator are technical expert positions that require experience in dispersant operations and specialized software to effectively perform their duties. The Aviation Operation Coordinator should be a member of, or have experience with, the Dispersant OSRO so that they know the capabilities of the aircraft and personnel.

D. Airport/Port Staging Base Dispersant Team Organization

The Staging Base Dispersant Team organizations are as important as the Command Post Dispersant Group because this team has responsibility for ensuring that the aircraft and vessels have everything they need to conduct dispersant operations and maintain the readiness of the equipment and personnel. This includes:

- Scheduling and documenting spray sorties
- Working with the Fixed Base Operator (FBO) and Airport or Port Manager on fueling, dispersant transfers and storage, personnel access, and ramping aircraft
- The overall safety of the staging base and field operations and assisting with OSHA inspections.

There are other organizational structures that can be used; however, the structures described below were validated during DWH response and are proven to meet all of the expected and unexpected response needs and the necessary operational coordination and field onsite management.

An example of a typical Airport Staging Base Dispersant Team organization chart is shown in Figure 1-3, and a similar Port Staging Base Dispersant Team organization chart is shown in Figure 1-4. The “Red” positions are those that should be activated for every spill response involving dispersant application. The other positions should be activated based on the magnitude and needs of the spill response. Descriptions of each position are provided in Appendix A and a template for listing the names and contact information for each member are provided in Appendix B.

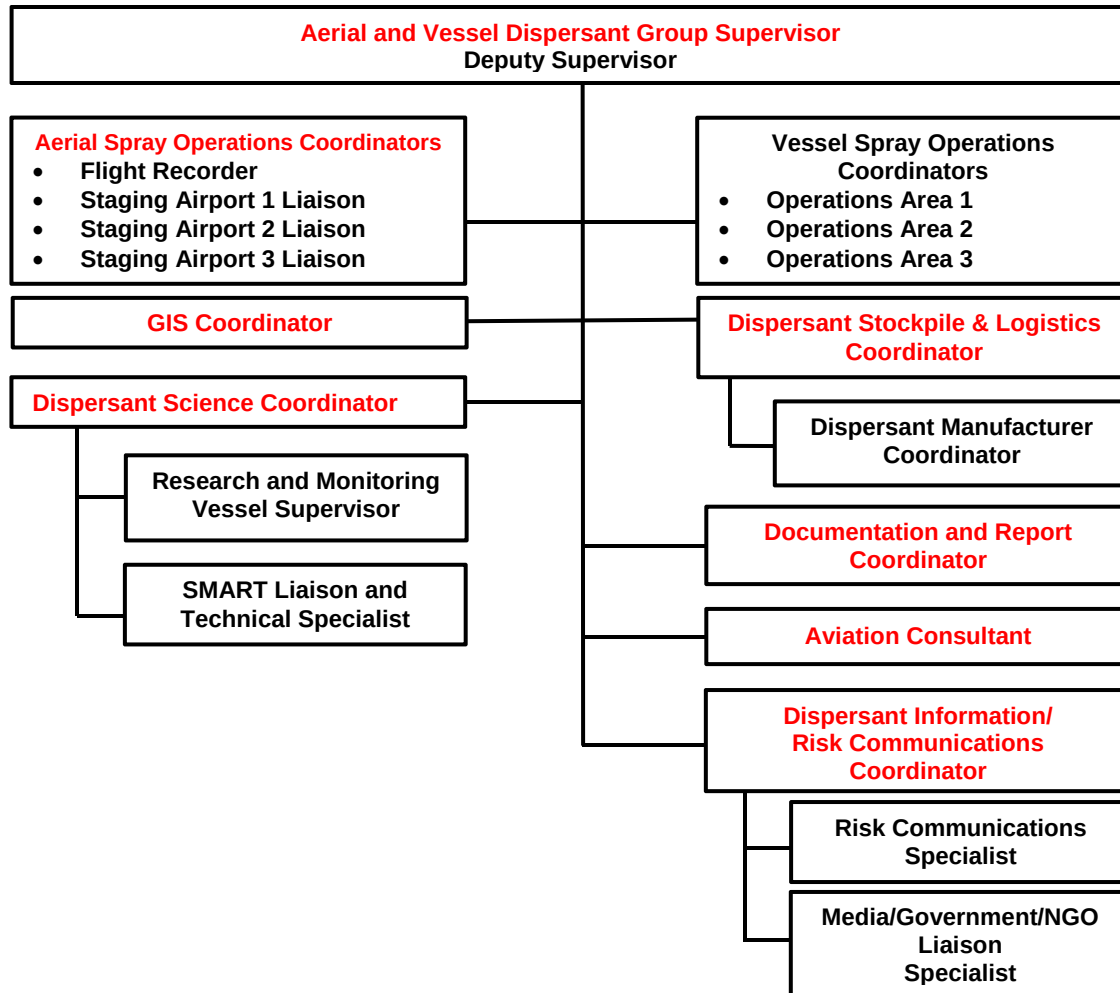


Figure 1-2 – Example Command Post Aerial and Vessel Dispersant Group Organization Chart

There may be additional positions assigned to the Staging Airport by other branches such as an Air Safety Supervisor assigned by Air Operations or a Logistics Coordinator for dispersant stockpiles by the Logistics Section. These positions are not shown on the organization chart as they are not under the management of the Aerial/Vessel Dispersant Group.

The Airport and Port Staging Base Managers should be a member of the Dispersant OSRO providing dispersant application services associated with the staging base. This responder should have knowledge of the aircraft or vessel capabilities and equipment, the pilots or vessel captains and the operating policies and procedures of their company. Additionally, they will be responsible for submitting invoices for services identifying the flight or vessel hours, personnel and other assets and expendables used in the response on a daily basis.

Aerial Surveillance/Observation consultants are included in the Airport Staging Base Dispersant Team staff as experts in identifying oil and reporting on the dispersant application effectiveness. This position provides the Responsible Party with the expertise needed to work with the U.S. Coast Guard SMART teams to ensure accurate reporting of the dispersant spray operation, assessment of the application effectiveness and to assist in evaluating whether to continue or terminate dispersant operations. These Aerial Surveillance/Observation personnel can also be used to monitor the effectiveness of vessel based dispersant applications.

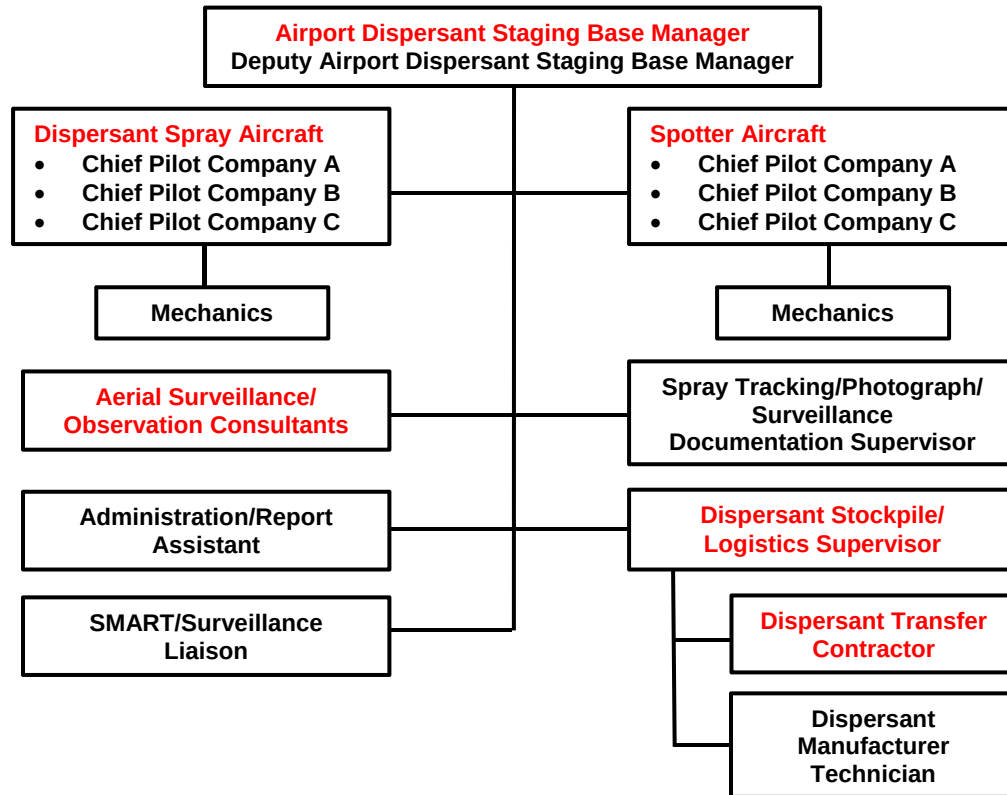


Figure 1-3 – Example Airport Staging Base Dispersant Team Organization Chart

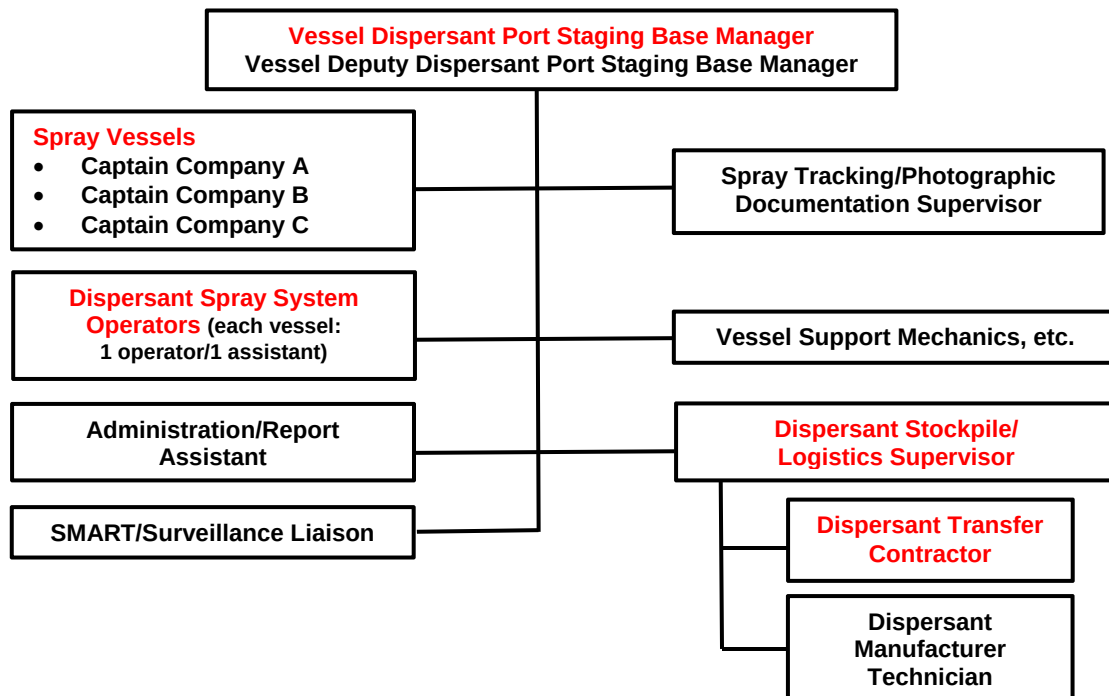


Figure 1-4 – Example Port Staging Base Dispersant Team Organization Chart

1-3 Assessing Dispersant Response Capability

A. Section Purpose and Scope

In the planning process for a particular facility, group of facilities or operations, companies should identify the available dispersant application resources and estimate how much oil can be dispersed. Then a determination should be made if this dispersant capability meets the company's expectations for spill mitigation and meets applicable regulatory requirements. Also, these procedures may be used to answer "what if" questions for changing the number and type of aircraft/vessels or the staging airport(s)/port(s). Therefore, this section provides guidelines and recommendations for accurately estimating and assessing dispersant response capabilities.

The following paragraphs provide a four step procedure for estimating dispersant capability (i.e., the gallons of dispersant that can be applied and the gallons of oil that can be treated and potentially dispersed) with available aerial and vessel dispersant spray assets for a specified oil spill scenario. This information allows responders to design a more effective response to an actual spill situation by activating the appropriate resources. This information also permits assessing the sufficiency of the dispersant response as part of the overall response.

B. Site and Operation Specific Dispersant Capability Estimate

(1) Scenario Description

The first step in estimating dispersant capability for a specific spill scenario involves identifying the spill location, the dispersant staging bases and setting criteria such as how many daylight hours are available for applying dispersants, width/length of the expected spill, dispersant dosage (gallons per acre) to apply, etc. It should be noted that the quantity of the oil spill is not a necessary component in determining capability, but is essential in determining if the capability is adequate for each scenario. Dispersant capability depends mainly on the available spray assets and the location of the spill and the staging bases.

A graphic similar to the example provided in Figure 1-5, should be developed to show the oil spill scenario components (spill location, staging airports/ports, and transit distance to the spill site) that are needed to estimate the dispersant capability. Additional information concerning the type and quantity of oil, description of the source, etc. may be included to provide responders with a better understanding of the spill. If there are multiple facilities and areas, separate graphics or component descriptions should be generated for each, if the scenarios are substantially different.

(2) General Aerial and Vessel Platform Capability

The Dispersant Mission Planner 2 (DMP2) capability calculations in Figure 1-6 are provided to give responders an idea of how much dispersant can be applied and how much oil can be treated by each type of spray aircraft and representative vessel spray systems during a full operational day. These calculations estimate the amount of dispersant an aircraft or a vessel can apply in a 12 hour operational period (average hours of daylight operations) assuming

- a transit distance of 100 nm from the staging airport or port to the spill site,
- a 4 nm pass length for the spill area,
- aerial dispersant application using a race track pattern and a vessel dispersant application using a back and forth pattern,

- a dosage of 5 gallons per acre (gpa) for both aerial and vessel application, and
- loading fuel and dispersant simultaneously.

The 12 hour operational period, 4 nm pass length and 5 gpa dosage are used in this analysis as they are values used in U.S. regulatory materials. See 33 CFR Parts 154 and 155. The 100 nm transit distance was selected as a representative distance for many offshore facilities.

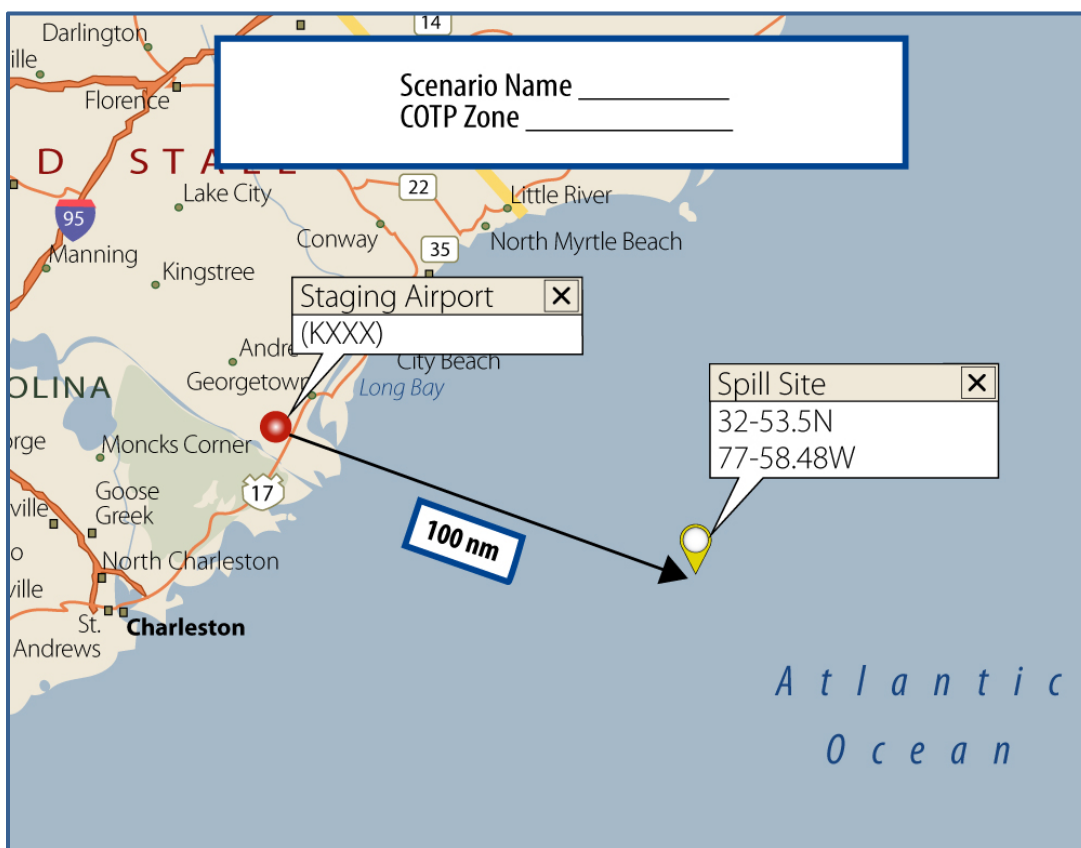


Figure 1-5 – Site Specific Scenario Components

Aircraft	Payload (gallons)	Estimated Dispersant Application Capability 12 Hour Day (gallons)	Estimated Amount of Oil Treated 12 Hour Day * (gallons/barrels)
C-130 with ADDS Pack	5,000	15,000	300,000/7,143
C-130A Internal Spray System	3,250	15,000 **	300,000/7,143**
BT-67	2,000	10,000	200,000/4,762
DC-4	2,000	8,000	160,000/3,810
DC-3	1,200	4,800	96,000/2,286
BE-90	350	2,800	56,000/1,330
Large OSRV	3,000	2,435***	48,700/1,159
Small OSRV	1,000	1,000	20,000/476

* Estimated amounts of dispersant applied are based on a 5 gpa dosage and a DOR of 1:20 to treat a 0.1 mm thick oil slick (solid black or brown in color) and a 100 nm transit distance to the spill site. No estimate for effectiveness is provided as this can range from 50-90% or more depending on the oil, weather conditions, etc. DORs of 1:40 or more may be used for planning, if these dosages are known to be effective for the oil.

** Under the specific assumptions described above, a plane with a smaller payload may be able to treat a similar volume of oil as a plane with a larger payload, since the larger 5000 g payload takes considerably longer to apply dispersant and to reload. In this particular case the smaller payload aircraft (3,250 g) is able to make more sorties than the larger aircraft; thus applying the same amount of dispersant during the 12 hour operation day.

*** Large OSRV capability calculation is for how much dispersant can be applied by having the dispersant stockpiles resupplied by other vessels to the OSRV at the offshore spill site. With the OSRV in port at the beginning of the operational day, there would be no application on Day 1 of the spill because the mobilization time and transit time to the spill site at 10 knots would be greater than 12 hours.

Figure 1-6 – Estimated Aircraft Dispersant Application Capability and Amount of Oil Treated

(3) Dispersant Spray Asset Capability Evaluation

The table shown in Figure 1-7 should be completed by using the DMP2 software to estimate the amount of oil that can be dispersed by the available spray assets over a three day operating period for each scenario described above. The DMP2 software can estimate how many sorties per day can be conducted and the quantity of dispersant that can be applied by each spray aircraft and vessel. DMP2 software is available at the NOAA web site: <http://response.restoration.noaa.gov/dmp2>.

Standard criteria used for regulatory compliance calculations of dispersant capability are pass length, utilization time, Dispersant to Oil Ratio (DOR) and dosages. However, all of the criteria used in the calculations may be changed to better reflect actual operational criteria.

In completing the right-hand column in the table in Figure 1-7, a value for the effectiveness of the dispersant on the oil must be used for the calculation. The effectiveness will depend on the properties of the crude oil/product spilled, environmental conditions, the dispersant type applied, DOR used, weathering of the oil, etc. Please refer to Section 1-11 for more information about oil dispersibility.

(4) Dispersant Stockpile Evaluation

The table shown in Figure 1-8 can be used to estimate the dispersant stockpile amounts and delivery times to the staging base(s) to ensure that the spray aircraft and vessels will have no delays in spraying due to lack of onsite dispersant stockpiles. The table can also be completed to verify that dispersant stockpiles can be delivered to the staging airport to meet aircraft spray needs for the particular scenario.

The amount of dispersant that can be delivered to the staging airport/port on each day should be compared to the daily dispersant capability totals in Figure 1-7 to determine if supplies are sufficient and can be timely delivered to the designated staging site(s). This will ensure adequate dispersant supplies are available to meet the requirements for each scenario.

Figure 1-8 is intended to assist with compliance with the U.S. regulatory requirements of:

- Day 1 – 8,250 gallons for the Gulf of Mexico and 4,125 gallons everywhere else
- Day 2 and Day 3 – 23,375 gallons each day.

Additional guidance for U.S. regulatory compliance for the times and quantities of dispersant stockpiles to arrive at the staging airport are provided in USCG Policy Letter on Oil Spill Removal Organization (OSRO) Classification Program dated April 24, 2013.

A listing of all dispersant stockpiles in the United States and Canada as of October 1, 2013, are provided in Appendix C. The stockpiles owned by a company or immediately available through a cooperative or OSRO should be highlighted so responders will know which ones to access first. An inventory of globally available dispersant stockpiles is available from Oil Spill Response, Ltd. (OSRL) for their members.

Aircraft/ Home Airport	Payload (gallons)	Estimated Dispersant Capability *				Estimated Amount of Oil Dispersed **			
		(gallons)				(gallons/barrels)			
		DAY 1	DAY 2	DAY 3	Total	DAY1	DAY 2	DAY 3	Total
OSRO 1									
Aircraft 1 (xxxx)									
Aircraft 2 (xxxx)									
Aircraft 3 (xxxx)									
OSRO 2									
Aircraft 4 (xxxx)									
Aircraft 5 (xxxx)									
Vessel 1 (xxxx)									
OSRO 3									
Aircraft 6 (xxxx)									
Vessel 2 (xxxx)									
TOTAL	-----								

* Calculations are prepared by using Dispersant Mission Planner 2 (DMP2) for a spill that is ___ nm wide, ___ nm from the staging airport, applying a dosage of 5 gallons per acre, spraying for a full 12 hour day using a _____ pattern. Day 1 capabilities are calculated based on the aircraft being activated at the beginning of the operational day. This provides a conservative (minimum) Day 1 estimated capability.

Mobilization times for aircraft are OSRO 1 ___ hours, OSRO 2 ___ hours, OSRO 3 ___ and OSRO 4 ___ hours from activation. Capability values are rounded down to the nearest 100 gallons.

The capability listed represents 100% effectiveness for the DOR applied.

** Estimated amounts of oil dispersed are based on a ___% effectiveness value for the dispersant which vary due to the crude oil/product, dispersant, etc.

Figure 1-7 – Site Specific Scenario Dispersant Capability Table
Estimated Dispersant Capability for (Insert Asset/Location Name)
Using Staging Airport (Insert Airport Name & Location)

No.	Stockpile Location	Stockpile OWNER	Dispersant Name	Amount (gallons)	Cascade Time to Staging Airport * (hours)	Estimated Arrival at Staging Airport Date/Time	Running Total (gallons)
DAY 1							
1							
2							
3							
DAY 2							
4							
5							
6							
7							
8							
9							
10							
DAY 3							
11							
12							
13							
14							

* Calculations may be based on 2 to 4 hours stockpile mobilization time and an over-the-road transit speed of 50 mph for realistic transit times. The road distances between stockpile locations and staging bases may be obtained from Google Earth or other software. U.S. regulations should be consulted regarding over the road transit speeds and mobilization time. If stockpiles are air freighted, estimates of the arrival time will need to be developed that include aircraft mobilization time to the loading airport, stockpile mobilization time and transit times to the loading airport, cargo loading times, and finally aircraft transit time to the dispersant staging airport which will depend on the specific freight aircraft used.

**Figure 1-8 – Dispersant Stockpile Logistics Plan
Staging Airport or Port (Insert Airport or Port Name and Location)**

C. Integration of Dispersant and Other Response Capabilities

Using the above dispersant capability analysis the company should determine if the dispersant response component is sufficient when considering all of the response tools the company has available. It is the company's responsibility to determine the sufficiency of their response assets for the risk posed. No guidance is provided as to what dispersant capability is sufficient, because this will vary greatly due to spill scenarios and the total available response assets.

An estimate of the total amount of oil that theoretically can be recovered and treated using all of the response tools (skimming, dispersants and in-situ burning) can be calculated by using the Response Options Calculator (ROC) software. ROC software is available at the following website: <http://www.genwest.com/roc/>. The dispersant component of this software is based on the DMP2 algorithms. Other spill modeling software packages (e.g., OSCAR, SIMAP) may also be used in assessing the selection and capability of the response resources and techniques.

1-4 Dispersant Authorization Policies

A. Purpose and Scope

This section describes dispersants authorization policies accepted in the United States and provides references to the dispersants plans developed by several of the Regional Response Teams (RRTs). Area Contingency Plans (ACPs) should also be consulted as they may contain additional guidance and procedures for obtaining approvals and applying dispersants.

B. Authorization Policies

To become familiar with the appropriate dispersant authorization process the company should first determine whether the area of the potential dispersant application is located in a pre-authorized, case-by-case, or excluded dispersant application area. If in a pre-authorized or case-by-case area, the company must then determine which RRT has jurisdiction over the spill site area. Although similar, each RRT has its own dispersant use policies, procedures and approval forms.

It is recommended that the company review, in advance, the RRT dispersant documents for your geographical area(s) to ensure that, during a spill response, you follow the appropriate RRTs guidance for dispersant approval. Additionally, it is helpful to know the FOSC and members of the RRT for your area and understand the dispersant forms, process and information they will use to approve dispersants for a spill response. Attending RRT meetings, which are open to the public, is a means to meet decision makers and stay abreast of dispersant and other response changes. Conducting a table-top exercise with RRT members or participating in a dispersant exercise with the RRT is a good way to learn about, and to gain experience in, how the dispersant approval process works in your area.

The following sections describe various dispersant zones in the coastal areas around the U.S., where dispersants are approved for use. Specific RRT dispersant application procedures and forms are discussed in Section 2-3 of Part 2 – Operations with associated forms provided in Appendix D. The websites where the RRT Dispersant Plans are located are provided in Section 1-4 D below for the plan preparer to review and use as deemed appropriate.

C. Dispersant Offshore Application Areas

The following paragraphs describe the general RRT designations of coastal waters for dispersant application and the RRT jurisdictions and pre-authorized areas are shown in Figure 1-9. The specific RRT plans should be reviewed to determine if any changes should be made to the descriptions. It should be noted that web site information may not reflect the most current RRT policies so the FOSC and/or RRT should be directly contacted to confirm where dispersant may

be sprayed. Some RRTs, such as RRT3 in Delaware Bay, have additional dispersant approval areas. Plan Holders should add the specifics for their particular operating area to their plans; Figure 1-9 may be modified or expanded in the Plan Holders plan to more clearly show the dispersant approval areas, marine sanctuaries, etc. that are applicable to their operations.

(1) Pre-authorization Areas

These areas are the offshore waters where the RRT has pre-authorized the use of dispersants and has delegated the FOSC authority to approve dispersant use without further consultation with the RRT, if the spill meets specified criteria. The FOSC is provided a checklist of information to complete in making the dispersant use decision. This checklist varies for each RRT in both format and content. The FOSC will immediately inform the RRT whenever the pre-authorization authority to apply dispersants is exercised.

(2) Case-by-Case RRT Authorization Areas

Case-by-Case authorization areas (usually near shore areas with relatively shallow water depths) require authorization to use dispersants by the members of the RRT (USCG, EPA, and the affected State(s), with the Department of the Interior (DOI) and Department of Commerce (DOC) being consulted). This authorization requires RRT members to approve dispersant use for the specific situation presented and often will require additional information and a net environmental benefit analysis.

(3) No Dispersant Areas: These are inland water areas, offshore marine sanctuaries or other protected offshore or near shore areas. RRT guidelines should be reviewed for details of these areas and for the notification requirements when dispersants are used in adjacent areas.

D. RRT Dispersant Plans

When pre-planning for dispersant application the specific dispersant response policies, procedures and forms for coastal RRTs associated with the company's facilities or operations should be identified and included in the plan. The following is a list of web links that can be accessed to obtain the applicable RRT dispersant authorization information. The dispersant plans may also be accessed via the U.S. Coast Guard website by clicking on the "Port Directory" tab, then selecting the applicable USCG Sector/COTP office, then scrolling down on the right side of the page to find the "Area Contingency Plan" which will provide specifics on dispersant application in the area. The link to the website is <https://homeport.uscg.mil/mycg/portal/ep/home.do>. If there are questions, personnel in the USCG Captain-of-the-Port office should be contacted.

RRT 1, 2, 3 and 4 <http://www.rtt.nrt.org/>

RRT 6 **FOSC Dispersant Pre-authorization Guidelines and Checklist**
http://www.losco.state.la.us/pdf_docs/RRT6_Dispersant_Preapproval_2001.pdf
Near Shore Environment Dispersant Expedited Approval Process and Checklists
http://www.losco.state.la.us/pdf_docs/RRT6_Nearshore_Dispersant_EAP_031605.pdf

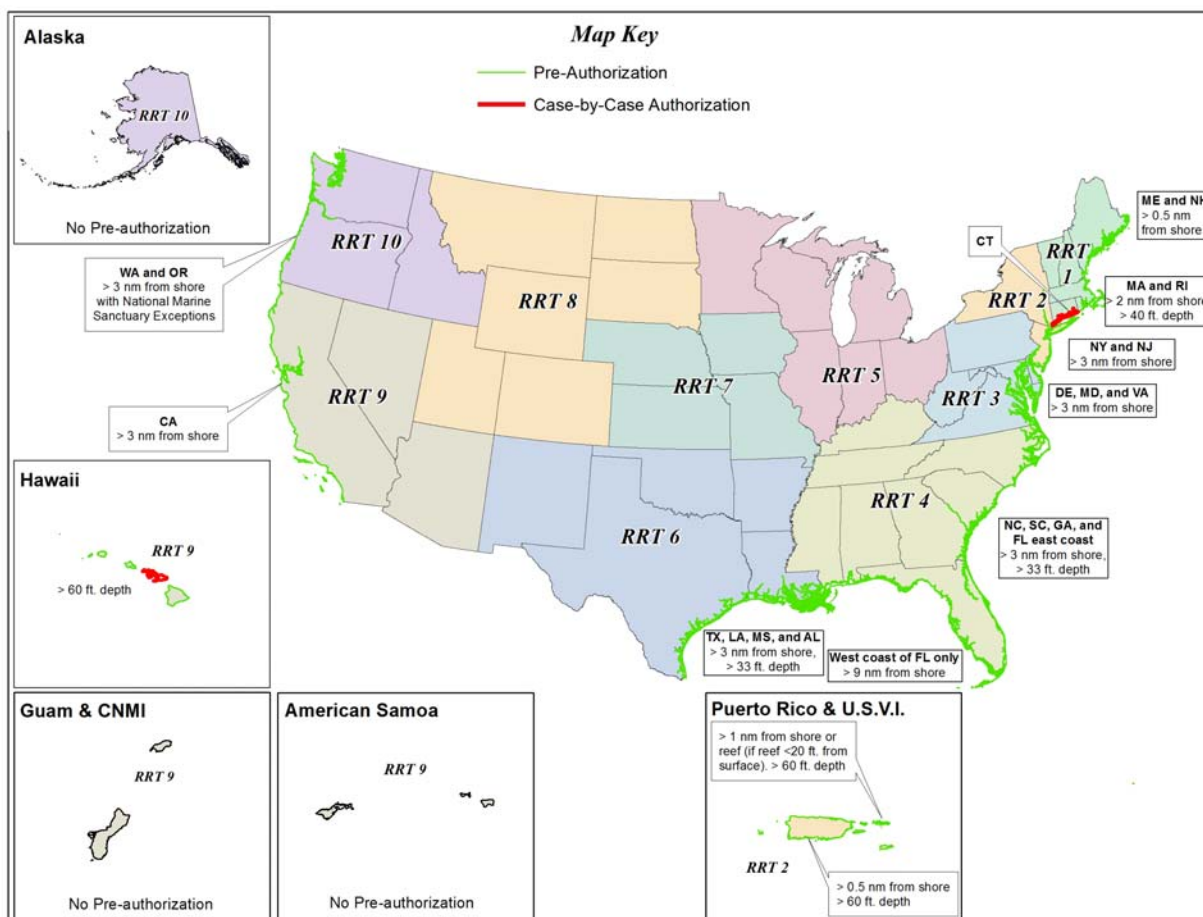
RRT 9 **California Dispersant Plan and Federal On-scene Coordinator (FOSC) Checklist for California Federal Offshore Waters**
<http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=15889>
California Area Contingency Plans (ARPs)
<http://www.rtt9.org/go/doctype/2763/50275>

RRT 10 **Section 4610, Northwest Area Contingency Plan**
<http://www.rtt10nwac.com/NWACP/Default.aspx>

CRRT **Caribbean Regional Response Team** <http://www.crrt.nrt.org/>

ORRT **Oceania Regional Response Team** <http://www.oceaniarrt.org/go/doc/3911/1039647/>

To assist in authorizing the use of dispersants, the application should contain technical information on identifying oils that can be dispersed, dosages that should be applied, the use of trial spray passes, etc. Each RRT has slightly different information requirements, policies and procedures which are of considerable length so will not be reiterated herein.



* Note: The State of Florida has withdrawn their pre-authorization for dispersant application in state waters. Therefore, the west coast of Florida pre-authorization area is 9 nm offshore. See RRT 4 for additional information on the Florida pre-approved area.

Figure 1-9 – RRT Dispersant Application Pre-authorized Areas (as of July 2013)

E. Reference Information

There are excellent publications that provide technical information on individual dispersants, how dispersants interact with the oil, appropriate application techniques and dosages, and descriptions of how to determine when the dispersant is effective. The following is a partial list of dispersant publications that may be consulted for dispersant application technical information. Dispersant OSROs will also have training materials and application information and procedures for their dispersants and spray equipment.

- ExxonMobil Oil Spill Response Field Manual (2008)
- Open Water Oil Identification Job Aid (NOAA 2007)

- Dispersant Application Observer Job Aid (NOAA)
- Introduction to Observing Oil from Helicopters and Planes (NOAA)
- Use of Dispersants to Treat Oil Spills (ITOPF Technical Information Paper)
- Using Dispersant to Treat Oil Slicks at Sea – Airborne and Shipborne Treatment (CEDRE 2005)
- Oil Spill Dispersants (Alun Lewis and SINTEF 2001)
- IMO Guidelines for the Use of Dispersants for Combating Oil Pollution at Sea, 2013.

1-5 Health and Safety Plan for Aerial and Vessel Dispersant Application

A. Section Purpose and Scope

The health and safety of responders is the number one priority in dispersant operations. It is the responsibility of every responder to ensure that the operations they are conducting or are supervising are performed in the safest manner possible.

A Health and Safety Plan should be prepared for every dispersant response. As part of the pre-planning process, a template should be developed to facilitate rapid preparation of a health and safety plan for aerial and vessel dispersant operations. The organization of the Dispersant Operation Health and Safety Plan should follow the Plan Holder's format. The IMT Safety Officer will be responsible for ensuring the plan is completed and integrated into the overall Incident Safety Plan. Because these plans are company specific, detailed guidelines are not included in this section. A description of the aviation safety network and the interaction among aviation safety professionals is provided in Section C below.

B. General Guidelines

The key health and safety operational procedures and personal protective equipment for the various dispersant activities are provided in Appendix E. The supervisors of the dispersant staging airports and ports are responsible for the safety of operations at the staging locations and the aircrafts' Pilot-In-Charge (PIC) and the vessels' captain are responsible for the safety of operations under their supervision. The leader/supervisor of spray equipment teams, monitoring teams and other teams dispatched to operate on either dispersant aircraft or vessels are responsible for the safe operations of their team members and of their equipment. However, the overall responsibility for safety remains with the PIC and the vessel's captain should there be any difference of opinion on safety issues.

C. Aviation Safety

Aviation safety is a critical aspect of dispersant operations as dispersant application involves multiple aircraft working together at low altitudes in offshore areas often out of the sight of land. Aviation Safety during a response relies on a network of safety professionals working together to ensure the safe operations. For dispersant operations this safety network consists of the IMT Safety Officer, who has overall incident safety responsibility, and members of the Air Operations Branch, Aviation Consultant in the Aerial/Vessel Dispersant Group, OSRO safety managers, safety managers/organizations of the contracted dispersant aircraft companies and most importantly the Pilots-In-Charge (PICs) of the dispersant aircraft. The Dispersant Aviation Consultant works closely with Air Operations Branch by attending the daily Air Operations briefings and meetings and assisting in developing aviation procedures to ensure dispersant activities are represented, fully coordinated and integrated with overall air space management.

The Aviation Consultant also meets with and coordinates the aviation operations procedures with the aviation staging base personnel. This network provides both the experience in aviation operations as well as dispersant application to enable sound safety plans and operational procedures to be developed and timely communicated and executed.

The OSRO and its dispersant aviation contractors will prepare safety and operational plans for the operations at the staging airports they are assigned. This staging base safety and health plan will be prepared based on the standard operating and safety procedures that are part of each aviation contractors Operational Plan and which are exercised during annual training and dispersant application flights. During a response the contractor safety and operational plans will incorporate the guidance and procedures that are developed by the Air Operations Branch for the specific spill incident (i.e., separation distances, communications frequencies, etc.).

During a response the Air Operations Branch will prepare guidance that will apply to all aircraft operators and operations (e.g., surveillance aircraft, logistics aircraft, observation aircraft, etc.) and will cover the areas described below. Examples of this guidance are not provided as it will depend on the specifics of the spill incident and the plan holders aviation policies and procedures.

- Request Temporary Flight Restrictions (TFRs) or other necessary operational restrictions on air space
- Establish coordination procedures for aircraft operators
- Establish flight and duty hour time limits for pilots and ground support personnel. It should be noted that additional flight and/or support crews may need to be activated to ensure flight duty hour limits are met.
- Coordinate and publish air-to-air and ground-to-air radio frequencies
- Set altitude separation, entry & exit point operational criteria, check-in and check-out and safety stand down procedures, and other criteria for de-confliction and management of air operations throughout the response area
- Coordinate and publish air traffic control procedures
- Develop Aviation Site Safety Plan as part of the Incident Safety Plan prepared by Incident Safety Officer
- Prepare aviation accident-near-miss investigation procedures and conduct investigations
- Prepare guidance on conducting mission and flight risk assessments and the frequency of risk assessments
- Assign aviation safety personnel to staging bases, as needed.

1-6 Dispersant Application Systems and Operations

A. Section Purpose and Scope

Prior to obtaining authorization for dispersant use, the FOSC or RRT will likely require documentation that the dispersant application system has been designed and tested to satisfy applicable regulatory requirements. See 33 CFR Parts 154 and 155. Therefore, the company should become familiar with those standards and, as part of the pre-planning process, ensure

the available systems are compliant. This documentation should be prepared in advance and be available to include in the dispersant authorization application, if requested by the FOSC or RRT. Consequently, this section provides some background on aerial and vessel dispersant application systems as well as design and calibration information.

B. Application System Standards

There are numerous aerial and vessel dispersant application systems that are available from commercial sources or that have been specially fabricated for specific aircraft or vessels. All dispersant spray systems must satisfy applicable regulatory requirements to meet ASTM Standards for droplet size and distribution, dosage and swath width for the planned application speed and height off the water. See 33 CFR Parts 154 and 155. It would be prudent for the Plan Holder to request and review test and calibration data from the Dispersant OSRO to ensure the OSRO application systems are in compliance with ASTM Standards. Specifically this data should include up-to-date dosage spray charts for each spray asset and documentation that spray operations are being recorded, including where each spray pass is conducted and its associated information.

C. Aerial Dispersant Application System and Operations

Aerial spray systems only apply dispersant neat (pure, i.e., without any dilution with water) due to their high application speeds. Before being FAA certified to apply dispersants, all aircraft must have their spray system installation engineering plans approved by the FAA and flight tested to ensure the aircraft can operate safely while applying dispersant. The aircraft must also comply with other FAA requirements for offshore operations.

Aerial spray systems, prior to use, must be tested to ensure proper operation (i.e., no leaks), steady flow through the nozzles and that the spray systems can apply the proper dosage, droplet size and droplet distribution at the application altitude, speed and swath width according to ASTM standards.

Additionally, a Dosage Spray Chart should be available on the aircraft showing the dosages that can be applied at various application speeds and boom pressures for each dispersant that will be used. An example of the Dispersant Application (Dosage) Spray Chart is provided as Figure F-1 in Appendix F.

D. Vessel Dispersant Application System and Operations

Newer vessel boom spray systems apply dispersant neat (pure, without any water dilution) and older spray systems mix the dispersant with water usually via an overboard eductor system. All vessel spray systems should be tested to determine compliance with ASTM Standards for swath width, droplet size and distribution and application dosages. A Dosage Application Chart for each vessel, similar to that shown in Figure F-1 in Appendix F for aerial application, should be available on the vessel. The Dosage Application Chart provides the dosage applied for various boom pressures and application speeds.

Vessel fire monitor systems may also be used to apply dispersants. These systems will require dilution of the dispersant with sea water and these systems must comply with the requirements of ASTM F2465, Standard Guide for Oil Spill Dispersant Application Equipment: Single-point Spray Systems.

1-7 SMART (Special Monitoring of Applied Response Technologies) Operational Key Actions and Activities

A. Section Purpose and Scope

- (1) In order to obtain authorization to use dispersants, the FOSC or RRT will require that a monitoring program be in place primarily to evaluate dispersant effectiveness. Other monitoring or sampling may also be required for response personnel's potential exposure to airborne dispersants or water column samples to determine hydrocarbon and/or dispersant concentrations at various depths. In any case, the widely accepted SMART protocols will generally be used to conduct the monitoring. Therefore, this section is intended to enable Plan Holders to become familiar with SMART such that they can rapidly develop a fit for purpose monitoring program in the event of a spill where dispersants are a viable option.
- (2) SMART is an option available for the Unified Command to assist in decision-making. While every effort should be made to implement SMART or parts of it in a timely manner, dispersant application should not be delayed to allow the deployment of the SMART team, unless required by the FOSC.

B. SMART Monitoring Overview

SMART is a monitoring program developed by U.S. government agencies and consisting of standardized, scientifically-based monitoring protocols for providing real-time field data on dispersant effectiveness. It has been adopted by the RRTs as their monitoring procedure and implemented by USCG monitoring teams.

SMART monitoring provides the Unified Command with a confirmation that the dispersants are applied according to plan and that the dispersants are effective in dispersing the oil into the water column. It may be required to be in place prior to the initial application as part of the FOSC dispersant approval process.

It should be noted that changes are being developed to the SMART protocols. One change that will be made is adding a Quality Assurance/Quality Control (QA/QC) form that will review the SMART field information and determine if the dispersant:

- was effective,
- was not effective, or
- the observations were inconclusive.

A draft SMART QA/QC Form is provided in Appendix G.

C. SMART Monitoring Tiers

SMART recommends a three-tiered approach for dispersant monitoring. These tiers are unique to dispersant monitoring and should not be confused with response tier categories. The following paragraphs briefly describe the SMART monitoring tiers:

- **Tier I** is the visual observation by trained observers, usually from aircraft, to determine the dispersant application effectiveness. The Responsible Party may need to provide an aircraft for the SMART observers. A list of fixed wing aircraft and helicopter companies that can provide aircraft for SMART observations and other surveillance activities should be

prepared in advance. A template for compiling aircraft information is provided below in Figure 1-10.

- **Tier II** consists of towing a fluorometer under the oil slick before and after dispersant application to determine the increase in oil droplets in the water column at 1 meter depth. Water samples may also be taken for later analysis.
- **Tier III** expands the fluorometry monitoring to two depths, usually 1 m and 10 m, and may incorporate a portable water laboratory to determine water temperature, pH, conductivity, turbidity, etc.

Aircraft Companies That Can Provide Suitable Offshore Surveillance Aircraft			
____ STATE			
Aircraft Company	Phone Number	Aircraft Available #-Type-#passengers	Comments

Figure 1-10 – Template for Pre-identifying Surveillance Aircraft

SMART document version 8 dated 2006 can be obtained at the following web site: http://docs.lib.noaa.gov/noaa_documents/648_SMART.pdf. Included in the SMART guidelines is a syllabus for training personnel to conduct Tier I, II and III observations and monitoring and the forms to record pertinent information.

D. General Operational and Equipment Information

To conduct effective SMART monitoring there are many procedures that should be followed to facilitate joint operations and improve communications, reporting and overall dispersant application. These procedures, as well as the aircraft and vessel requirements for conducting SMART monitoring, are described in Appendix G.

Most RRTs state that monitoring should not delay dispersant application and does not have to be initially conducted. It is a good practice to have SMART Tier 1 monitoring, so fixed wing monitoring aircraft should be identified and immediately made available during a response. It has been found that, unless the SMART monitoring team works closely with the aerial and vessel dispersant group, it is difficult, if not impossible, for the SMART team to be in position for aerial observations. It is even more important in the case of Tier II and III monitoring as vessels need to be in position outside of dispersants spray zone, but near the application area to conduct fluorometry and water sampling of the dispersed oil immediately after the application is completed.

1-8 Dispersant After Action Report

A. Section Purpose and Scope

After Action Reports (AARs) are generally required to record many aspects of the dispersant operations conducted and to capture associated lessons learned to continually improve aerial and vessel dispersant application operations. Therefore, the Dispersant Group members should become familiarized in advance with the AAR topics and the critical information to record daily to enable more accurate reporting upon termination of the response.

Some RRTs have detailed requirements for AARs such as topic sections and a time frame in which to submit the after action report. Other RRTs simply require that a report is submitted to them. This section provides an overview of the AAR and checklists that can be used to develop an AAR following an incident. The AAP should be structured for the specific response and may not contain information on all of the topics listed in the Table of Contents below.

B. Report Overview

It is important to document the actions taken during a response, analyze their effectiveness, and develop lessons learned to improve future responses. Separate aerial and/or vessel dispersant AARs should be prepared to ensure all activities conducted, the accomplishments of the operations as well as the lessons learned are captured. It is also important to document the monitoring conducted and the conformance of operations with FOSC/RRT government direction.

The Aerial and Vessel Dispersant Group will prepare the AAR and should submit the report to the Operations Section Chief, or others as directed, within 45-60 days of the termination of surface dispersant operations or as otherwise required by the RRT or Unified Command. The report should provide the amounts, types, and locations of the dispersant applied on a daily basis, the OSROs, aircraft and vessels activated and a review of the lessons learned.

C. Table of Contents

- (1) The following Table of Contents is based on RRT 6 guidance for the preparation of the dispersant after action report. The report should be structured for the duration, magnitude and complexity of the spill response and may not include all of the sections listed.

AFTER ACTION REPORT TABLE OF CONTENTS

- Incident Overview
- Oil Slick Trajectory and Behavior
- Justification for Dispersant Use
- Chronology (Date and Time) of Dispersant-Related Events
- Overview of Dispersant Operations
- Completed Dispersant Application Form
- Lessons Learned

Suggested outline for the report: The report should be tailored to the complexity of the spill response. Not all of the sections identified below may be necessary.

Incident Overview

- Description of initial report (date, time, source, etc.)
- Spill source
- Spill location
- Estimated quantity & potential quantity
- Environmental conditions

Oil Slick Trajectory and Behavior

- Expected movement of slick

- Expected weathering and behavior of product
- Observations of same

Justification for Dispersant Use

- Potential impact areas and their respective sensitivities to impact
- Location of the spill relative to the dispersant approval areas
- Potential for use of other recovery methods (e.g., mechanical recovery, in-situ burning)
- Weather and sea state

Chronology (Date and Time) of Dispersant-Related Events

- Government notification of spill
- Reconnaissance aircraft requested
- Reconnaissance aircraft "wheels up"
- Monitoring initiated and monitoring assets
- Reconnaissance aircraft on-scene and reports
- Source and field sample requested
- Dispersant use approved under guidelines
- Dispersant asset operators notified
- Dispersant stockpiles requested
- Dispersant stock en-route
- Dispersant stocks arrive at airport/dock
- Spotter aircraft "wheels up"
- Dispersant aircraft/boat "wheels up"/left dock
- Spotter aircraft on-scene
- Dispersant aircraft/boat on-scene
- Source and "in-water" sample collected
- First application
- Spotter aircraft opinion of efficacy and continued reports
- Additional applications, Spotter aircraft opinions, and sampling (as required)
- Termination of dispersant operation

Overview of Dispersant Operations

- Map indicating dispersant operating area(s) and exclusion zones
- Amounts and times of dispersants applied
- Any extenuating circumstances affecting the deployment of any element (spotters, dispersant, etc.)
- Estimates and observations of efficacy
- Any discrepancies between estimates
- Any discrepancies between observations

- Any sightings of pelagic/migratory birds, sea turtles, or marine mammals

Lessons Learned

- Statement of the Lesson Learned
- Discussion of the response issues that generated the lesson learned
- Recommendations for improving response operations

1-9 Training, Exercises and Oversight

A. Section Purpose and Scope

Annual training and exercises are needed to educate and prepare responders for their responsibilities, to test activation procedures and to ensure dispersant response readiness of service providers. The basic tenant is, "Train and exercise the same way you respond." It is the responsibility of the Plan Holder to ensure that their response team(s) and dispersant service providers participate in reasonable training and exercise programs to ensure response readiness. The training and drill program developed by the Plan Holder with respect to dispersant application should be included in their oil spill response plan or a separate dispersant preparedness plan. This section describes the types and frequency of training and exercises recommended for dispersant operations. Guidelines for an audit program are also provided.

B. Program Overview

The training, exercises and oversight actions below are divided into three sections. Section C includes the activities that the Plan Holder's IMT should conduct, and Section D includes the activities that the Plan Holder's dispersant service provider should conduct and Section E provides audit guidelines. Although the Section D activities are performed by the service provider, it is the Plan Holder's responsibility to verify that the Dispersant OSRO meets the U.S. dispersant regulatory requirements. Additionally, the USCG has published detailed guidelines on how they will classify dispersant OSROs to meet the regulations. Consequently, Section E provides guidelines for conducting audits to ensure dispersant service providers are meeting the regulatory training and exercise requirements, properly conducting equipment maintenance and calibration, and ensuring the effectiveness of dispersant stockpiles. These audits may be conducted by the Plan Holder or the Plan Holder may accept the audits conducted by the OSRO or OSRO members.

The Coast Guard and the Bureau of Safety and Environmental Enforcement (BSEE) are updating the National Preparedness Response Exercise Plan (NPREP) program to establish exercise requirements for aerial and vessel dispersant operations for compliance with U.S. dispersant regulations. As changes to the NPREP are published, the Plan Holder should revise this section of their plan to reflect the most current requirements. Currently the proposed NPREP guidance published in January 2014 states that an annual exercise should be conducted of "Each dispersant package listed in the plan and relied on by the plan holder in meeting response equipment capability requirements, including dispersant delivery vehicles, application equipment, and dispersed oil plume monitoring equipment."

The Section D activities performed by the Dispersant OSRO are equally credited to its other members, i.e., Dispersant OSRO's are not required to conduct every exercise with each plan holder. Plan Holders should maintain records of the training and exercises conducted by their OSROs.

C. Company IMT Training and Exercise Activities

(1) Aerial and Vessel Dispersant Group Table-Top Exercises

The Plan Holder's Incident Management Team (IMT), Qualified Individual (QI) and members of the Aerial and Vessel Dispersant Group should train and participate periodically (recommend annually) in a table-top exercise simulating dispersant application with the Dispersant OSRO to ensure familiarity with the dispersant plan. Company IMT participation in Dispersant OSRO field exercises is encouraged so they become familiar with operational procedures and equipment.

The designated QIs should participate in the exercises to review the activation procedures and activities listed in the dispersant activation checklist provided in Part 2. The exercise may include reviewing the dispersant authorization procedures and may include contacting the local USCG Captain of the Port to obtain authorization to use dispersants. QI participation in IMT exercises with activation of dispersant assets would also meet the purpose of the dispersant exercise and training. These exercises can be conducted in person or by telephone and can be of short duration. The main purpose is to provide an opportunity for the QI to review the dispersant activation checklist, procedures and processes.

Unannounced table-top exercises may also be conducted annually for QIs and Operations Section Chiefs to review activation procedures, activities and contact information and ensure knowledge of spray equipment and RRT approval procedures. These exercises should be short, 1 or 2 hours, to exercise the most important activities to the activation checklist.

(2) Field Equipment Deployment Exercises

Periodically, a field exercise with the IMT members and the Dispersant OSRO should be conducted to exercise, in real-time, all aspects of dispersant operations. The purpose is to demonstrate the ability to deploy, operate and maintain the equipment and to manage the overall operations.

D. Dispersant OSRO Activities

The following exercises should be conducted by Dispersant OSROs to ensure the readiness of their equipment, pilots and support personnel and to ensure the spray equipment is operating in compliance with ASTM Standards. It is a reasonable expectation that Dispersant OSROs will have instituted their own exercise program. Plan Holders should observe and/or verify that the below or similar exercises are successfully conducted. An example of what an OSRO exercise program should entail is described below. The Dispersant OSRO should confirm annually that the exercises were successfully conducted. Plan Holders and OSROs will comply with the new dispersant exercise requirements in the NPREP when they are published.

Spray and Spotter Aircraft Training and Exercises

The spray and spotter joint exercise is important to review and practice communication procedures to direct spray aircraft on the spill, prepare joint flight plans, and review joint operational procedures. Suggested training and exercise activities include:

- Spray and spotter aircraft should individually conduct monthly training flights to practice standard operating procedures and to exercise all of the dispersant spray, tracking, recording and communications equipment.

- Spray and spotter aircraft should train together twice a year or at least annually to practice all aspects of offshore spray operations. This training and exercises should be conducted offshore, out of sight of land, to provide the pilots the opportunity to apply water in a realistic situation where the only reference is the air/sea horizon.

Unannounced Dispersant OSRO Exercises

Dispersant OSROs should consider conducting an unannounced activation exercise for each of their aircraft to maintain crew and equipment readiness. These exercises may entail mobilizing the aircraft and pilots to the point of take-off or actually flying offshore and spraying water.

Spray System Testing and Calibration

The static and field testing of aerial and vessel dispersant spray systems is necessary to ensure the systems continue to operate within regulatory requirements and to ensure the dosages of dispersant applied to an oil slick are known. Otherwise dispersant effectiveness cannot be properly evaluated. The dispersant OSRO's testing program should be referenced in the Plan Holder's OSRP or dispersant plan to enable the IMT Dispersant Group to access that information, if needed, during the dispersant authorization process and to provide assurance on the scope of the program. A description of a standard testing program is provided below.

Dispersant spray systems must meet applicable regulatory requirements, including ASTM Standards as required. Dispersant OSROs should test their aerial and vessel spray systems as indicated in the following paragraphs. Dispersant OSROs may elect to conduct testing more frequently.

- Field collector card testing of the spray system to determine Volume Media Diameter (VMD) droplet sizes, droplet distributions, swath width and application dosages. Although there is no set time stated in the ASTM Standards for this test, it is recommended the testing be conducted every 3-5 years or whenever major changes to the spray system are made.
- Static calibration of spray systems should be conducted annually or after making any system configuration changes according to ASTM Standard F1460 to ensure flow rates and to prepare Dispersant Application (Dosage) Spray Charts (see Appendix F, Figure F-1) are accurate and the system is functioning properly, i.e., no plugged nozzles, leaking pumps, proper boom pressures, etc.

E. Dispersant OSRO Program Audit

It is the Plan Holder's responsibility to ensure the OSROs are compliant with the applicable regulatory requirements. Therefore, it is recommended to conduct a regulatory compliance audit of the company's contracted Dispersant OSRO(s). Although both vessel and aircraft systems should be audited, only the aerial dispersant systems are covered here as they are much more complex.

The audit should cover both the aircraft and aircrews and the spray systems as described in the following paragraphs.

(1) Audit Frequency

An audit of Dispersant OSROs should be conducted periodically and an audit report filed. If there are any discrepancies noted during the audit they should be reviewed with the Dispersant OSRO and a schedule for resolution developed and tracked until the discrepancy is corrected.

Aviation Audit

The aviation segment of the audit should review the aircraft, aircrews, support equipment, maintenance records, personnel training records and qualifications for compliance with FAA regulations, compliance with the International Association of Oil and Gas Producers (OGP) Aviation Guidelines and Plan Holder aviation policies.

An audit checklist is not provided here because an aviation checklist is extensive and should be provided by the Plan Holder's aviation group or independent aviation consultant performing the audit. The aviation audit segment should be conducted by the Plan Holder's aviation personnel or a certified aviation inspector. Additionally, the Plan Holder may accept the audit of an independent third-party, certified aviation consultant contracted by the Dispersant OSRO or the dispersant aircraft company.

(2) Spray System and Dispersant Stockpile Audit

There are no prepared dispersant spray system and stockpile audit checklists published. The below is a short listing of the major components that should be audited and is not all inclusive or sufficiently detailed for conducting an audit.

a. Spray System and Associated Equipment

- Review Dispersant Health and Safety Plan including Material Safety Data Sheets (MSDSs) for dispersant stockpiles
- Review documentation showing compliance with Federal and State dispersant regulations
- Check collector card field tests showing compliance with ASTM standards for swath width, VMDs (Volume Median Droplet) sizes, and dosages
- Check annual static tests of spray system with water showing the flow rates tested and the ability to spray 5 gpa at selected application speeds and boom pressures
- Dosage Spray Chart available in the cockpit of each spray aircraft
- Inspect flight tracking and spray pass recording equipment e.g., SkyConnect, SatLoc, and other dispersant related equipment.
- Check dispersant communications systems (marine radio, satellite phone, intercom system, etc.)
- Review training and exercise records and OSRO dispersant response plans
- Review Hurricane and Decontamination plans

b. Dispersant Stockpiles and Transfer Equipment

- Inspect trailers, ISO tanks and other dispersant stockpile storage devices and areas
- Inspect dispersant transfer and metering systems
- Check dispersant stockpiles records, labeling, MSDSs

- Check that the dispersant's effectiveness testing was conducted by a certified laboratory using an acceptable testing procedure and that the dispersant was found to have acceptable effectiveness. Every 3-5 years is a common testing frequency, unless the effectiveness is deteriorating.

1-10 Dispersant Response Phone Book

To be adequately prepared to respond it is essential to have dispersant contact information readily available for all of the assets, equipment and personnel that may immediately be called upon for dispersant activation. Ready access and contact numbers to vetted assets is critical to successfully initiating and continuing to respond to a spill. Therefore, a fill-in-the-blank template for an Aerial and Vessel Dispersant Application Response Contact Phone Book is provided in Appendix B. This template identifies each asset category that may be needed with the contacts or companies that are capable of adequately providing those assets or expertise. The Phone Book should be modified for the types of spill risks identified and for the geographical operating area/country where the spill may occur.

Appendix B can be published as a small 5 in. x 7 in. separate document to permit responders to carry hard copies with them or it can be uploaded into portable electronic devices or downloaded from the company's intranet. The Phone Book can be supplemented with other information such as the Operations Checklist, Dispersant Response Objectives, and other items to make a "Quick Guide" for the initial dispersant response actions.

1-11 Oil Characterization and Dispersibility Evaluation

It is the Responsible Party's task to provide regulators with information indicating that the dispersant used will be effective on the oil spilled. This can be accomplished in several ways:

- (1) By using the initial oil properties (API gravity, viscosity, Pour Point, etc.) as well as modeling predictions of how these properties will change as oil weathers at sea.
 - A viscosity of 10,000 cSt is often used as an indication of oil's dispersibility (IMO, 2013). Oils with viscosity (at seawater temperature) of up to 10,000 cSt are considered to be potentially dispersible. As oil weathers at sea its viscosity increases until it is no longer dispersible. Emulsification and evaporation processes increase oil viscosity and decrease its dispersibility. The time during which oil remains dispersible is called "the window of opportunity for dispersion." It varies according to the type of oil and the environmental conditions.
 - Pour Point indicates a temperature at which oil may become semi-solid. Oils are dispersible when they are liquid, i.e., at a temperature above its Pour Point.
 - API gravity indicates whether oil is lighter than water. Only oils floating on the water surface are dispersible.
- (2) By providing laboratory test data on the dispersants effectiveness. It is important to note that most of the bench-top laboratory procedures were designed for an evaluation of different dispersants and they purposefully create an environment with low mixing energy only allowing the most effective dispersants to pass the test. These tests are not meant to simulate the actual performance of these dispersants in the field and often significantly underestimate their performance.
- (3) By providing test tank data if available. Several oils and dispersant combinations have been tested in test tanks in US, Canada, France, and Norway. These tests can better