SECTION II: RRT Approval Zones

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OVERVIEW

RRT APPROVAL ZONES

Protocols for dispersant use

The FOSC shall arrive at a decision to use dispersants using the information-gathering and decision-making process outlined below, and, using the checklists and procedures attached to this document, forward this information to the RRT for approval. These protocols presume that the FOSC has previously determined that a proposed dispersant use does not meet the criteria of pre-approval, but that dispersant use under a case-by-case RRT approval authority is being pursued.

RRT approval required for dispersant use

For those spill situations that are not addressed by the pre-approval process, FOSC authorization to use dispersants requires the concurrence of the RRT Co-Chairs (the U.S. Coast Guard and U.S. EPA) and State representatives to the RRT and in consultation with the DOI and DOC representatives. The RRT must approve the use of dispersants at the time of a spill for all scenarios within the designated marine waters:

- Marine waters within 3 nautical miles from the coastline, waters designated as a part of a National Marine Sanctuary, or waters that are within three miles of the borders of the Country of Mexico or the State of Oregon; or,

- Marine waters one mile from anadromous fish streams during times of emigration and immigration.

Once an FOSC determines to pursue the use of dispersants in a non-pre-approval zone, a formal evaluation of the trade-offs associated with this proposed dispersant use must be conducted. The forms and checklists found in the **DISPERSANT ASSESSMENT WORKSHEET** and **DISPERSANT USE CHECKLIST** below are designed to assist the FOSC or his/her designee in making this determination. The following is an overview of pertinent decision-making points:

- The spilled oil must be amenable to chemical dispersion. Diesel is strictly prohibited from dispersant-use;
- Oceanographic conditions allow for the effective and safe use of dispersants;
- The use of dispersants provides a net environmental benefit. Of special concern are kelp beds and marine waters less than 60 feet deep;
- Appropriate dispersants, dispersant application equipment and personnel are available.

Once the FOSC has filled out the checklists and forms and has determined dispersant use would be a viable and appropriate response option, the FOSC must put in a formal request for approval to the RRT. A spill-specific RRT conference call will be conducted in which all aspects of the dispersant-use request will be evaluated. The RRT will provide the FOSC with an answer regarding the dispersant approval request within 2 hrs of the formal request. The decision to use dispersants will be with approval of the RRT co-chairs and the representative of the State of California with consultation from the DOI and DOC. It is likely that the RRT will address similar stipulations as outlined in the pre-approval process, such as the following;

- Dispersants should not be applied directly to marine mammals within or outside of an oil slick;
- Dispersants will be applied in such a way as to avoid, to the maximum extent practicable, the spraying of seabirds outside the oil slick being treated;
- During the actual dispersant application operations, the sea surface area designated for dispersant application should be assessed by trained wildlife observers in the spotter aircraft for the presence of marine birds and mammals to avoid inadvertent spraying.
- The effectiveness of the dispersant application should be monitored at a minimum by observers trained is dispersant use and if possible with the Special Monitoring of Applied Response Technologies (SMART) monitoring program.

Quick Guide to Forms, Worksheets and Checklists

The CDP is designed primarily to assist the FOSC in making a dispersant use decision at the time of an incident. Many forms, worksheets, and checklists are included as a part of the CDP to facilitate information gathering, decision-making and providing supporting documentation, as necessary. These worksheets and forms should assist the Unified Command in making a dispersant use decision, not hinder the process with unnecessary paperwork.

As a part of the dispersant pre-approval zone decision-making process, please use the quick guide to forms, worksheets and checklists outlined below.

1) Dispersant Assessment Worksheet Not Required by RRT

This document was designed to assist in the gathering and organization of pertinent information necessary to make a dispersant use decision.

2) Pre-Approval Zone Dispersant Use Checklist Required by RRT

This checklist was designed to provide an overview of the pre-approval decision-making process and to provide a "dispersant decision summary" for the Incident, detailing the decisions made. Once this form is completed and the FOSC decides to use dispersants, the checklist should be faxed to the RRT as soon as feasible.

3) Checklist Documentation and Support Form Not Required by RRT
Boxes #1 - #12

This form was designed as a support tool to evaluate the information required in the pre- approval zone dispersant use checklist. This form guides the user through each decision- making point, allowing evaluation of each question that is a part of the dispersant use decision-making process. This form also cross-references the appendices, as needed, where additional information can be found.

DISPERSANT ASSESSMENT WORKSHEET

Information gathered to complete this form will facilitate the RRT dispersant use determination; complete as much as possible without inadvisably delaying RRT decision-making.

This report made by: _____ Organization: _____ Date: _____ Time: _____
Phone: ( )_____Fax: ( )_____ Mobile: ( )_____ Pager: ( )_____

On-Scene Commander: _____ Agency: _____
Phone: ( )_____ Fax: ( )_____ Mobile: ( )_____ Pager: ( )_____

Caller: _____ Organization: _____ Date: _____ Time: _____
Phone: ( )_____ Fax: ( )_____ Mobile: ( )_____ Pager: ( )_____
Street: _____ City _____ State _____ Zip Code _____

OES Control # _____ **NRC #** _____

SPILL

Date of spill: _____(month/day/year) Time of spill: _____(PST, 24-hr clock)
Location: Latitude: _____N Longitude: _____W

Spill source and cause: _____
_____

Amount spilled: _____(gal or bbl) Type of release: ❑ Instantaneous ❑ Continuous
Flow rate if continuous flow (estimate): _____
Oil name: _____ API: _____ Pour point: _____ (ºC)

Information source: _____

ON-SCENE WEATHER, CURRENTS AND TIDES

(If not immediately available contact NOAA Scientific Support Coordinator (206-321-3320) or other resources noted in Appendix A).

Wind (from) direction: _____ Next low tide: _____ (ft) at _____ (hrs)
Wind speed: _____ (knots) Next high tide: _____ (ft) at _____ (hrs)

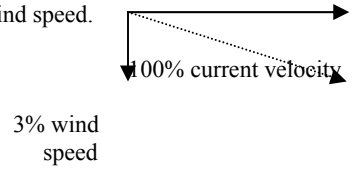
Current velocity: _____ (kts) Current (to) direction: _____ (°true/magnetic)
Predicted slick speed: _____ (kts) Predicted slick direction: _____(°true/magnetic)

Visibility: _____ (nautical miles) Ceiling: _____ (feet) Sea state:_____ (wave height in feet)

Information source:_____

PREDICTING SPILL MOVEMENT

Plot spill movement on appropriate nautical chart. Using the information from the box above, predict slick direction and speed using 100% of current velocity and 3% of wind speed.



Estimated distance to shore/sensitive area: _____ (nm)
Estimated time to shore/sensitive area: _____ (hrs)

ESTIMATING OIL SPILL VOLUME

Extent of spill:

(a) Length of spill _____(nm) x Width of spill _____(nm) = Total spill area _____(nm^2)

(b) Estimate what proportion (%) of the total spill area is covered by oil: _____ (Express as decimal, % x 100)

(c) Estimate slick area: _____ x _____ = _____
Total slick area (a) % oil cover (b) Estimated slick area

Estimated spill volume:

You can make this estimate using any of the following approaches:

- Get a thickness estimate from the ADIOS oil weathering model (call the NOAA SSC (**206-321-3320**) for assistance);
- Generate your own volume estimate of spilled oil and the area it covers (convert both volume and area to metric units and then divide the volume by the area to estimate the thickness. Use the unit conversions found in Appendix K). Convert thickness to millimeters to use Appendix D.1).
- Use your knowledge of the approximate number of barrels of oil or emulsion per acre of slick.

DISPERSANT SPRAY OPERATION

Dispersant spray contractor name: _____ Street: _____
Dispersant name: _____ Quantity available: _____ City: _____
State: _____ Zip Code: _____
Phone: ( )_____

Platform: Aircraft type: ❑ Multi-engine ❑ Single-engine
Boat type: _____
Other: _____
Dispersant load capability (gal): _____

FOSC Complete:

"Window of opportunity" for getting dispersant on the oil (App.): _____ (hrs from first report of spill)
Number of daylight hours available for first day of dispersant application:_____ (hrs from first report of spill)
Time to first drop on the oil: _____ (hrs from first report of spill)

Can dispersants to be effective after day one of the spill? YES / NO / Cannot determine at this time
(circle one)

Note: It might be appropriate to conduct a small dispersant test before proceeding to a full application.

POTENTIAL BIOLOGICAL RESOURCE IMPACTS

Using the predictive spill and weather information from the boxes above, ADIOS, the NOAA SSC, other RRT trustee agencies, aerial wildlife observers and regional resource information noted in **Appendix B**, briefly describe potential coastal areas and resources that could be impacted form this spill.

When the spill is in a National Marine Sanctuary, Sanctuary representatives can assist with valuable resource information.

On-Water Resources:

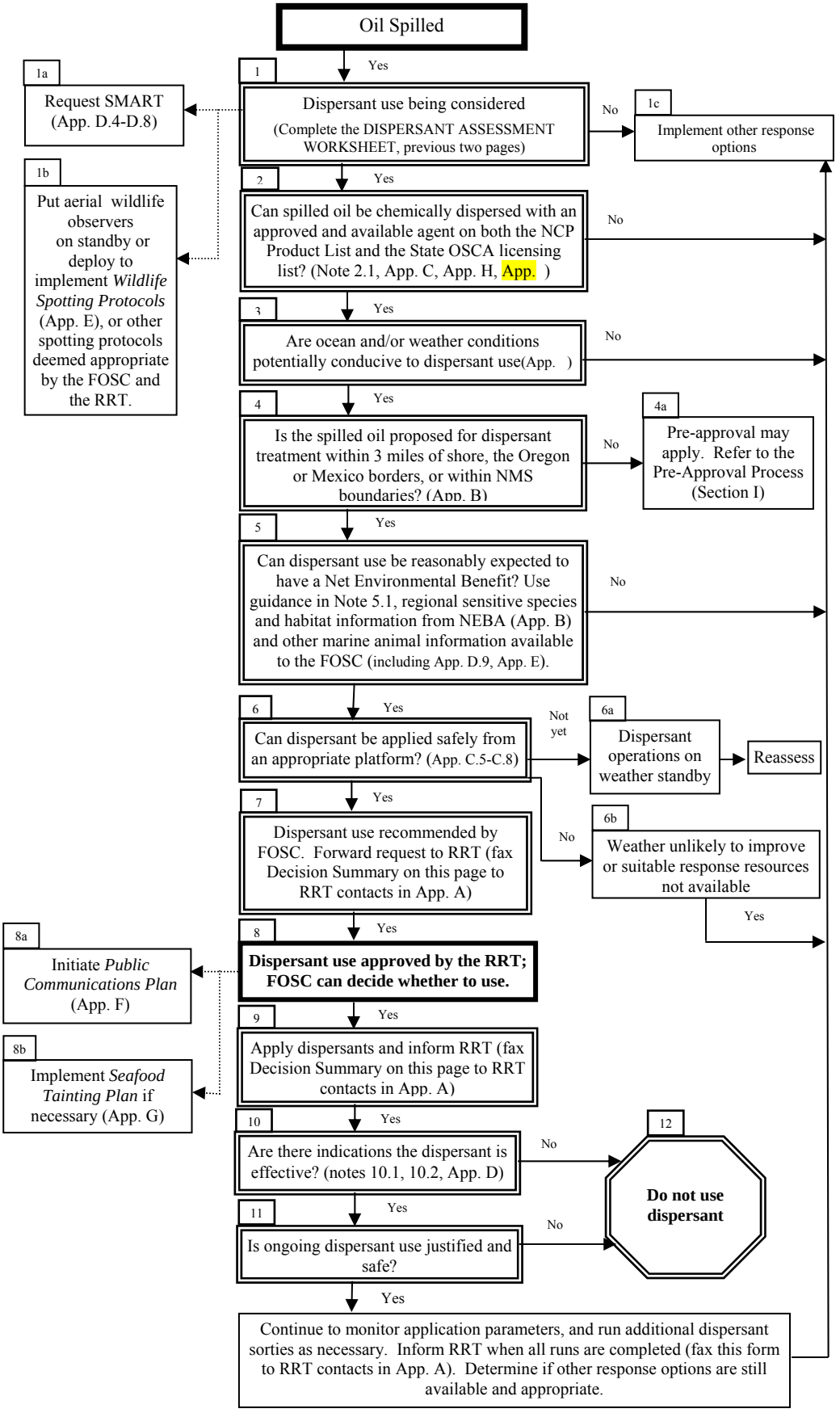
Shallow Subtidal Resources

Intertidal Resources:

Anadromous Resources:

Significant Water Column Resources:

DISPERSANT USE CHECKLIST: RRT APPROVAL REQUIRED ZONES



RRT Approval Zones

Dispersant Decision Summary

Spill location: _____

Decisions approved by: _____

Box	Decision	Time:	Date:	Initials:
1	Yes/No			
2	Yes/No			
3	Yes/No			
4	Yes/No			
5	Yes/No			
6	Yes/No			
7	Yes/No			
8	Yes/No			
9	Yes/No			
10	Yes/No			
11	Yes/No			
	Run 2			
	Run 3			
	Run 4			
	Run 5			
	Run 6			
	All done			
12	Do not use			

Supplemental Decisions:

1a	Yes/No			
1b	Yes/No			
4a	Yes/No			
6a	Yes/No			
6b	Yes/No			
8a	Yes/No			
8b	Yes/No			

Comments:

.....
.....
.....
.....
.....
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.....
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The following boxes and checklists are to support decision-making. Complete as appropriate given time and information constraints. Do not allow completing each check-box to inadvisably delay an RRT decision.

BOX 1 **IS DISPERSANT USE BEING CONSIDERED?**

Dispersant use should be considered if:

- ❒ Oil is likely to significantly impact birds, marine mammals, or other flora and fauna at the water surface
- ❒ Natural dispersion is limited
- ❒ Other response techniques are unlikely to be adequate, effective, or economical
- ❒ The oil could emulsify and form mousse or tar balls
- ❒ Oil is likely to significantly impact shorelines, structures and facilities (*e.g.*, marinas, wharves)
- ❒ Oil is likely to significantly impact economically important resources (*e.g.*, shellfish beds, tourist beaches)
- ❒ Other ……

Decision: Consider dispersant use?

- ❒ Yes Make notifications in **Box 1a**
  Make notifications in **Box 1b**
- ❒ No Go to **Box 1c**

Make a note of the decision on Dispersant Use Checklist (Page II-9)

From Cawthron, 2000.

Discussion Note 1.1 **KEY BENEFITS OF DISPERSANT USE**

- Dispersant use minimizes the effects of an oil spill principally by dispersing oil before it reaches shorelines or sensitive areas (*e.g.*,wetlands, estuaries).
- Removing oil from the surface of the water reduces the potential for impacts to birds and marine mammals, and limits the action of wind on spill movement.
- Dispersants can prevent oil from sticking to solid surfaces, and enhance natural degradation.
- Dispersants can effectively treat large spills more quickly and inexpensively than most other response methods.
- Dispersants can be effective in rough water and strong currents where mechanical responses are limited.
- Effective dispersant responses can greatly reduce the quantity of oil requiring recovery and disposal.
- Dispersant use is often the only feasible response to spills that exceed mechanical response capabilities.
- Dispersant use does not generally limit other options, except oleophilic mechanical responses.
- Dispersed oil that cannot be mechanically recovered generally poses few significant environmental problems.

From Cawthron, 2000

BOX 1a **REQUEST SMART**

Immediately deploy USCG Strike Team SMART to the spill site if dispersant use is likely. Every attempt should be made by the FOSC and the Strike Team to implement the on-water component of the SMART monitoring protocols in every dispersant application. **Dispersant application should <u>not</u> be delayed should sea conditions, equipment failure, or other unavoidable circumstances preclude the positioning of monitoring equipment and personnel.** However, at a minimum, Tier 1 (visual) monitoring should occur by trained observers during any dispersant operations approved in accordance with the California Dispersant Plan. Tier 2 (on-site water column monitoring) and Tier 3 (fate and transport of the dispersed oil) SMART monitoring will be deployed as appropriate. Other information on monitoring dispersant effectiveness, including additional SMART background information, tools and report forms, is presented in **Appendices D-4 – D.8**.

Decision: Deploy SMART?

- ❒ Yes Use contact information in **Appendix A**. Go to **Box 1b**. **Estimated arrival time**: _____
- ❒ No Note reason why not deployed. ……..……

Go to **Box 1b** or **Box 1c** as appropriate.

Make a note of the decision on Dispersant Use Checklist (Page II-9)

BOX 1b **PLACE AERIAL WILDLIFE OBSERVERS ON STANDBY OR DEPLOY THEM TO IMPLEMENT THE *WILDLIFE SPOTTING PROTOCOLS***

Consider deploying trained wildlife spotters in initial spill overflight aircraft so that they can determine if the presence of marine animals in the spill or dispersant application zones could influence spray pattern decisions by the FOSC. The goal is to minimize over-spray onto unaffected animals. Wildlife spotters should use the forms and procedures given in the *Wildlife Spotting Protocols* (**Appendix E** and **Appendix D.9**). The FOSC will decide how subsequent and systematic wildlife spotting efforts can be safely conducted with the aerial resources available.

Decision: Notify/deploy aerial wildlife spotters?

❒ Yes Use wildlife spotter contact information in **Appendix E**. Go to **Box 2**.
❒ No Note reason why wildlife spotters not deployed ……
……

Make a note of the decision on Dispersant Use Checklist (Page II-9)

Reconsider under **Box 8**.

BOX 1c **IMPLEMENT OTHER RESPONSE OPTIONS**

Consider all response options to identify which option, or combination of options, is most appropriate. The following options are described in the Area Contingency Plan (Section 1640) and the Regional Contingency Plan (Section 1007.05).

❒ No action other than monitoring
❒ Containment and recovery of oil at sea
❒ Clean-up of oil from shorelines
❒ *In situ* burning

From Cawthron, 2000

BOX 2 **CAN SPILLED OIL BE CHEMICALLY DISPERSED WITH AN APPROVED AND AVAILABLE AGENT ON BOTH THE NCP PRODUCT LIST AND THE STATE OSCA LICENSING LIST?**

A NCP Product List may be found in **Appendix H**. Updated NCP Product Lists can be accessed via the EPA representative on the RRT (**Appendix A**), by calling the Emergency Response Division of the U.S. EPA (202-260-2342) OR ACCESSING THE Internet at http://www.epa.gov/oilspill/ncp/dsprsnts.htm

The State OSCA licensed dispersants may also be found in **Appendix H** or by calling the State OSPR representative on the RRT (**Appendix A**).

Decision: Can this oil be dispersed with an approved and available agent?

❒ Yes Go to **Box 3.**
❒ No Go to **Box 1c**

Make a note of the decision on Dispersant Use Checklist (Page II-9)

Taken in part from Cawthron, 2000

Discussion Note 2.1 **OIL DISPERSIBILITY (Also see App. __ for Window of Opportunity)**

Three types of oils are typical of those produced or transported in California offshore waters: a) crude oils produced in California Outer Continental Shelf waters; b) oils imported from Alaska and foreign countries into California ports; and c) fuel oils that could be spilled from a variety of marine industrial activities (*e.g.*, fuel tanks from ships, cargoes of small tankers). Dispersants only work if the spilled oil has a relatively low viscosity at the time of treatment.

Appendices C.1 and C.2 show the California platform-produced oils and tankered oils, respectively.

Most oils produced from offshore platforms are heavy, and border on the range of oils that are considered to be difficult or impossible to disperse. The oils transported by tanker (1999-2001 data) include two-three dozen different types of oil (only the most common are listed in Appendix C.2). The most important is Alaska North Slope crude, which represents 50% of each annual total. Based on API gravity information, these oils appear to be dispersible when fresh.

- The most important criterion for dispersant use is whether the oil is dispersible.
- The best indication of oil dispersiblity is from specific oil weathering and dispersion data from field trials.
- Potential dispersibility can be *estimated* from physical properties of oils, under different oil weathering and spill scenarios (*e.g.*, ADIOS, Table 2.1 below). The ADIOS computer database predicts oil dispersion based on physical and chemical properties of spilled oil under specified spill conditions.
- Dispersant use should not be rejected exclusively on the basis of predictive models

Generally, if: (get box/matrix from Jason)

- Oil is able to spread on the water, it is likely to be dispersible.
- Viscosity is 2000 cSt, dispersion is probable.
- Viscosity is >2000 cSt, dispersion is possible.
- Viscosity is >5000 cSt, dispersion is possible with concentrated dispersant (*e.g.*, Corexit 9500).
- Sea temperature is >10º C below oil pour point, dispersion is unlikely.

Potential dispersion may also be assessed using tables in Appendix C.

Limitations of predicting dispersion:

- Using generic values of viscosity and/or pour point to predict dispersion (*e.g.*, ADIOS, Appendix tables C.3 and C.4) can underestimate the potential for oil to be dispersed.
- Most models are based on limited oil weathering, emulsification or dispersion data, therefore estimated windows of opportunity may be inaccurate.

Taken in part from Cawthron, 2000 and S.L. Ross, 2002

Table 2.1 **ADIOS (AUTOMATED DATA INQUIRY FOR OIL SPILLS) COMPUTER DATABASE**

Use the **DISPERSANT ASSESSMENT WORKSHEET** and the NOAA SSC (206-321-3320) for the information needed by ADIOS, or use the form below. The NOAA SSC should also be able to assist with ADIOS.

Copies of ADIOS are available from the NOAA website: http://response.restoration.noaa.gov/software/adios/adios.html

Oil/product name: _____
Amount spilled: _____ (gal or bbl)
Type of release: Circle one
- ❑ Instantaneous
- ❑ Continuous

Wind speed: _____ (knots)
Wave height: _____ (m)
Water temp.: _____ (ºC)
Water salinity: _____ (ppt)

Important limitations on the use of ADIOS: ADIOS predicts dispersibility based on estimates of oil properties (including emulsification) under different conditions. As emulsification data are scarce, **predicted rates of dispersion may be different than actual rates of dispersion**. ADIOS is intended for use with floating oils only, and does not account for currents, beaching, or containment of oil. ADIOS is unreliable for very large or very small spills. It is also unreliable when using very high or very low wind speeds in modeling the spill.

BOX 3 **ARE OCEANOGRAPHIC AND/OR WEATHER CONDITIONS POTENTIALLY CONDUCIVE TO DISPERSANT USE?**

Does the available technical information indicate that the existing oceanographic (*e.g.*, surface current direction and speed, wave and chop height) and weather (*e.g.*, wind direction and speed, visibility, ceiling height) conditions are suitable for a successful dispersant application?

Use the following resources:

- ❒ Information on the DISPERSANT ASSESSMENT WORKSHEET
- ❒ Consultation with the NOAA Scientific Support Coordinator (206-321-3320)
- ❒ Information resources and web sites noted in **Appendix A**
- ❒ Information from aerial overflights
- ❒ Information from ADIOS

Decision: Are ocean and weather conditions suitable for a dispersants application?

❒ Yes Go to **Box 4**.
❒ No Go to **Box 1c**

Make a note of the decision on Dispersant Use Checklist (Page II-9)

BOX 4 **IS THE SPILLED OIL WITHIN 3 MILES FROM SHORE, A STATE OR FEDERAL BOUNDARY OR WITHIN NMS BOUNDARIES?**

A full-page statewide nautical chart indicating the area three nautical miles from shore and the areas within National Marine Sanctuaries (Gulf of the Farallones, Cordell Banks, Monterey, Channel Islands) is in Chart 4.1 below. Regional charts, with dispersant approval zones noted, are in Appendix B.

Plot the position of the spill on the appropriate nautical chart, draw a circle around the spill source with a 10 nautical mile radius as a worst-case scenario for surface movement. Hash mark any area within the circle that is in waters 3 nautical miles from shore or within a National Marine Sanctuary. This is considered the dispersant operational area.

Decision: Is the spilled oil within an RRT Approval Required zone?

❒ Yes Go to **Box 5**.
❒ No Pre-Approval may apply. Go to **Box 4a**.

Make a note of the decision on Dispersant Use Checklist (Page II-9)

BOX 4a **PRE-APPROVAL MAY APPLY; REFER TO THE PRE-APPROVAL PROCESS.**

The request for dispersant use may not require a case-by-case RRT approval and may fall within the parameters of the pre-approval guidelines for the use of dispersants in RRT Regional IX. Review the Pre-Approval Guidelines and begin the pre-approval process if appropriate (see Section I).

ADD NEW CHART FOR RRT APPROVAL ZONES

BOX 5 **CAN DISPERSANT BE REASONABLY EXPECTED TO HAVE A NET ENVIRONMENTAL BENEFIT?**

Use the regional sensitive species and habitat information from the Net Environmental Benefit Analyses for each major coastal area in which dispersant use may have an impact.

Consider:

- ❒ The type and value of habitat potentially affected.
- ❒ The sensitivity of affected resources to oil, and to different oil response strategies.
- ❒ Natural recovery rates of affected species and habitats.
- ❒ Likely oil persistence and degradation rates with and without dispersant use.
- ❒ Potential oil toxicity on surface water species compared to water column and/or seafloor species.

Dispersant use is generally not appropriate in areas with limited water circulation and flushing, near aquaculture facilities, shellfish beds and fish-spawning grounds, and around seawater intakes.

Decision: Will the dispersant use have a net environmental benefit?

- ❒ Yes Go to **Box 6**.
- ❒ No Go to **Box 1c**.

Make a note of the decision on Dispersant Use Checklist (Page II-9)

Discussion Note 5.1 **ASSESSING NET ENVIRONMENTAL BENEFIT**

The most important question to answer is: **Will dispersant use significantly reduce the impact of the spilled oil**?

- Rapid decisions on use are essential as dispersant must be applied quickly to be effective.
- Decision-makers must consider the various environmental, social, economic, political and cultural factors unique to each spill.
- Tradeoffs will be necessary, as no response is likely to satisfy all parties and protect all resources. The ecological impacts of oil are generally longer-lasting and more persistent than most other impacts.
- Ecological effects will be due primarily to the spilled oil. Dispersant applied at recommended rates is unlikely to cause significant adverse effects, even in multiple applications.
- Oil dispersed into greater than 10m or water will quickly dilute to levels where acute toxic effects are unlikely.
- Few acute toxic effects have been reported for crude oil dispersed into less than 10m of well-flushed water.
- Small spills of light fuels seldom require dispersant use.

BOX 6 **CAN DISPERSANT BE APPLIED SAFELY FROM AN APPROPRIATE PLATFORM?**

Use the information in the **DISPERSANT ASSESSMENT WORKSHEET** to evaluate which application platform(s) will be most effective, given the following particular considerations:

- The amount of oil spilled;
- The location of the operational area;
- The volume of available dispersants;
- The timeframe in which the required equipment can be on-scene.

Assume for planning purposes that the weather information on the **DISPERSANT ASSESSMENT WORKSHEET** will remain the same during the timeframe in which this decision is operating. At the earliest opportunity, contact the NOAA SSC (206-321-3320) for more detailed and updated weather information, but do not delay this decision process for the NOAA SSC weather input. Weather information may also be available from resources noted in **Appendix A**. See **Appendix C** for specific information on dispersant application platforms.

Decision: Is there an appropriate application platform for a dispersant operation?

	Yes	(Type)	No
C-130/ADDS Pack	☐		☐
DC-4	☐		☐
Other large multi-engine airplane	☐	……	☐
Cessna AT-802	☐		☐
Other single-engine airplane	☐	……	☐
Helicopter	☐	……	☐
Work boat	☐	……	☐
	Go to **Box 7**		Go to **Box 6a**

Make a note of the decision on Dispersant Use Checklist (Page II-9)

Taken in part from Cawthron, 2000 and S.L. Ross, 2002

Discussion Note 6.1 **CURRENT LOGISTICS FOR A CALIFORNIA DISPERSANTS APPLICATION**

Use the information on the **DISPERSANT ASSESSMENT WORKSHEET** to consider the following:

- ❒ Is the selected dispersant available in the quantity needed?
- ❒ Can the estimated "window of opportunity" for getting the dispersant on the oil be met?
- ❒ Can the dispersant and application resources get to the spill scene on time?
- ❒ Will there be enough daylight hours for an effective dispersant application?

Refer to **Appendix C** for more specific regional dispersant resource information.

Discussion Note 6.2 **GENERAL SAFETY ISSUES**

- The FOSC is responsible for ensuring that health and safety requirements are adequately addressed during a response.
- Individuals should not engage in activities that they are not appropriately trained to perform.
- Individuals are expected to adhere to safety procedures appropriate to the conditions they are working under and/or are included in a dispersant-specific Site Safety Plan Annex.
- Vessel/aircraft operators are expected to define appropriate operational limits and safety and maintenance requirements for their craft.
- Vessels and response resources should be properly maintained and undergo proper decontamination procedures.
- Apply dispersants only if there is no significant risk to response personnel (*e.g.*, ignition risk, operational hazards).
- Ensure the appropriate personal protective equipment (PPE) is available.
- Ensure that application aircraft and vessels remain within standard operating limits.
- Each person involved in a response is required to take personal responsibility for his or her safety. The FOSC may appoint a Safety Officer and request development of a specific Site Safety Plan Annex. Key safety aspects to be considered in the plan may include:

  - Physical hazards (e.g., waves, tides, unstable or slippery surfaces)
  - Heavy machinery and equipment
  - Chemical hazards (e.*g*., oil and dispersant exposure)
  - Atmospheric hazards (*e.g*., fumes, ignition risks)
  - Confined spaces\PPE
  - Nose
  - Fatigue
  - Heat/cold stress
  - Wildlife (bites/stings)
  - Cleanup facilities
  - Medical treatment

HUMAN SAFETY OVERRIDES ALL OTHER CONSIDERATIONS DURING A RESPONSE

From Cawthron, 2000

BOX 6a **DISPERSANT OPERATIONS ON WEATHER STANDBY**

Consult with appropriate RRT IX members (USCG/District 11 Co-Chair, EPA, DOI, DOC and OSPR (See **Appendix A** for contact information) to notify them that dispersants are being considered, but delayed due to weather.

Decision: Has the weather improved to the point where dispersants can be applied?

		Date	Time
❒ Yes	Go to **Box 7**	…….	…….
❒ No	Continue to **reassess** (until/unless time window for successful application closed) or Go to **Box 6b**	…….	…….

BOX 6b **WEATHER UNLIKELY TO IMPROVE OR SUITABLE RESPONSE RESOURCES NOT AVAILABLE**

There will be spill situations where dispersant use may be appropriate but weather conditions and available resources will not allow dispersants to get on the oil within the appropriate weather window. In these cases, dispersant use will need to be abandoned and other response options considered instead.

	Date	Time
Go to **Box1c**	…….	…….

BOX 7 DISPERSANT USE RECOMMENDATION FORWARDED BY THE FOSC TO THE RRT FOR REVIEW AND APPROVAL

Once the FOSC has completed as much as possible of the DISPERSANT ASSESSMENT WORKSHEET and the DISPERSANT USE CHECKLIST and completed the dispersant decision summary, the FOSC will forward a request, along with any other requested data, to the RRT via a phone conference. Based on the information provided, the RRT will provide an approval/disapproval decision for dispersant use within 2 hours of he request.

A dispersant use approval will be made with the concurrence of the U.S. Environmental Protection Agency and the U.S. Coast Guard representatives to the RRT and the State of California, and in consultation with the U.S. Department of Commerce and U.S. Department of the Interior natural resource trustees.

BOX 8 DISPERSANT USE APPROVED BY THE RRT

DISPERSANTS APPROVED FOR USE BY THE FOSC NEED TO BE APPLIED USING THESE RRT IX GUIDELINES AS WELL AS ANY CASE-SPECIFIC GUIDELINES ISSUED BY THE RRT AS PART OF THE APPROVAL:

- ❒ The SMART controller/observer should be over the spray site before the start of the operation. If possible, a DOI/DOC-approved marine mammal/turtle and pelagic/migratory birds observation specialist will accompany the SMART observer, but in any event, operations will not be delayed for these individuals.
- ❑ Dispersants cannot be applied to any diesel spill in the San Diego Area Contingency Plan area.
- ❒ Personnel protective equipment for personnel on-site will conform to the appropriate dispersant's Material Safety Data Sheet (MSDS).
- ❒ Dispersant application aircraft will maintain a minimum 1000-foot horizontal separation from rafting flocks of birds. Caution will be taken to avoid spraying over marine mammals and marine turtles (see Appendix A for resource agency contact information).
- ❒ If the dispersant application platform is a boat:
  - The following ASTM standards apply to systems involving spray arms or booms that extend over the edge of the boat and have fan-type nozzles that spray dispersant in a fixed pattern:
    - ASTM F 1413-92: Standard Guide for Oil Spill Dispersant Application Equipment: Boom and Nozzle Systems
    - ASTM F-1460-93: Standard Practice for Calibrating Oil Spill Dispersant Application Equipment Boom and Nozzle Systems
    - ASTM F 1737-96: Standard Guide for use of Oil Spill Dispersant Application Equipment During Spill Response: Boom and Nozzle Systems.
  - Boat-based systems using a fire monitor and/or fire nozzle shall avoid a straight and narrow "firestream" flow of dispersant directly into the oil. There are no applicable ASTM standards for these systems at this time (December 2003).

BOX 8a **INITIATE *PUBLIC COMMUNICATIONS PLAN***

Once a decision to use dispersants is made, it is critical that a public communications plans be implemented (**Appendix F**). The general public as well as stakeholders must be made aware of the decisions to utilize dispersants and a mechanism must be put into to for reliable and continuous updates (**Appendix F.3**).

An initial press conference should be held which outlines the decision to utilize dispersants, provides background and scientific information as well as any environmental and safety considerations. Press packet information can be found in **Appendix F.1**.

A town hall meeting should be scheduled as soon as to provide a mechanism for sharing of information as well as addressing public concerns and fears. **Appendix F.2** provides guidelines for preparation of a town hall meeting. Areas that must be adequately addressed include the following;

- Seafood tainting concerns posed by the use is dispersants (**Appendix G**).
- Risk communication (**Appendix F.2**)
- Net environmental benefit analysis conducted and species of special concern.
- Monitoring policies established for the spill.

BOX 8b **CONSULT SEAFOOD TAINTING PLAN**

- Refer to **Appendix G** for key points to consider regarding Seafood tainting, as well as information on accessing NOAA and State of California resources for assessing the tainting risk

BOX 9 **APPLY DISPERSANTS AND INFORM RRT**

❒ Using the information on <u>estimated oil spill volume</u> from the **DISPERSANT ASSESSMENT WORKSHEET** and Discussion Note 9.1 below to:

- Determine the dispersant application ratio (usually 1:20), and
- Calculate the volume of dispersant required (**Appendix D.1**).

❒ Record the details on the Dispersant Application Summary Form (**Appendix D.2**);
❒ Mobilize application team;
❒ If not already done, mobilize SMART. Some blank SMART forms are included in **Appendix D** for use by other trained professionals, if appropriate and when approved by the FOSC.
❒ Inform RRT (see **Appendix A** for contact information).

Decision: Dispersants applied?

❒ Yes Go to **Box 10**.
❒ No Explain.

Make a note of the decision on Dispersant Use Checklist (Page II-9)

In part from Cawthron, 2000

Discussion Note 9.1 **GENERAL APPLICATION INFORMATION**

- The FOSC has final responsibility for operational aspects of dispersant applications.
- Dispersant must only be applied by experienced spray applicators.
- Dispersant must be applied in accordance with manufacturer instructions, unless approved otherwise by the FOSC.
- The persons applying dispersant are responsible for the calibration and operation of the spraying system, and the safety and maintenance of the application platform.
- Droplet size is the key variable influencing dispersant effectiveness. Undersized droplets (*e.g.*, fog or mist) will be lost through drift and evaporation. Oversized droplets will punch through the oil and be lost in the water column.
- Dispersants pre-diluted in water are less effective than undiluted dispersant.
- Only undiluted concentrate dispersant is applied from aircraft. Dispersant should, where possible, be applied into the wind and parallel with the slick.
- Dispersant should be applied in a methodical and continuous manner to ensure the entire target area is treated.
- Spraying effort should concentrate on the thickest sections, and/or the leading edges, of oil that threaten sensitive areas.
- Thick portions of the slick may require several applications.
- Oil sheen (oil less than approximately .001 inch or .02 mm thick) should not be sprayed with dispersant.

Regarding the relationship between Dispersant-to-Oil Ratio (DOR) and the concentration of oil being treated:

- Regardless of DOR ratios suggested by dispersant manufacturers, there are may factors that influence dispersibility (*e.g.*, oil characteristics, degree of weathering, water salinity, sea state) that may make it very difficult for any "user" to select an appropriate DOR for the conditions faced on the day of a specific spill
- he variability of slick thickness (or oil concentration) is such that one can never really characterize the actual oil concentration for more than a few seconds within the speed and swath constraints of a particular application system.
- With most application systems, one is usually overdosing and underdosing as the system moves through light, heavy and sometimes "no" oil on the water surface.
- The best estimate of the average oil thickness (or average volume of oil per unit are) must be used.
- Crude oil that is dark in color and thick enough to merit any response is generally between .001 inch (.017 mm) thick and .01 inch (0.25 mm). Crude oil emulsion begins to form at .01 inch (0.25 mm), and tar balls at .1 inch (2 mm). See Appendix D.1 for more information.
- Given that precise spray parameters are extremely difficult to achieve, dispersant applicators generally use about 5 gallons of dispersant per acre on their first run. This is a "middle-of-the-road" concentration in most situations of 2 to 3 barrels of oil per acre (or ~ 100 gallons per acre) following the initial rapid spreading phase. With a common accepted DOR of 1:20, the recommended dosage would be 1/20 x 100, or 5 gallons of dispersant per acre.
- Area, volume and thickness can be related with the following expression:

$$\mathbf{10^4 \times Area\ (hectare) \times Thickness\ (mm) = Volume\ (liters)}$$

or

$$\mathbf{Volume\ (liters/Area\ (hectares) = 10^4 \times Thickness\ (mm)}$$

► To convert liters/hectare to gallons/acre, multiply by 0.107
► To convert liters/hectare to gallons/square kilometer, multiply by 26.42

► These values (in any units) multiplied by the DOR (as a fraction, e.g., 1:5 = 1/5 or .2) will then yield the Desired Dosage (in those units) for that value of DOR.

- Refer to **Appendix D.1** for some pre-calculated values.

From Cawthron, 2000 and Al Allen (Spilltec), 2003 personal communication

Discussion Note 9.2 **AERIAL APPLICATION**

This general aerial application guide is intended simply to highlight key issues. The FOSC will coordinate and oversee operational aspects of aerial dispersant applications.

- Aircraft applications should always include pump driven spray units.
- Dispersant droplet size should be between 400 and 1000 microns.
- Commercial aircraft spray nozzles generally range between 350 and 700 microns.
- 1000 micron spray nozzles may be needed for use on viscous oils.
- Nozzles should achieve an application rate of between 5.3 gallons per acre (1:20 ratio)
- Spray nozzles should be installed to discharge directly aft.
- Underslung buckets on helicopters should be mounted so the pilot can see the ends of the spray booms in flight.
- The altitude of the aircraft should be as low as possible.

From Cawthron, 2000

Discussion Note 9.3 **BOAT APPLICATION**

- Spray booms should be mounted as far forward as possible t prevent oil being moved aside by the bow wave before being sprayed. This then utilizes the mixing energy of the bow wave to break up the oil.
- Spraying systems should be set so that the spray pattern is flat, striking the water in a line perpendicular to the direction of the boat's travel.
- The fan-shaped sprays from adjacent nozzles should be set as low as possible, overlapping just above the oil/water surface, with the inboard spray striking the hull just above the waterline.

Undiluted dispersants

- Air blast sprayers and modified spray pumps can be used to apply undiluted concentrated dispersants and conventional dispersants.
- Treatment rate is usually constant and determined by nozzle size and spray pressure.
- Calibration and use of an appropriate droplet size is critical toe effective applications.

Pre-diluted dispersants

- Concentrated dispersants can be applied after pre-dilution in seawater, but will be less effective.
- The dispersant : water ratio should be equal to, or greater than, 10%
- Applications through ship's fire-fighting equipment are controlled by opening or closing the dispersant supply. Vessel speed is used to control the treatment rate.
- Dual pump systems for dispersant and seawater supplying spray booms allow the dilution rate to be adjusted.
- Boat speed is the main determinant of dispersant dose rate (reduce boat speed to increase the dose rate).
- Boat speed should be in the order of 5 knots for fresh spills of liquid crude or fuel oil, which assumes that the oil has spread to 0.1 mm thick.
- With reduced boat speeds, the required application rate per acre or km^2 can be maintained by reducing pump speed.

From Cawthron, 2000

BOX 10 ARE THERE INDICTIONS THE DISPERSANT IS EFFECTIVE?

- ❑ Acquire information from dispersant monitoring team (SMART team or other FOSC-designated monitors).
- ❑ Review dispersant monitoring results after each dispersant application.
- ❑ Determine if dispersant application is effective.
- ❑ Determine if chemical dispersion is significantly greater than natural dispersion.
- ❑ Assess whether changing application parameters could make the application more effective.

Decision: Is the dispersant effective?

- ❑ Yes Go to **Box 11**
- ❑ No See Discussion Note 10.2 and return to **Box 9**, or Go to **Box 12**

Make a note of the decision on Dispersant Use Checklist (Page II-9)

From Cawthron, 2000

Discussion Note 10.1 ASSESSING DISPERANT EFFECTIVENESS

- Dispersant applications must be monitored to confirm whether or not dispersant use is effective, and to determine the fate and transport of treated oil.
- Dispersant applications should not be delayed simply because monitoring is not in place.
- Visual observation is the minimum level of monitoring. Observations teams may use the forms in **Appendix D**.
- There will be very few instances where a dispersant application is possible but visual monitoring is not.
- Because dispersed oil plumes are often highly irregular in shape and thickness, it can be difficult to accurately estimate dispersant efficiency.
- The appropriate dispersant application dose depends on the oil thickness (see **Appendix D.1** for common dose rates based on oil thickness). Slicks are generally not of uniform thickness, and it is not always possible to distinguish among thicker and thinner portions of the same slick. It is therefore possible to apply too much or too little dispersant to some parts of a slick. Because over- and under-dosing can lead to variations in effectiveness, these variations should be noted.
- On-site monitoring of oil dispersed in the water column should support visual monitoring whenever possible. See **Appendix D** for additional information and forms.
- Decisions to terminate operations due to poor effectiveness should ideally be based on on-site monitoring results.
- A visible coffee-colored cloud in the water column indicates the dispersant is working.
- A milky-white plume in the water column can indicate excessive dispersant application.
- When dispersant is working, oil remaining on the water surface may also change color.
- A difference in the appearance of treated and untreated slicks indicates dispersion is likely.
- Absence of a visible cloud in the water column makes it difficult to determine whether the dispersant is working. When the water is turbid, you may not be able to see a plume. Oil remaining at the surface and sheens can also obscure an ability to see oil dispersing under the slick.
- Successful dispersion can occur with no visible indication of dispersion.
- A subsurface plume may not form instantly once dispersant has been applied. In some cases (*e.g.*, emulsified oil) it can take several hours for a plume to form. In other cases, a visible plume may not form, and you may wish to use sampling to learn whether dispersion has occurred.
- Boat wakes may physically part oil, falsely indicating successful dispersion. Mechanically dispersed oil will re-coalesce and float to the surface.
- Dispersants sometimes have a herding effect on oil after initial applications, making a slick appear to be shrinking when, in fact, the dispersant is "pushing" the oil together. The effect results from the surfactants in the dispersant, which causes a horizontal spreading of thin oil films. This can cause parts of a slick to seem to disappear from the sea surface for a short time.

From Cawthron 2000 and NOAA Oil Spill Job Aids

Discussion Note 10.2 **WHEN DISPERSANT IS NOT EFFECTIVE**

If monitoring shows dispersion does not appear effective, review all aspects of the application and monitoring for possible reasons why. Aspects to consider include:

- Dispersant formulation
- Application rations (increase or decrease oil: dispersant ratio)
- Application methods
- Monitoring methods
- Interpretation of monitoring results
- Oil weathering
- Weather conditions

From Cawthron, 2000

BOX 11 **IS ONGOING DISPERSANT USE JUSTIFIED AND SAFE?**

All of the following must apply to justify ongoing dispersant use:

- ❑ The spill can be chemically dispersed with an approved and available agent (see **Box 2** and **Appendix H**);
- ❑ Oceanographic and weather conditions are potentially conducive to dispersant use (see **Box 3** and DISPERSANT ASSESSMENT WORKSHEET);
- ❑ The dispersant will have a net environmental benefit (see **Box 5**);
- ❑ The dispersant can be applied safely (see **Box 6**), with suitable weather (**Box 6a**) and available resources (**Box 6b**);
- ❑ The dispersant is effective (see **Box 10**).

Decision: Continue with dispersant use?

❑ Yes Go to **Box 9**

(No Go to Box 12

There will be a point when dispersantS ARE no longer effective.

BOX 12 **DO NOT USE DISPERSANT**

Dispersant should not be used if any of the following apply:

(The spill cannot be chemically dispersed with an approved and available agent (see Box 2 and Appendix H);

(Oceanographic and weather conditions are not potentially conducive to dispersant use (see Box 3 and DISPERSANT ASSESSMENT WORKSHEET);

(The dispersant will not have a net environmental benefit (see Box 5);

(The dispersant cannot be applied safely (see Box 6), with suitable weather (Box 6a) or available resources (Box 6b);

(The dispersant is not significantly more effective than natural dispersion or other response options (see Box 10).

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Resources from Internet World Wide Web sites:

NOAA Oil Spill Job Aids	http://response.restoration.noaa.gov/job_aid/glossary.html
(web links of 12/18/03)	http://resposne.restoration.noaa.gov/oilaids/spiltool
	http://response.restoration.noaa.gov/disp_aid/remember.html
	http://response.restoration.noaa.gov/disp_aid/checklist.html
	http://response.restoration.noaa.gov/oilaids/OilatSea.pdf
	http://response.restoration.noaa.gov//oilaids/SMART/SMART.html