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Oil Spill Countermeasures

REGION IV
REGIONAL RESPONSE TEAM

BIOREMEDIATION SPILL RESPONSE PLAN

AUGUST 1997

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INTRODUCTION

Biodegradation is a natural process in which microorganisms chemically alter and breakdown organic molecules into other substances - such as fatty acids, carbon dioxide and water - in order to obtain energy and nutrients. The basis for this process is relatively simple: microorganisms require minerals and sources of carbon, as well as water and other elements, to survive and function. The process can involve one step or a series of steps that proceed through the formation of molecules with successively fewer carbons. Generally, the extent to which a particular organic molecule is biodegradable and the rate of degradation depend on the molecule's structural characteristics (chain length, amount of branching, number and arrangement of rings, stereochemistry) and the environmental conditions (temperature, available oxygen, substrate).

Bioremediation is a treatment technology that utilizes biodegradation to reduce the concentration and/or toxicity of chemical substances such as petroleum products and other hydrocarbons. Because microbes capable of degrading hydrocarbons are commonly found in nature, most untreated hydrocarbon spills eventually are removed from the environment by microbial degradation and other processes. Enhanced bioremediation, however, seeks to accelerate natural biodegradation processes by applying specially chosen nutrients and/or microbes to spilled substances. Although microbes have been used extensively and successfully for many years to treat wastes and wastewater in controlled facilities, their potential as a tool for responding to spills of oil and hazardous substances in uncontrolled environments has only more recently received significant interest. (For additional information on bioremediation, refer to Appendix G.)

This document presents a plan for considering and implementing bioremediation, through either natural attenuation or nutrient/microbe enhancement, as a supplemental response tool for spills in US Environmental Protection Agency (EPA) Region 4. It was developed through the coordinated efforts of EPA's Subcommittee on National Bioremediation Spill Response and the members of the Region 4 Regional Response Team (RRT), using EPA's Interim Guidelines for Preparing Bioremediation Spill Response Plans.

PURPOSE

This document has a threefold purpose:

> To outline a process by which Federal On-Scene Coordinators (OSCs) in Region 4 may request authorization to use bioremediation in response to spills of oil or hazardous substances (the authorization procedures presented are consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP));

> To define the types of information necessary to determine if bioremediation is

feasible, provide as much of this information in advance as possible, and outline a mechanism for capturing information on bioremediation use for future decision making; and,

To describe how to implement a bioremediation activity and determine if bioremediation is working.

The document is intended to guide decision makers in evaluating the appropriateness of bioremediation in the cleanup strategy for a spill and in undertaking a bioremediation activity. Ultimately, decisions regarding the use of bioremediation must be based on the OSC's best judgment given the particular circumstances of the spill incident.

The RRT's Response Technology Committee will examine, on an as needed basis, the information in this plan, consider any new advances in and additional experience with bioremediation, and revise the plan as appropriate. Recommendations for revisions should be submitted to the Region 4 RRT for approval. Upon, approval by the RRT, revisions should be incorporated into the Region 4 RCP and other local plans, as appropriate.

APPLICABLE REGULATIONS

Legislation at both the federal and state level may affect decisions to use bioremediation. Existing regulations and policies that govern the use of bioremediation agents in response to spills in Region 4 are summarized in Appendix A.

ROLES AND RESPONSIBILITIES

This section discusses issues relevant to managing the response to a spill, with particular emphasis to managing bioremediation activities.

On-Scene Coordinator (OSC)

As per 40 CFR Section 300.120, USCG and EPA provide pre-designated OSCs that have overall responsibility for oil spill responses in the coastal and inland zones respectively. When considering or actually using bioremediation as a response tool, the OSC shall be responsible for ensuring that the requirements set forth in this plan are properly followed and implemented. This includes notification, planning, documentation and monitoring of all bioremediation activities. Thus, the OSC, in conjunction with his/her contractors or a responsible party, will be directly involved in the cleanup effort.

Federal Agencies

US Environmental Protection Agency - EPA, with their extensive technical expertise in bioremediation, may lend themselves to the OSC as a technical advisor. This expertise includes information on the ability of various bioremediation treatment techniques to degrade oil, their relative toxicity to a habitat and the expected rate of degradation. Typically, EPA provides the Scientific Support Coordinator for inland zone spills. In addition, EPA maintains laboratory facilities that may be used to run bioremediation related studies and analyses.

US Coast Guard - The USCG supplies expertise in oil spill response technology and incident command. Response support, through manpower or equipment, can be provided by the Strike Teams and the National Strike Force Coordination Center. Additionally, the USCG can assist with cost tracking and funding support from the Oil Pollution Trust Fund.

National Oceanographic and Atmospheric Administration - NOAA/HAZMAT provides Scientific Support Coordinators (SSCs) and their support teams. The SSC provides scientific advice to support the Federal OSCs in operational decisions that will protect the environment effectively, mitigate collateral harm, and facilitate environmental recovery. The NOAA/HAZMAT Scientific Support Team has extensive expertise in all scientific aspects of spill response and mitigation and vast experience with oil spill response and several applications of bioremediation in both operational and experimental use. Their expertise in biology, geomorphology, chemistry, and physical and coastal processes and their support can assist in the appropriate selection of bioremediation as a response technique and in its proper application. NOAA/HAZMAT also provides the Department of Commerce RRT member. The DOC RRT member provides advice and access to NOAA and DOC resources and expertise and serves as the point of contact for DOC/NOAA trustee issues.

Department of Interior - DOI has direct jurisdiction for the protection of resources on its own lands, as well as trustee responsibilities for certain natural resources, regardless of location. They can provide information concerning the lands and resources related to geology, hydrology, minerals, fish and wildlife, cultural resources and recreation resources. The DOI natural resource trusteeship also includes migratory birds, anadromous fish and endangered or threatened species and their critical habitats.

State and Local Agencies

State and local agencies have a distinct role and perspective during a response that impacts their own resources. Typically, these agencies can provide valuable information on the latest regulations, guidelines, water resource conditions, environmentally sensitive areas and public concerns. Therefore, any response effort should be carefully coordinated with impacted State and local agencies.

Responsible Parties (RP)

Since the RP has firsthand information concerning the spilled material, the RP may request OSC approval for the use of bioremediation or the application of a bioremediation enhancing agent. The RP can initiate a bioremediation activity after the request is approved by the OSC following concurrence from RRT 4 and consultation with the impacted natural resource trustees. The OSC's request, on behalf of the RP, shall be accompanied by a completed Bioremediation Use Authorization Form. Maximum cooperation and participation should be expected from the RP throughout the entire response and bioremediation activity.

DECISION TOOLS

Spills may be good candidates for bioremediation treatment based on characteristics of the spill and environmental sensitivities of the spill location. To assist OSCs and the RRT in evaluating spills for bioremediation treatment and to document the basis for response decision making, the following are provided: (1) a diagram outlining the decision process that OSCs should follow when deciding whether to use bioremediation, and (2) a form for obtaining authorization to use bioremediation that specifies information which should be collected for presentation to the OSC and RRT. This form, the Bioremediation Use Authorization Form, is presented in Appendix B.

Decision Process

Decisions to use bioremediation should be made after applicable regulatory policies, potential environmental impacts, operational feasibility, logistical coordination, and other pertinent issues have been evaluated. The process to determine whether bioremediation may be feasible for a particular spill is illustrated in Diagram 1. Details for addressing the specific issues are outlined in the section Feasibility Assessment Criteria.

Bioremediation Use Authorization Form

A Bioremediation Use Authorization Form that specifies the minimum information requirements necessary to support decisions regarding the use of bioremediation is included in Appendix B of this plan. The form requests details of the spill incident, bioremediation details, bioremediation Work plan and monitoring plan. Once the form has been completed, it should provide pertinent information needed to make a decision regarding the use of bioremediation.

A completed authorization form should be transmitted to the RRT for the required authorization to proceed with bioremediation treatment. The RRT shall approve or disapprove the use of bioremediation within *24 hours* of receiving a completed form from an OSC.

DIAGRAM 1: DECISION TREE FOR CONSIDERATION OF BIOREMEDIATION

Identify spilled pollutant

Y

Is pollutant amenable to bioremediation?

N

Consider Alternative Method

Y

N

Do regulations permit use of bioremediation AND do hydrodynamics of spill area allow for an effective use of bioremediation?

Y

Implement guidelines for use of bioremediation. Determine Cleanup Endpoints and Time lines.

Characterize impacted areas & identify bioremediation approach

Could impacted areas accommodate active bioremediation/agent application?
(agent must be on NCP Product Schedule)

N

Consider Alternate Method

Y

Infrastructure in place to perform and/or monitor?

N

Is an alternate bioremediation method available?

Y

N

Consider Alternate Method

N

Obtain RRT approval

Y

Bioremediation authorized as

FEASIBILITY ASSESSMENT CRITERIA

Assessing the feasibility of bioremediation is basically a two-stage process. The first stage determines whether a particular spill is a candidate for bioremediation treatment. The second stage determines whether bioremediation can be implemented effectively, given the logistics of application and monitoring.

Incident Characteristics

The characteristics of a spill incident provide indications of the extent to which bioremediation treatment will be safe and effective against the contaminant spilled in a particular location. To aid in assessing bioremediation as a response option in several different habitats, bioremediation advisability information has been provided in the following sections. The matrix provides general guidelines regarding the advised use of bioremediation in different habitats based primarily on concerns for preserving habitats and minimizing harm to the indigenous flora and fauna.

Characteristics of Spilled Oil

The possibility and practicality of using bioremediation against the type of oil or petroleum product spilled should also be evaluated. That is, the extent to which the remaining chemical constituents of the spilled oil (which characterize that oil) are expected to be biodegradable needs to be assessed before bioremediation treatment is considered further. Biodegradation is typically useful on moderately to heavily oiled substrates, after other techniques have been used to remove as much oil as possible and on lightly oiled shorelines where other techniques are destructive or not effective. When used on diesel-type and medium oils that do not have large amounts of high molecular weight, slowly degrading components, bioremediation is most effective. On thick oil residues it is least effective. However, bioremediation should not be considered for gasoline spills, which will be completely removed by evaporation at faster time frames than by microbial degradation. Generally, oils can be divided into the following categories *(to further assist in making this determination see Appendix C, "Evaluating Biodegradation Potential of Various Oils".)* :

Group I: Very Light Refined Products *(gasoline, naptha, solvents)*

- very volatile and highly flammable
- complete removal by evaporation likely
- high acute toxicity to biota
- can cause severe impacts to water-column and intertidal resources
- specific gravity less than 0.80
- will penetrate substrate, causing subsurface contamination
- **not considered for bioremediation due to high evaporation rates**

Group II: Diesel-like Products and Light Crude Oils *(no.2 jet fuel oil, jet fuel, kerosene, marine diesel, West Texas Crude, Alberta Crude)*

- moderately volatile; persists in environment for an increasing period of time as Aweight@ of material increases
- light fractions will evaporate to no residue
- crude oils leave residue after evaporation
- moderate to high toxicity to biota
- can form stable emulsions
- tend to penetrate substrate; fresh spills are not adhesive
- specific gravity of 0.80-0.85; API gravity of 35-45
- **bioremediation most effective on lower molecular weight oils, with faster degrading components; aromatic portions less susceptible to degradation**

Group III: Medium-grade Crude Oils and Intermediate Products *(North Slope crude, South Louisiana crude, no. 4 fuel oil, lube oils)*

- moderately volatile
- up to one third will evaporate in the first 24 hours
- moderate to high viscosity
- specific gravity of 0.85-0.95; API gravity of 17.5-35
- variable acute toxicity, depending on amount of light fraction
- can form stable emulsions
- variable substrate penetration and adhesion
- **bioremediation most effective on lower molecular weight oils, with faster degrading components**

Group IV: Heavy Crude Oils and Residual Products *(Venezuela crude, San Joaquin Valley crude, Bunker C, no. 6 fuel oil)*

- slightly volatile
- very little product loss by evaporation
- very viscous to semisolid; may become less viscous when warmed
- specific gravity of 0.95-1.00; API gravity of 10-17.5
- low acute toxicity relative to other oil types
- can form stable emulsions
- little substrate penetration; can be highly adhesive
- **higher molecular weight and fewer number of straight-chained hydrocarbons makes bioremediation less effective than on medium oils**

Group V: Very Heavy Residual Products

- very similar to all properties of Group IV oils, except that the specific gravity of the oil is greater than 1.0 (API gravity less than 10). Thus, the oil has greater potential to sink when spilled.

Characteristics of Affected Habitats

After evaluating the spilled oil's susceptibility to biodegradation, the habitats impacted by the spilled contaminant and the background level of nutrients in the impacted area should be identified and characterized. For each of the following habitats, the recommended approach is provided; **O** for *Optional*, **NA** for *Not Advisable*. [NOTE: NA does not preclude the OSC from conducting a Pilot Test to determine the effectiveness of bioremediation in an area. The harmful effects of the oil must be balanced against the potential effects of bioremediation.] The listed habitats are appropriate for marine, estuarine and riverine settings.

Open Water (NA)	Off-shore Waters (NA)
Tidal Inlets (NA)	Water Intakes (NA)
Small Lakes/Ponds (NA)	Small Rivers/Streams (NA)
Exposed Man-made Structures (NA)	Sheltered Man-made (NA) Structures
Exposed Scarps in Clay (O)	Wave-cut Clay Platforms (O)
Fine-grained Sand Beaches (O)	Sandy Banks (O)
Mixed Sand and Shell Beaches (O)	Shell Beaches or Banks (O)
Exposed Rip-rap (O)	Sheltered Rip-rap (O)
Exposed Tidal Flats (NA)	Sheltered Tidal Flats (NA)
Salt to Brackish-water Marshes (O)	Freshwater Marshes (O)
Freshwater Swamps (O)	Mangroves (O)

Open Water, Off-shore, Tidal Inlets and Water Intakes **NA**

Bioremediation is not effective for the time-frames of concern, relative to the potential of transport of the oil to areas where it could affect more sensitive resources. Thus, bioremediation treatment is not advisable for these habitats or areas.

Small Ponds, Lakes, Rivers and Streams **NA**

Not applicable for gasoline and light oils due to their rapid evaporation. There is insufficient information on impacts and effectiveness for other oil types, however there are special concerns about nutrient overloading in small, restricted water bodies.

Solid Man-Made Structures: Exposed and Sheltered **NA**

Oiling of exposed sea walls usually occurs as a band at the high-tide line. This type of oiling is not amenable to bioremediation because of difficulty of application and low effectiveness.

Exposed Scarps in Clay and Wave-Cut Clay Platforms **O**

Because of their erosional nature, removal of lightly oiled sediments may not be recommended on these habitats. Bioremediation may be an option whereby the oil could be treated in place.

Fine-grained Sand Beaches or Sandy Banks **O**

On outer beaches with low recreational use, bioremediation may be an option, particularly for light oiling or residual oil left after other countermeasures have been completed.

Fine-grained sand beaches also occur along bay margins and dredge spoil banks. Sandy banks occur along rivers. These habitats typically occur in more sheltered areas, where natural removal of residual oil by wave or current action will be slower then along exposed beaches. They are often not amenable to mechanical removal, thus manual removal of heavy accumulations of oil or oiled wrack may be conducted. Bioremediation may be considered for sites with light oiling or residual oil left **after** manual removal efforts have been terminated.

Mixed Sand and Shell Beaches and Shell Beaches or Banks **O**

For lightly or moderately oiled beaches and banks, particularly where mechanical cleanup may result in removal of large amounts of sediment or be logistically difficult, bioremediation or Ano action@ may be considered. This option is best considered for sites without significant recreational use.

Riprap: Exposed and Sheltered **O**

Oil on riprap can occur as a coating on the boulders or as persistent accumulations of oil in the void spaces between the boulders. Neither type of oil is amenable to effective removal by bioremediation techniques under most conditions. Thus, bioremediation treatment would be optional.

Exposed Tidal Flats and Sheltered Tidal Flats **NA**

Both of these habitats are inundated daily by high tides which results in rapid dilution and flushing of applied nutrients. Bioremediation is not likely to be effective under these conditions. There are significant toxicity concerns for use of bioremediation agents in shallow, poorly flushed areas, such as sheltered tidal flats, or subtital habitats where there are concentrations of sensitive life stages of fish and shellfish, such as sea grass beds and oyster reefs.

Salt to Brackish-water Marshes, Freshwater Marshes, Freshwater Swamps and Mangroves **O**

There are very few cleanup options which do not cause significant impacts to these sensitive habitats. Most often, Ano action@ is the preferred option. However, there may be conditions under which bioremediation may be considered, particularly for lighter oils. In wetlands with shallow, poorly mixed water bodies, the potential increase in eutrophication and ammonia caused by aggressive bioremediation needs to be considered.

LOGISTICAL CONCERNS

Characteristics of a spill incident, including characteristics of affected habitats and spilled pollutant, should determine whether a spill is a candidate for bioremediation treatment. If, based on these factors bioremediation has not been eliminated as a response alternative, then the logistical feasibility of implementing an appropriate bioremediation action plan should be evaluated. Implementation considerations include the proposed scale of a bioremediation activity, the availability of the bioremediation agent(s) proposed for application (if used), and the availability of the resources necessary to conduct the application and monitoring recommended for the agent(s) proposed for use in each affected habitat. (The latter two considerations are highly dependent on the first.)

Scale of Bioremediation Response

The first step in assessing the logistical feasibility of bioremediation is to determine the scale of the bioremediation response. The scale of the bioremediation response refers to the extent to which bioremediation will be involved in the cleanup, particularly in terms of the size of the area. The scale of the bioremediation response effort will determine the amount of agent(s) *(if any)*, the number of personnel, and the equipment resources necessary to complete the chosen treatment technique and monitoring of the bioremediation response effort.

Agent Availability

Once the proposed scale of the bioremediation response activity has been determined and agent alternatives have been identified, the availability of these agents for use at the spill location should be assessed. If an agent is not available in quantities necessary to complete the bioremediation response activities, the scale of the bioremediation response should be reevaluated, a different bioremediation technique should be considered, or bioremediation should be eliminated as a response alternative.

Application and Monitoring Resources

Several application methods are generally available for bioremediation agents and each method may have unique resource requirements for its implementation. To determine whether requirements for application methods will preclude or limit the use of a particular method, the habitat(s) where bioremediation is being considered for cleanup should be evaluated to determine which method is most appropriate.

Next, the types and supply of available equipment and personnel adequate to implement and monitor the bioremediation response effort, as well as access to laboratory facilities for sample analyses, should be evaluated. (Refer to the Biomonitoring Plan section for recommended monitoring activities and monitoring resource requirements.) If the desired bioremediation response requires more resources than are currently available or attainable, the scale of the bioremediation response may need to be reduced.

IMPLEMENTATION

Before initiating bioremediation treatment, several steps shall be completed. First, the OSC shall notify RRT 4 that the use of bioremediation is being proposed by transmitting the completed Bioremediation Use Authorization Form. Second, a Bioremediation Work Plan and Bioremediation Monitoring Plan shall be developed to address issues necessary to ensure an efficient and effective bioremediation spill response.

RRT Notification

After finalizing the selection of a bioremediation treatment technique and the appropriate method for each affected habitat to receive treatment, the completed Bioremediation Use Authorization Form shall be transmitted to the affected State(s), EPA Region 4, the appropriate USCG District and the Federal Trustees for concurrence and consultation with the decision. If applicable, the appropriate Federal Land Manager (e.g., DOI) should also be notified.

If use of bioremediation in the spill area has been pre-approved or pre-authorized by RRT 4, this concurrence is not necessary. However, the OSC must still notify RRT 4 of the decision to use bioremediation. In the event RRT 4 pre-authorizes an area for the use of bioremediation, such areas will be included in the plan by addendum.

BIOREMEDIATION WORK PLAN

Work plans are important to ensure the safe, coordinated, and well documented implementation of bioremediation. Work plans are comprised of systematic procedures and guidelines that clarify and resolve issues such as worker and public safety, documentation requirements, response personnel roles and responsibilities, treatment technique agent application protocols, and application control and oversight considerations. Complete Work plans must include spill and site specific considerations. It is essential in a response that every incident or event be managed according to a plan and bioremediation is no exception. The Work plan shall provide:

- A clear statement of objectives and actions.
- A basis for-measuring work effectiveness and cost effectiveness.
- A basis for measuring work progress and for providing accountability.

Plans should be prepared for specific time periods or operational periods. These periods can be of various segments of time. Decisions on the length of the operational period or time segments may be affected by the length of time available/needed to achieve objectives, the availability of resources, environmental considerations, and safety considerations. Essential parts of any Work plan are:

1. **Statement of objectives -** Statement of what is expected to be achieved. Objectives must be measurable.

2. **Organization -** Describes what organization will be in place. This will describe in detail the specific roles and responsibilities of the participants in a bioremediation treatment technique. This will also describe the interaction of one entity to another.

3. **Tactics and assignments -** Describes tactics and control operations and what resources will be assigned. If the application is a large one, resource assignments may be done by groups.

4. **Supporting material -** Examples include a map or sketch of the area(s) to be treated, communications, traffic plan, weather data, special precautions, and safety information.

All supervisory personnel must be familiar with the plan and any changes which develop throughout the life of the project. This can be accomplished through briefings and by distributing copies of the written plan.

The Work plan must include an avenue to provide for ongoing evaluation of the plan's effectiveness. Supervisors should regularly assess work progress against control operations called for in the plan. If deficiencies are found, improved direction or additional staffing may be required, tactical operations may need to be modified, and/or changes may need to be reflected in planning for the next segment of time.

Demobilization activities, although often overlooked, are an integral part of the

Work plan. As the project begins to wind down, everyone will be anxious to leave the scene and return home. Demobilization planning helps to assure a controlled, safe, efficient, and cost effective demobilization process.

Organization

The response structure or organizational framework identifies the participants in a response, their general areas of responsibility, and the lines of authority among them. A chart illustrating the participants in a bioremediation response activity in Region 4 and their inter-relationships would be very helpful in summarizing this information. In developing this section, the following questions should be addressed:

- Who will manage the overall bioremediation activity?
- Who will be the likely participants (e.g. federal and state agencies) in the activity for the Region? What are the general roles?
- Who will be the likely participants, if any, from outside the Region? What are the general roles?
- Who will manage the monitoring portions of the activity?
- Who will develop an appropriate Work plan for the bioremediation activity?
- Who will perform specific treatment method or agent(s) application(s)?
- Who will perform monitoring?
- Who will perform public outreach?

Describe in detail the specific roles and responsibilities of the likely participants (RRT, federal and state agencies, international governments/agencies, non-governmental organizations, responsible parties, etc.) in a bioremediation activity in Region 4. The information in this section should coincide with the information presented above on the regional response structure.

Tactics and assignments

Tactical direction includes determining the tactics and operations necessary for the selected strategy and determining and assigning the appropriate resources.

Resource assignments should be made for each specific work task. Such assignments should consists of the kind, types and numbers of resources available and needed to achieve the desired outcomes.

Personnel and logistical support factors must be considered in determining tactical operations. Lack of logistical support can mean the difference between success and failure in achieving objectives.

Supporting Material

Public Safety/Information - Public safety is paramount in any bioremediation project. The following are some suggested actions which should be taken during a spill response to ensure public awareness and protection:

> Provide news releases and updates to newspapers, radio, television stations, and neighboring areas that could potentially be impacted by bioremediation activities. Be prepared to discuss details regarding the chosen treatment technique in simple layterms so the affected public will have an understanding of exactly what to expect and what the expected benefits are.

Site/Worker Safety - Worker health and safety is always the foremost concern during any spill response action. Since all oil spill response actions require a health and safety plan and the bioremediation application is merely a facet of the total spill response effort, the existing heath and safety plan should be used for the bioremediation application and augmented with the specific safety hazards associated with the bioremediation treatment method or agent application. A section referred to as biological hazards should be included in all health and safety plans associated with oil spill responses where biological agents are used as a response tool. This section should discuss the specific health and safety concerns associated with possible exposure to biological agents and include material safety data sheets (MSDS) for all agents being used. At a minimum, the health and safety plan should address the following aspects of the bioremediation treatment method/monitoring program:

1. minimum health and safety concerns,
2. potential hazards during application and monitoring,
3. evaluations of those identified hazards,
4. actions described to minimize the potential hazards, and
5. response(s) needed if hazard does effect worker(s).

The following documents contain guidance on the preparation of health and safety plans:

1. OSHA 1910.120 and EPA 40 CFR 311,
2. USEPA, OERR ERT Standard Operating Procedures,
3. NIOSH/OSHA/USCG/EPA Occupational Health and Safety Guidelines,
4. ACGIH Threshold Limit Values, and
5. existing local and area contingency plans.

To avoid disturbances to the treated area after treatment, all treated and control sites should be secured by the best achievable means. To avoid possible injury, post warning signs or secure the treated area to differentiate the site from surrounding localities.

BIOMONITORING PLAN

Bioremediation is assumed to enhance the biodegradation of oil or hazardous substances without increasing adverse impacts to human or ecological health. Until there is defensible documentation from actual field use to confirm this assumption, however, bioremediation effectiveness and safety need to be monitored through a sound program of applied science. Therefore, an associated biomonitoring program shall be conducted when bioremediation treatment (either natural or enhanced) is used as a response tool. The plan outlining the biomonitoring program will be referred to as the biomonitoring plan.

Objectives

The principal objectives of the monitoring program and the elements of each objective are listed below.

1. Determine the efficacy of the selected bioremediation treatment method as it relates to the degradation of the spilled material.

   To continue to use biological degradation, the response community must compile data which shows that the use of bioremediation accelerates the breakdown of oil in the environment at a faster rate than if the oil was left to breakdown and degrade naturally. If there is no proven acceleration of the breakdown, then the risks and costs associated with the use of biological methods may outweigh the advantages.

2. Measure the environmental impact, if any, resulting from the biotreatment of an area, throughout the response activity to ensure against the harmful effects from the response. Especially, monitor any increases in eutrophication or ammonia caused by bioremediation.

   The monitoring of water quality parameters throughout the bioapplication is essential due to the potential for algae blooms, dissolved oxygen depletions, elevated available toxins in the water column, all of which may result in a critical impact to aquatic and vegetative life.

3. Determine if the bioremediation end points have been reached.

   With the use of all response tools it is important to determine at what point the tool is no longer effective or at what point it has achieved its objective. Thus biomonitoring end points must be developed prior to the initiation of the application, keeping in mind that these end points may need to be modified as the program progresses.

4. Ensure the comparability of data collected from all bioremediation response efforts conducted within Region 4 through compliance with USEPA Region IV=s Sampling Standard Operating Procedures.

This is done in order that the data may be used to enhance our understanding of bioremediation as an oil spill response tool. Properly collected, validated and interpreted data will provide critical information to assess the efficacy and environmental impact of bioremediation treatment and related response activities. Such documentation is needed to identify and correct problems in the biological treatment process, to determine whether bioremediation endpoints have been reached, to ensure that biotreatment is less environmentally harmful than the spilled pollutant and to support cost recovery and other legal actions.

Secondarily, the data can be used for developing regional and national data bases, interfacing with natural resource trustees, preparing interim and final reports, and revising this biomonitoring plan.

Quality Assurance

The quality of environmental data used to support OSC decision-making is critical to a spill response that considers or uses bioremediation. The primary goal of the quality assurance (QA) program is to ensure the accuracy of the environmental data considered by the OSC and RRT 4. It is the QA policy of RRT 4 that all activities associated with data collection and derivation are to be documented thoroughly. A monitoring program manager should be selected to specify procedures for ensuring the quality of data generated through the monitoring program and for providing sufficient resources for QA of collected data.

Biomonitoring Plan Design

Each biomonitoring program, in large part, will be event/site specific; however, pre-event planning and standardization of collection/analysis methods is encouraged. The design of the biomonitoring program is two-fold: (1) to document any impact to water quality which might result from the treatment or application and (2) to provide for the evaluation of the effectiveness of the treatment method or applied agent(s).

Conducting biomonitoring does not preclude the OSC/RP from conducting any other required monitoring associated with the spill event.

Project planning and site reconnaissance are essential activities conducted prior to the design of the biomonitoring plan. The OSC/RP may wish to refer to the area contingency plan (ACP) for existing shoreline or site assessment procedures developed by the area committees. The purpose of site reconnaissance activities are to gather information sufficient to:

- Determine that the objectives of the biomonitoring plan are consistent with the features of the site selected for application;
- Identify the type and quantity of existing historical water quality data for the area selected for the application, such as nutrient loading trends and physical water parameters;
- Define the geographic area of the spill targeted for application, for physical and chemical characteristics important to the design and execution of the biomonitoring plan;
- Determine the distribution, abundance, and seasonality of habitats, in the area to be considered for application;
- Project weather forecasts, meteorological and hydrogeological trends in the potential application area, for the proposed application time period;
- Determine equipment needs based on operational logistics; and
- Develop procedures designed to document sample collection methods and procedures.

The extent of the biomonitoring program should be directly proportional to the complexity and sensitivity of the area(s) chosen for biological degradation. The more diverse and sensitive the effected environment, the more complex and extensive the biomonitoring program should be. The volume of material spilled is not the driving factor in determining the extensiveness of the biomonitoring program; however, the larger the spill, in general, the more area affected and the greater the potential for affecting sensitive ecosystems. Thus, large spills generally will require a more extensive biomonitoring program. The OSC/RP should refer to the ACP and incorporate any and all required monitoring as directed by the ACP.

Because one spill event may affect several different morphological environments or habitats, bioremediation treatment techniques may be applied in several different habitats. The supporting biomonitoring program must be designed to accommodate inherent differences which are present in each habitat. Thus, each discrete habitat, within an application area, may require its own monitoring program.

Monitoring Activities

Biomonitoring plans should ensure that observations and samples be collected and analyzed from the following areas - within each discrete habitat(s):

<u>Untreated areas</u>

1. uncontaminated, untreated source areas (this will serve as background information and may not require the same intensity of sampling as the other areas),
2. contaminated, untreated source areas, and

<u>Treated area</u>

3. contaminated, treated areas

In order to evaluate the effectiveness of the bioremediation treatment technique the biomonitoring plan should provide for the comparison of replicate data from treated and untreated areas for the duration of a project.

Within each discrete habitat which is a part of the bio application project, treated and untreated sites that exhibit similar chemical and physical characteristics should be chosen. Their similarity will support the comparability of the data generated. During their selection the following criteria should be considered, (1) environmental parameters, (2) physical habitat and geomorphology, and (3) oil loading and the probability of further oiling. Site variability should be limited as much as possible in order to generate data which is comparable.

Other physical variances which may effect the integrity of the data collected are wave action, tidal flushing, currents, boat traffic, and exposure to wind or other external forces.

Because efficacy analyses focus on evaluating relative changes in the concentration of the constituents of oil between treated and untreated sites, it is important to ensure that uncontaminated source areas remain uncontaminated for the duration of the monitoring program and contaminated areas are not reoiled for the duration of the monitoring program.

Monitoring should take in place in two forms:

1. Qualitative - serves as real time feedback for response decision and is usually in the form of visual observations, supported by photo documentation.

2. Quantitative - serves as the basis for longer term analysis of the success of the project and is in the form of sample collection and analysis.

Although visual observation is considered subjective, there is no substitute for this type of "real time" or fast feedback. Observers must be assigned to the project and trained to monitor morphological changes which may occur to the oil as it breaks down and any changes in organism behavior, such as the occurrence of algae blooms and fish kills.

All sample collection and analysis begins with a sampling plan. The sampling plans should include, at a minimum, the following:

- Implementation schedule (monitoring should be expected to take place over 3-4 months or until end points are reached)
- List of objectives
- Tasks to be conducted
- Description of project management
- Identification of sensitive areas included in/adjacent to the sample location areas
- Identification of sample locations, frequency, and collection methods
- Description of sample chain of custody procedures and QA/QC procedures
- Description of water quality history (if available) of the affected area or procedure for

determining background values for the affected area if historical data does not exist

The environmental characteristics and measurements that should be assessed and the samples that should be taken as part of the biomonitoring are presented in Table 2, along with a schedule for performing these activities. Sampling at each site, water depth (as appropriate), and time, should be performed in *duplicate for 10% of the samples collected*. Although the mix of samples collected should be based on the requirements of the analytical methods, minimum sample sizes are recommended as 1 liter for water samples and 4 - 16 oz for sediment or shoreline materials. All samples should be placed in precleaned jars or bottles with Teflon lined caps, as appropriate.

The monitoring parameters should involve a tiered approach which utilizes relatively inexpensive techniques such as total petroleum hydrocarbons (TPH) for screening and more sophisticated methods that target individual petroleum constituents to confirm biodegradation efficacy in *at least 25% of the samples analyzed*. The latter would include GC/MS analysis of target aliphatic and aromatic hydrocarbons which have been identified as marker compounds for tracking oil degradation and weathering, such as the normal alkanes, the isoprenoids, pristane and phytane, and the conservative biomarker hopane. Water quality measurements should include nutrients, dissolved oxygen, biological oxygen demand (BOD), TOC and COD. Refer to Appendix E for methodologies and recommended procedures.

All data is subject to review by the OSC or a delegate and will be made available upon request. This data will support further response decisions and to provide the response community with a better understanding about the use of bioremediation as an oil spill response tool.

DOCUMENTATION AND REPORTING

During the course of a bioremediation activity and accompanying monitoring effort, the following reports shall be prepared and submitted to the OSC:

<u>Activity reports</u> -- provide descriptions of the bioremediation activity area, weather, unique observations, and activities undertaken, as well as the names and affiliations of persons on site. Activity reports should be prepared whenever activities on a site are undertaken.

<u>Analytical reports</u> -- provide laboratory analysis results of environmental and control samples. Lab results should be analyzed, interpreted and a brief summary report prepared within a reasonable time agreed to by all parties.

<u>After action report</u> -- provide a description of the overall bioremediation activity and accompanying monitoring effort, including results of both field and laboratory activities. A draft should be submitted within 30 days after the end of the monitoring

effort. A final report, (incorporating comments from those the draft was submitted to, as well as photos) should be submitted within 60 days after submission of the draft.

In addition, at the time the final after action report is submitted, all field notes, including those of contractors, should be submitted to the OSC.

To facilitate information transfer and the development of a data base on bioremediation use and bioremediation agents, the Bioremediation Use Follow-Up Form in Appendix F should be completed at the end of the bioremediation activity.

PLAN REVISION

The monitoring plan and suggested procedures outlined in this section should be implemented and modified, as necessary, based on the cumulative experience and knowledge gained from conducting bioremediation field activities and associated laboratory activities. Recommendations for revisions should be submitted to the Region 4 RRT for approval.

TABLE 1
FIELD-MONITORING PARAMETERS

Parameter	Sample Size[1]	Assessment/ Collection Location	Assessment/Collection Frequency[2]
Visual observations (mortality, behavioral effects, appearance changes, oil distribution)	N/A	All test sites	Daily to the extent possible; at least each day that water, sediment, and/or shoreline material sampling is performed
Temperature (air, water)	N/A	All test sites	Days 0, 1, 7, 14 and every week thereafter
Salinity	N/A	All test sites	Days 0, 1, 7, 14 and every week thereafter
Dissolved oxygen	N/A	All test sites	Days 0, 1, 7, 14 and every week thereafter
Sea state	N/A	Activity area	Days 0, 1, 7, 14 and every week thereafter
Current	N/A	Activity area	Days 0, 1, 7, 10 and 20
Wind velocity	N/A	Activity area	Days 0, 1, 7, 14 and every week thereafter
Efficacy (water, sediment, and/or shoreline material)	1 liter water; 20 grams sediment or shoreline material	All test sites and, as appropriate, all water depths	Days 0, 1, 7, 14 and every week thereafter
Toxicity[3] (water, sediment, and/or shoreline material)	8 liters water; 20 grams sediment or shoreline material	All test sites and, as appropriate, all water depths	Days 0, 1, 7 for Microtox and at same intervals for every reapplication of agent, for long term amphipod days, 0, 1, 7, 14 and every week thereafter

[1]N/A means "Not Applicable".
[2]Frequency is relative to the time of agent application.
[3]Sample size, location and frequency for toxicity testing are recommendations. Actual parameters shall be determined based upon conditions of the spill event.

APPENDIX A

APPLICABLE FEDERAL AND STATE REGULATIONS

Legislation at both the federal and state level may affect decisions to use bioremediation. Existing regulations and policies that govern the use of bioremediation treatment techniques and agents in responses to spills in Region 4 are summarized below.

Federal Regulations

At the Federal level, Subpart J of the NCP governs the use of chemical and biological agents -- which include bioremediation agents -- in responding to oil spills. Specifically, the Subpart:

Restricts the use of chemical and biological agents that may affect US waters to those listed on the NCP Product Schedule;

Specifies technical product information that must be submitted to EPA for an agent to be added to the Schedule; and

Establishes conditions for obtaining authorization to use chemical or biological agents in a response action.

If EPA determines that the required data were submitted, EPA will add the agent to the Schedule. Note, however, that listing of an agent on the NCP Product Schedule does not constitute approval of that agent for use or confirmation of any claims regarding the agent's safety or effectiveness.

Data on agents listed on the NCP Product Schedule are available through EPA's Emergency Response Division in Washington, DC.

The OSC, with concurrence of RRT 4, including the RRT representative from the State with jurisdiction over the waters threatened by the spill, may authorize the use of any agent listed on the Product Schedule. In addition, when practicable, the OSC should consult with the Department of Commerce (DOC) and Department of Interior (DOI) representatives to the RRT before making a decision to bioremediate a spill. If the use of particular products under certain specified circumstances is approved in advance by the State, DOC, and DOI representatives to the RRT, **<u>and</u>** such preapproval is specified in the Regional Contingency Plan, the OSC may authorize bioremediation without consulting the RRT.

State Regulations and Policies

The following States do not currently have set policies regarding the use of bioremediation during a spill event. For approval or information, contact the State=s representative to the Region 4 RRT.

Alabama	**Georgia**
Kentucky	**Mississippi**
South Carolina	**Tennessee**

Regulations and Policies in the State of Florida

The State of Florida does not have any regulations that specifically address the use of bioremediation as a spill response tool. However, regulations do specify that any person discharging a pollutant shall immediately undertake actions to contain, remove, and abate the discharge (Chapter 376.305(l), Florida Statutes) to the satisfaction of the Department of Environmental Protection (DEP). The DEP does not encourage bioremediation as a primary response countermeasure, but instead it may be used in conjunction with other conventional remedial actions. The exception to this is when the option of doing nothing is considered or conventional cleanup/treatment methods are not feasible. In those cases, in-situ bioremediation can be an effective substitute for traditional cleanup technologies.

The DEP has developed a set of guidelines to assist the state OSC or first responder with bioremediation decisions and proper use. The AGuidelines for the Use of Bioremediation as a Cleanup Technique@ apply to spills of less than 50 gallons of petroleum on inland areas or in non-navigable waters of the state. The DEP has not established any guidelines or policies regarding the use of bioremediation for coastal spill response. In these cases, the DEP will work closely with the Florida Marine Research Institute, the federal OSC and the RRT to identify areas where bioremediation would be considered.

The use of bioremediation is prohibited for petroleum contaminated site (inland UST sites) remedial actions unless specifically approved by the DEP Bureau of Waste Cleanup, Technical Support Section. The DEP has established petroleum contaminated soil cleanup criteria (Chapter 62-770, Florida Administrative Code) and publishes AGuidelines for the Assessment and Remediation of Petroleum Contaminated Soil@ to clarify the DEP=s position concerning petroleum contaminated soil remedial actions.

Regulations and Policies in the State of North Carolina

The State of North Carolina=s Department of Environment, Health, and Natural Resources regulates the use of bioremediation for response to spills. When requesting an evaluation to utilize bioremediation the following information must be submitted to:

Dr. Luanne Williams
North Carolina Department of Environmental, Health and Natural Resources
Occupational and Environmental Epidemiology Section
PO Box 29601
Raleigh, NC 27626-0601
(919) 715-6429

Required General Information

1. Division of Environmental Management (DEM) contact person and phone number.
2. Current or future use of site with site contact person, address & phone number.
3. Contractor applying product, contact person, address & phone number.
4. Distance and impact to public or private wells used for drinking, industrial processes, cooling, agriculture, etc. and is area served by public water supply? Verification must be provided by the regional Groundwater and Public Water Supply Sections. Send responses to Dr. Luanne Williams.
5. Detailed specifications of the contamination present in the soil and/or groundwater.
6. Approximate distance & name of nearest surface water body (provide map).

Required Product/Process-Specific Information (All information submitted will be maintained as proprietary and not disclosed to other parties.)

1. Product manufacturer name, address, phone number and contact person.
2. Genus/species/strain of microorganism(s) contained in product
3 Identity of specific ingredients and concentrations of ingredients contained in the product and purpose of each.
4. Documentation of evidence from authoritative technical references (i.e. Bergey=s Manual of Systematic Bacteriology, Bergey=s Manual of Determinative Bacteriology or other existing references) that the microorganism(s) are not pathogenic to animals or humans.
5. Documentation (i.e. references) of whether or not the microorganism(s) are naturally-occurring in the immediate or similar environment.
6. Documentation (i.e. references) of specific degradation products expected.
7. Documentation (if available) of migratory potential of microorganisms and degradation products in soil and groundwater.
8. Complete description of the bioremediation process on a site (e.g. application of the product to soil and/or groundwater, aeration of soil, procedures needed to maintain growth and chemical degradation).

The risk evaluation will be forwarded to the designated contact person within the company, site owner, manufacturer, consultant applying the product, DEM contact person and Groundwater Section contacts--Linda Blalock (Federal Trust Fund) and Brian Wagner

(Operations Branch).

APPENDIX B

BIOREMEDIATION USE AUTHORIZATION FORM

The following questions should be answered, if known, and presented to the OSC who will review them and present them to the RRT for consideration. A question left unanswered will not automatically result in a no-go decision, but EVERY effort should be made to present accurate and timely information. The RRT will use the information provided below to assist in making the decision for use of bioremediation.

The form consists of two parts, incident characteristics and feasibility assessment criteria. Additionally, a Bioremediation Work plan and Biomonitoring Plan must be prepared and submitted to the OSC or his designee for review. (Note: Many of the items requested in the feasibility assessment criteria section can and should be included in the bioremediation Work plan.)

Incident Characteristics

Time and date of release:

Product spilled:

Quantity spilled:

Status of spill:

Location of incident:

Description of incident:

Properties of spilled product:
- specific or API gravity
- viscosity, cp
- pour point, at temp, F
- sulfur content, %w

Responsible party information:
- company
- address
- telephone
- contact person
- telephone

Feasibility Assessment Criteria

Specific location proposed for treatment:

What are the characteristics of the spill environment?

- type of environment, habitat
- marine, brackish, freshwater
- past spill history

Amount of weathering spilled product has undergone:

Description of impact(s):

Has ownership of land been determined:

Has written permission from landowner been obtained:

Bioremediation agent proposed for use:

- Name of product.
- Type of agent (microbial, nutrient, microbial + nutrient, etc.).
- Is agent listed on NCP?
- Has EPA data been reviewed by the SSC?
- To what tier has the agent been formally evaluated?
- Does the agent or responsible party have any previous first hand experience with the use of the proposed bioremediation agent, or have any corroborated (laboratory or field) data indicating it enhances biodegradation and is not toxic to affected spill environment?
- Has this agent been used on previous oil spills?
- What were the characteristics of the oil and the spill environment in each case?
- Are degradation results (based on oil chemistry and microbial tests) available for review?
- Is a reference available?

Supply:

- source of supply
- amount available
- ETA to site

Application:
- estimated amount of agent(s) needed
- who will apply the agent (vendor personnel, response contractor personnel, or other contractor)
- method to be used in applying agent
- impacts of proposed application method
- time to prepare agent for application
- has application equipment been calibrated for this particular application
- planned rate of application
- how long will application take
- will product have to be reapplied
    - how frequently

Bioremediation Work plan

Has a bioremediation Work plan been prepared?
Has the plan been reviewed?

Biomonitoring Plan

Has a biomonitoring plan been prepared?
Has it been reviewed?

Project Management

Bioremediation application project manger:
contact number:
address:

This bioremediation application has been approved:

__________ Federal On-Scene Coordinator	__________ State On-Scene Coordinator	Environmental Protection Agency
__________ Department of Commerce	Department of Interior	

APPENDIX C

EVALUATING BIODEGRADATION POTENTIAL OF VARIOUS OILS

APPENDIX D

BIOREMEDIATION AGENTS AND AGENT SELECTION

This section describes the various types of bioremediation agents, a procedure for evaluating them, and guidelines for selecting the appropriate agent for use in a particular spill situation.

Background

Section 311 of the Clean Water Act requires that the US Environmental Protection Agency (EPA) prepare a schedule of dispersants and other chemicals that may be used in preparing for and responding to discharges of oil and releases of hazardous substances, as provided for in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This schedule is known as the NCP Product Schedule. The Schedule lists agents that may be authorized for use on oil discharges in accordance with the procedures set forth in Section 300.910 of the NCP. (Authorization of use requires that the Federal On-Scene Coordinator (OSC) considering the use of a dispersant or other agent, such as a biodegradation enhancing agent, seek the concurrence of the Regional Response Team prior to the agent's application.) Any agent considered for application to an oil spill should be listed on the NCP Product Schedule.

The NCP Product Schedule currently divides chemical and biological agents into five categories:

1. dispersants,
2. surface collecting agents,
3. biological additives,
4. burning agents, and
5. miscellaneous oil spill control agents.

Most bioremediation agents, including those that are solely nutrients, are listed as biological additives, as the designed purpose of these agents is to enhance the rate of oil biodegradation by increasing microbial activity. There are also bioremediation agents listed as dispersants; these agents are water-based products that claim to enhance the rate of oil biodegradation by emulsifying spilled oil thereby making it more "bio-available." Additionally, other products that do not fit a current regulatory definition because of their unique nature may be listed as miscellaneous agents. Use of any of these agents should be consistent with the Regional Response Team's general guidelines for their application and use.

Types of Agents

The number and type of agents which claim to enhance the rate of biodegradation has broadened to fill the current perceived market. Although there are no current regulatory definitions for every type of bioremediation agent, the following are broad definitions for those currently available:

Microbial Agents -- concentrated cultures of oil-degrading microorganisms grown on a hydrocarbon-containing medium that have been air- or freeze-dried onto a carrier (e.g., bran, cornstarch, oatmeal). In some cases, the microorganisms may be grown-up in bioreactors at the spill site. All commercially available agents use naturally-occurring microorganisms. Some agents may also contain nutrients to assure the activity of their microbial cultures. This type of agent is intended to provide a massive inoculum of oil degrading microbes to the affected area thereby increasing the oil-degrading population to a level where the spilled oil will be used as a primary source of food for energy. Microbial agents are designed to enhance the biodegradation of oil at any, location and would be most useful in areas where the population of indigenous oil degraders is small.

Nutrients -- agents containing nitrogen and/or phosphorous as the primary means to enhance the rate of growth of indigenous oil-degrading microorganisms. This type of agent is intended to increase the oil-degrading biomass already present in an affected area to a level where the oil will be used as a primary source of food or energy. Because the natural environment may not have sufficient nutrients to encourage bacterial metabolism and growth, extra nutrients may be required. The purpose of this type of agent, therefore, is to provide the nutrients necessary to maintain or increase microbial activity and the natural biodegradation rate of spilled oil. This type of product has been used in Prince William Sound, Alaska and Pall's Island, New Jersey to reduce the amount of oil on contaminated beaches. [For information on uses in Alaska, refer to Pritchard and Costa's article entitled 'EPA's Alaska Oil Spill Bioremediation Project' in *Environmental Science & Technology* (Vol. 25(3), 1991), and the article by Chianelli *et al.,* entitled "Bioremediation Technology Development and Application to the Alaskan Spill" *in Proceedings: 1991 Oil Spill Conference.*]

Enzymatic - bio-catalysts designed to enhance the emulsification and/or dispersion of oil and make it more available to microorganisms as a source of food or energy. These agents are generally liquid concentrates, which may be mixed with surfactants and nutrients, that are manufactured through fermentation. This type of agent is intended to enhance biodegradation by indigenous microorganisms.

Other Agent -- include agents that do not fall under the above definitions, such as application mechanism agents that are designed to have an affinity for oil and bring together the elements needed for enhanced oil degradation. Examples of application mechanism agents include time release capsules, liposomes, timed-release fertilizers (e.g., Custom blend), and agents that make oil more hydrophilic.

Agent Evaluation Procedure

In considering bioremediation agents listed on the NCP Product Schedule or proposed by agent vendors for potential use in spill cleanup, it is important that response decision-makers evaluate the various characteristics of agents, particularly their safety and efficacy. From the perspective of planning for bioremediation use, the most appropriate time to evaluate agents whether performed by EPA, product vendors, or contractors - is before a spill occurs. Provided below is a procedure designed specifically to aid in such an evaluation, which is directed ultimately at identifying bioremediation agents that will be safe and effective in field applications. There may be circumstances, however, under which there is not adequate time to perform thorough agent evaluations before a decision regarding bioremediation use must be made. In these instances, the procedure below should be used as a guide to determine whether existing information on individual agents is adequate to support further consideration of their use.

The procedure follows a "tiered" approach (a "Base Tier and four subsequent tiers) whereby bioremediation agent performance data is gathered as a means to predict the safety and efficacy of agent applications in various field settings or habitats where oil spills may occur. The proposed procedure is intended as a standard methodology for assessing the effectiveness and safety of different bioremediation agents. Following the procedure will not assure that a tested agent will be effective in spill cleanup, however, following the procedure should increase the level of confidence that use of an oil spill bioremediation agent will be effective and safe.

Base Tier -- "Go"/"No Go". Requirements and Information

Information on a bioremediation agent should be collected from the agent vendor and an initial screening of the information performed. Objectives of this screening are to:

- Ensure that the agent is listed on EPA's NCP Product Schedule.
- Obtain basic information on a bioremediation agent's makeup;
- Ensure satisfaction of minimal regulatory approvals that may be required;
- Certify whether the agent contains pathogenic, carcinogenic, or hazardous substances or microorganisms normally considered unacceptable for release into the environment; and,

Information needed from the agent vendor to perform this initial screening includes the agent's exact chemical and biological makeup as well as formulation characteristics, and proof of the agent's listing on the NCP Product Schedule.

Tier I -- Feasibility Assessment

Additional vendor information on a bioremediation agent should be collected to support an assessment of whether use of the agent is feasible. The objectives of this tier and assessment are to obtain an understanding of a vendor's capabilities; an agent's availability, contents, and proposed method of use; and an agent's history of use, where applicable. Agent information needed from the vendor to perform this assessment includes the following:

- Application rates and methods;
- Mode of biodegradation and calculated efficiency;
- History of use at previous cleanups;
- Chemical properties, fate and persistence, and potential toxicity or bioaccumulation for humans, mammals, and birds based on a review of published literature and chemical databases;
- Acute or chronic toxicity to one marine or freshwater fish and invertebrate species selected from US EPA's "Effluent Monitoring Program"; and, where available,
- Effectiveness in enhancing biodegradation over a baseline standard or control demonstrated by descriptions and quantitative analytical results of any laboratory or field studies performed (such as results of gas chromatographic analyses of treated and untreated samples for alkanes and/or aromatics).

A description of the management structure and qualifications of the vendor's organization is also needed.

Tier II - Laboratory-Scale Data

Standard laboratory methods should be used to develop data on an agent's toxicity and its ability to stimulate the biodegradation of a standard oil. The specific objectives of this tier are to evaluate the relative ability of a bioremediation agent to degrade oil, or stimulate the rate of biodegradation, under defined and controlled laboratory conditions and to determine the potential toxicity associated with the agent's use through the performance of standard toxicity tests. Analytical methods developed by EPA should be used to perform these laboratory studies.

The approach to evaluate an agent's relative effectiveness at degrading oil should:

- Provide sufficient information to indicate with a firm degree of confidence that the agent is degrading oil constituents;
- Provide an indicator of total microbial activity; and
- Assure the viability of the culture being tested, where applicable.

The approach should include temperature, salinity, and nutrient testing to document the conditions under which an agent's ability to degrade a standard type of oil was determined.

The approach to evaluate an agent's toxicity should be conducted for specific fresh-water or marine species on the agent alone and the agent and standardized oil combined. Seven-day chronic estimator methods should be performed using daphnia (Ceriodaphnia) and fathead minnows (Pimephales) for fresh water, and mysids (Mysidopsis) and silversides (Menidia) for marine applications. These are standard tests; additional tests specific for Regional species may be desirable. Mammalian toxicity of agent constituents should be reviewed in existing data to determine whether any precautions need be taken with regard to application methods, rates, or timing to protect persons applying agents as well as indigenous wild life.

Tier Ill - Simulated Field Test Demonstration

Based on findings of previous tiers, microcosm systems should be used to perform simulated field test demonstrations on a bioremediation agent, as appropriate. The objective of this tier is to predict a bioremediation agent's effectiveness at degrading oil or petroleum products in specific field settings or habitats.

Although EPA-approved microcosm systems for performing simulated field test demonstrations are still under development at the time of this writing, the approach for performing these tests is to use microcosm systems that simulate actual biodegradation field kinetics. This approach will aid in determining the relative effectiveness and toxicity of an agent under conditions that cannot be modeled in standard laboratory methods, such as those proposed in Tier 11 of the procedure. Microcosm systems that should be considered for simulated field test demonstrations of agents include:

1. cobble beaches, both marine and fresh water;
2. open water, both marine and fresh, warm and arctic;
3. marshes and wetlands, both marine and fresh water;
4. inland shoreline;
5. sandy beaches, both marine and fresh water; and,
6. land/soil.

Tier IV -- Limited Field-Scale Demonstration of the Agent

Depending on the results of the simulated field test demonstration in Tier III, a limited field scale demonstration of a bioremediation agent should be conducted. The objectives of this field demonstration are to test the effectiveness and toxicity of the bioremediation agent in actual field tests and to verify the accuracy of Tier Ill laboratory results in predicting field efficacy using the actual field monitoring data obtained. The approach for performing these demonstrations is to collect information during active field testing to support an evaluation to confirm the bioremediation agent's estimated environmental safety and efficacy.

At this time, EPA-approved protocols for performing limited field-scale demonstrations in various settings are still under development. Until such protocols become available, the guidelines provided in Section 6 for monitoring field applications of bioremediation agents could be used for evaluating limited field-scale demonstrations of agents.

Agent Selection

Due to a lack of specific bioremediation agent research and agent testing standards, the selection of a bioremediation agent that will enhance the rate of oil biodegradation must be based on best professional judgment. For most of the bioremediation agents currently on the NCP Product Schedule, there are only limited comparative data by which to measure their relative efficacy and safety. Some of the agents have been tested by EPA according to the procedure described above; however, these agents are not necessarily better than ones that have not been tested by these methods. Therefore, agent selection will remain largely a subjective process until a larger and more complete database of standard test data on agents can be assembled.

To the extent possible, the selection of bioremediation agents for potential use in oil spill cleanup against specific oils or petroleum products should take place in anticipation of an oil discharge, when time is not a critical factor. For areas where the potential for an accidental spill is high or where there has been a high frequency of spills (assuming the use of bioremediation agents is allowed in these areas), specific plans should be developed that outline the most likely petroleum products to be spilled and the alternative bioremediation agents that could be used to perform cleanup of those products in these areas.

APPENDIX E

LABORATORY ANALYSIS PARAMETERS

Parameter	Sample Matrix	Methodology	Recommended Methods
Oil hydrocarbons (C17, pristane, C18, Phy	Water, Sediment or shoreline al	GC + GC/MS	ASTM Method D3328
NH_3	Water, Sediment or shoreline al	Spectrophotometric	EPA Method 350.1, 350.2 or 350
NO_3	Water, Sediment or shoreline al	Spectrophotometric	EPA Method 353.2 or 353.3
NO_2	Water, Sediment or shoreline al	Spectrophotometric	EPA Method 354.1
PO_4	Water, Sediment or shoreline al	Spectrophotometric	EPA Method 365.1, 365.2 or 365
Toxicity	Water, Sediment or shoreline al		

Sampling is to be conducted in accordance with an approved sampling plan and should utilize a justified random approach where the individual sites are selected based on appropriate habitat-types within treated and untreated zones. Within a site, individual sampling stations should be randomly chosen. Dependent on habitat-type, the site may be further divided such that specific zones within the site are monitored such as the upper and lower intertidal zones or stream-side and back marsh areas. Sediment grab samples may be collected using a variety of standard techniques. Core sampling is preferred for most intertidal and subtidal areas since it consistently allows for a highly reproducible volume of sample to be collected. Typically the core depth should exceed the depth of contamination if applicable and the core should be sectioned by 5 cm increments. Scoop-type grab sampling is applicable but great care is required to ensure that consistency is maintained. The sampling plan should provide exact guidance as to the width and depth of each sample.

Adjacent subsurface water samples may be collected using standard grab techniques. Caution should be exercised to prevent surface oil from contaminating the collection vessel as it is lowered to the specified sampling depth. Water grab sample will typically be collected at 1-3'depth.

Analytical methods used for bioremediation monitoring should be consistent with standard methods utilized for oil weathering and degradation studies. Analytical guidance being developed by the EPA and NETAC for laboratory testing of bioremediation agents should be adopted for field monitoring studies.

Field and laboratory blanks should be specified in the monitoring plan and should represent at least 10% of the samples analyzed. To assess environmental variability, 10% of the sample stations should be sampled and analyzed in triplicate. Since no certified reference material is currently available for oil bioremediation monitoring, a reference sample of the spilled oil should be analyzed periodically to verify laboratory consistency. Quantitative values for the reference oil should not vary by more than 20% for selected analytes. Good laboratory practices should be employed that are consistent with the objectives of the biomonitoring plan.

Accurate sample identification and proper control of samples is essential. A chain of custody procedure will be established and implemented which will ensure integrity of the samples and proper handling of the samples.

APPENDIX F

INFORMATION FEEDBACK:
BIOREMEDIATION USE FOLLOW-UP FORM

Lessons learned from a spill cleanup operation are most useful when others, particularly those not personally involved in the original cleanup operation, can benefit from them by drawing upon the original responders' experiences. Region 4 has established a program to facilitate the collection and transfer of information on uses of bioremediation that is intended to provide decision makers with case data upon which future decisions regarding bioremediation may be based. Particularly because response officials have very limited experience with bioremediation in uncontrolled environments, such as open water and other marine areas, this program is expected to be a valuable resource for supporting informed decisions regarding bioremediation.

The principal objective of this bioremediation information feedback program in Region 4 are as follows:

To gather relevant, accurate, descriptive, and complete information from sites - where bioremediation has been used for spill response; and

To provide that information via an accessible network to future decision makers who are considering the use of bioremediation.

The Bioremediation Use Follow-Up Form on the following pages has been provided to guide information collection efforts in support of this program. A separate form should be completed for each unique bioremediation activity. Because certain information may not have been anticipated when the form was developed, feel free to provide any other information deemed appropriate regarding the use of bioremediation in a particular response action.

BIOREMEDIATION USE FOLLOW-UP FORM

A. <u>SPILL INFORMATION</u>

1. Spill event
2. Date
3. Location (e.g., offshore, wetlands, coastal)
4. Product(s) spilled
5. Amount of spill
6. Reason(s) for using bioremediation
7. Age of oil when bioremediation agents applied

B. <u>BIOREMEDIATION AGENT INFORMATION</u>

1 . First Treatment or Application:

a. Type of agent applied (e.g., nutrient, microbial, enzyme)
b. Name of agent
c. Agent listed on the NCP Product Schedule?
d. Vendor
e. Vendor address and phone number
f. Rate effectiveness (compared to control site) on a scale of 1 to 10, 10 being the highest score
   - Visual observation
   - Oil chemistry
   - Method used (e.g., GC, GC/MS, TPH)

2. Second Treatment or Application (complete if different from above):

a. Type of agent applied (e.g., nutrient, microbial, enzyme)
b. Name of agent
c. Agent listed on the NCP Product Schedule?
d. Vendor
e. Vendor address and phone number
f. Rate effectiveness (compared to control site) on a scale of 1 to 10, 10 being the highest score
   - Visual observation
   - Oil chemistry
   - Method used (e.g., GC, GC/MS, TPH)

3. Third Treatment or Application (complete if different from above):

a. Type of agent applied (e.g., nutrient, microbial, enzyme)
b. Name of agent
C. Agent listed on the NCP Product Schedule?
d. Vendor
e. Vendor address and phone number
f. Rate effectiveness (compared to control site) on a scale of 1 to 10, 10 being the highest score
   - Visual observation
   - Oil chemistry
   - Method used (e.g., GC, GC/MS, TPH)

C. <u>SITE CONTROLS</u>

1. Size and number of test site(s)
2. Size and number of control site(s)
3. Site security measures taken

D. <u>TREATMENT AREA LOCATION</u>

1 . On water (latitude and longitude)
2. Shoreline (latitude and longitude)
   Shoreline type (e.g., sand, shell, cobble)
   Shoreline zone (e.g., intertidal, surge, storm/overwash) Depth of shoreline oiling

E. <u>APPLICATION INFORMATION</u>

1. Microbial counts before application
2. Microbial counts after application
3. Applications performed by (names and titles)
4. Application method(s) used
5. Application date(s)
6. Application conditions (e.g., winds, waves)
7. Agent concentration and rates (e.g., gal/acre)
8. Additional information on re-applications

F. <u>MONITORING</u>

1 . Schedule and duration (e.g., weekly for 3 months)
2. Method (e.g., foot, by air, boat)
3. Monitoring performed by (names and titles)
4. Toxicity noted

G. <u>PROBLEMS ENCOUNTERED</u> (e.g., weather, site security, application)

H. <u>LESSONS LEARNED</u>

1. CONTACTS
   1. OSC (name, address, and phone)
   2. SSC (name, address, and phone)
   3. Form completed by (name, title, and agency)

APPENDIX G

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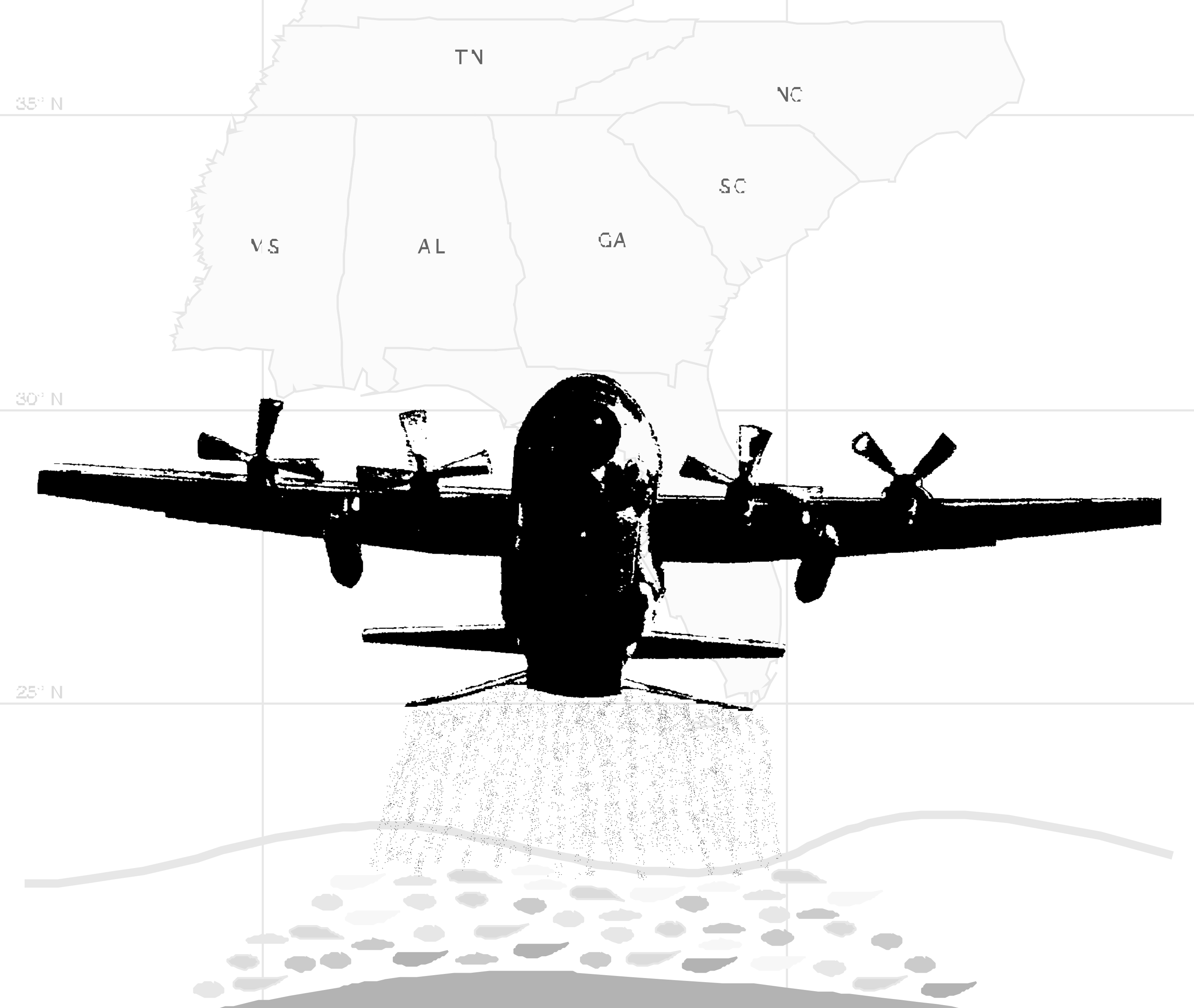
USE OF DISPERSANTS IN REGION IV



prepared for

REGION IV REGIONAL RESPONSE TEAM
RESPONSE AND TECHNOLOGY COMMITTEE
DISPERSANT WORKGROUP

Use of Dispersants in Region IV

Prepared for

Region IV Regional Response Team
Response and Technology Committee
Dispersant Workgroup

Region IV Regional Response Team
Ocean and Coastal Waters Dispersant Use Policy

RECORD OF CHANGES

Change Number	Effective Date	Date Entered	Entered By:	Page Check

Region IV Regional Response Team

From: Region IV Regional Response Team

To: Distribution

Subject: LETTER OF PROMULGATION

1. The Region IV Regional Response Team (RRT IV) has approved the attached policy for use of dispersants on oil in ocean and coastal waters throughout the RRT IV area of responsibility effective as of this date. This policy hereby replaces any other policies, guidelines or plans now in force throughout RRT IV. This policy will be used in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

2. This policy may become part of the local Area Contingency Plans (ACP) maintained by the U.S. Coast Guard Marine Safety Offices throughout RRT IV.

3. This policy shall be followed as closely as possible, but has not provided for every possible contingency that might occur. Deviations from this policy are authorized when necessary in the best interest of safety or protection of resources. The RRT IV must be made aware of any deviation as soon as possible.

4. This policy cannot be changed or altered without notice and opportunity for comment provided to each signatory official or designated representative to the RRT IV.

5. Any signatory official or designated representative to the RRT IV can petition the RRT IV to amend or revise the policy and/or withdraw approval at any time.

6. All comments and requests for revision shall be directed to the RRT IV Response and Technology Committee for consideration by the RRT IV.

7. The RRT IV Response and Technology Committee will remain abreast of developments and changes for dispesant use which may provide cause for recommending revision to this policy. Additionally, the Response and Technology Committee may be tasked at any time by members of the RRT IV to provide additional information or guidelines pertaining to dispersant use if available.

8. This Letter of Promulgation remains in effect until canceled by a competent authority.

DATE of EFFECT: 08 Oct 1996

U.S. Environmental Protection Agency RRT IV Co-Chair: //s//
Mr. Myron D. Lair

U.S. Coast Guard RRT IV Co-Chair: //s//
Captain R. C. Wigger

Encl: (1) RRT IV Dispersant Use Policy

DISTRIBUTION LIST

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

COAST GUARD
Commandant (G-MEP)
LANTAREA OPCEN
National Strike Force Coordination Center
Atlantic Strike Team
Gulf Strike Team
CGD Seven (m)
CGD Seven (cc)
CGD Eight (m)
CGD Five (m)
MSO Wilmington
MSO Charleston
MSO Savannah
MSO Jacksonville
MSO Tampa
MSO Miami
MSO Mobile

FEDERAL AGENCIES
U.S. EPA Region IV
U.S. Department of the Interior Region IV
U.S. Department of Commerce Region IV
U.S. Fish and Wildlife Service Region IV
National Marine Fisheries Service Region IV
NOAA National Marine Sanctuaries, Florida Keys National Marine Sanctuary
NOAA National Marine Sanctuaries, Grays Reef National Marine Sanctuary
NOAA HAZMAT Reference Library Seattle, Washington
NOAA Biological Assessment Team, Seattle, Washington
NOAA HAZMAT USCG Commandant (G-MEP)
NOAA Scientific Support Coordinator, CGD Seven

STATE AND LOCAL AGENCIES
State of North Carolina, RRT IV representative
State of South Carolina, RRT IV representative
State of Georgia, RRT IV representative
State of Florida, RRT IV representative
State of Alabama, RRT IV representative
State of Mississippi, RRT IV representative

NON-GOVERNMENT AGENCIES
Marine Spill Response Corporation, SE region
Clean Caribbean Corporation
Chevron Oil
Shell Oil

If you would like to be added to this distribution list please contact the Region IV Regional Response Team Response and Technology Chairperson or your agency representative to the regional response team.

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Dispersant Use Policy

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REGION IV
REGIONAL RESPONSE TEAM
POLICY FOR
USE OF DISPERSANTS
IN OCEAN AND COASTAL WATERS

INTRODUCTION

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

This Region IV Dispersant Use Policy is set forth by the Federal Region IV Regional Response Team (RRT) for the use of dispersants in response to oil spills on coastal or ocean waters. Its fundamental underlying precept is that dispersing all or part of the slick in offshore waters can prevent the potentially more devastating impacts of oil on sensitive environments inshore. Effective use of dispersants has a limited window of opportunity due to weathering characteristics of oils, which are rapidly affected by the physical environment. Therefore, the effective application of dispersants often requires that pre-approval for dispersant use be given prior to an incident.

This RRT IV Dispersant Use Policy includes pre-authorization agreements, consistent with the National Contingency Plan (NCP), which permit the limited use of dispersants in specifically designated areas. Within pre-approved areas, further consultation by the Coast Guard OSC is not required, as long as the appropriate RRT agencies are immediately notified and the relevant Protocols are followed. This plan is not intended to exclude or prevent the use of mechanical, in-situ burning, biological, or other cleanup methods. Instead, it encourages appropriate combinations of techniques to minimize a spill's effect.

Pre-authorization is not limited to only those organizations with pre-established contracts with dispersant application operators. Due to the time-critical elements involved in a dispersant-use decision however, RRT IV strongly recommends that contractual arrangements for provision of the necessary equipment and personnel for aerial spraying operations be established prior to an incident to avoid unnecessary delays in implementation of this policy.

RRT IV believes that this Dispersant Use Plan represents a conservative approach to dispersant pre-approval, and that institution of this policy will help to ensure a more rapid and effective response to oil spills in Region IV. It is hoped that this careful and measured endorsement of dispersant use in selected Region IV waters will lead to an increased availability of dispersants and associated dispersant application equipment in the region. Questions, concerns, and recommendations relating to this policy may be addressed to the Chair of the Response and Technology Committee or either Co-Chair of the Region IV Regional Response Team.

The Region IV Dispersant Plan is divided into an Introduction, followed by five sections and several appendices. The Introduction highlights important aspects of the policy and a general outline is given.

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

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

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

Section IV is a signature page where the RRT IV members representing the United States Coast Guard (USCG), the United States Environmental Protection Agency (EPA), the United States Department of the Interior (DOI), the United States Department of Commerce (DOC), and the coastal states within the RRT IV region have by signature agreed to adopt this policy for their respective agency or state.

Section V contains appendices and includes:

- Maps delineating zones of dispersant use per-authorization.

- Letters of Agreement from the coastal states within RRT IV for which this policy covers, that establish specific conditions for conducting any dispersant applications on state waters or special federally managed areas if applicable.

- Biological assessments and letters pertaining to section 7 consultations with the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFW) for protection of endangered species during dispersant application operations.

- The intent of RRT IV to adopt the current monitoring program for dispersant application operations in the RRT IV region which is supported by the U.S. Coast Guard National Strike Force.

- Dispersant application equipment, stockpile location, and contact information.

- Technical Product Bulletins for dispersants currently listed on the EPA National Product Schedule and available for use.

- Documentation forms, dispersant use decision elements and application procedures.

- Dispersant use operational planning and implementation guidance.

- Guidance and reference information.

No one document could contain all of the information, which may be pertinent to an OSC during the decision-making process. Therefore, RRT IV highly recommends that the OSC draw on the expertise of state and local officials, the NOAA Scientific Support Coordinator (SSC), and any other relevant sources of information when making a dispersant-use decision.

SECTION I

Purpose

This Policy implements Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) and provides pre-authorization for the limited use of dispersants by the pre-designated USCG On-Scene Coordinator (OSC) on oil discharges impacting federal waters within Federal Region IV boundaries. The above agencies agree that, in certain circumstances, the complete physical containment, collection, and removal of oil discharges may not be possible. The use of dispersants may therefore be considered to prevent a substantial threat to the public health or welfare, or to minimize serious environmental damage. This policy establishes criteria under which dispersants may be applied to the waters under federal jurisdiction within Federal Region IV or as established by separate state Letters of Agreement.

Authority

Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) provides that the Regional Response Team (RRT) representatives to the EPA, DOC, DOI and the affected State(s) may pre-approve the use of chemical countermeasures for oil spill response. Commandant, U.S. Coast Guard, has pre-designated the USCG Captains of the Port as On-Scene Coordinators for coastal spills; and has delegated authority and responsibility for compliance with Section 311 of the Federal Water Pollution Control Act, as amended, to them. The EPA, DOI, and DOC have delegated their authority for authorization of pre-approval of dispersants to their Regional Response Team representatives.

RRT IV representatives from the states of North Carolina, South Carolina, Georgia, Florida, Alabama and Mississippi have been delegated authority by their respective agencies or state governments to represent natural resource concerns and to serve as consultants to the OSC on these matters.

Scope

The USCG, EPA, DOI, DOC, and the coastal states of RRTIV have adopted the use of dispersants as an approved tool to respond to spilled or discharged oil on ocean and coastal waters within the jurisdiction of RRTIV. This policy includes protocols under which dispersant use must be conducted by the USCG On-Scene Coordinator on waters off the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and over special federally managed waters which are within the boundaries of the RRTIV region.

Offshore dispersant application to remediate oil spills occurring in federal Region IV will be conducted in accordance with this policy and, in addition, where applicable, in accordance with Letters of Agreement established between the USCG, EPA, DOI, DOC, and the affected State(s). The pre-approval to authorize the use of dispersants provided by this policy is in effect for the pre-designated USCG On-Scene Coordinator only.

SECTION II

Dispersant Use Pre-authorization and Application Zones

In general pre-authorization exists 3 miles seaward of any land providing that the water depth is at least 10 meters deep. Some special management areas are however, excluded from pre-authorization. Three zones have been established to delineate locations and conditions under which dispersant application operations may take place in waters of federal Region IV. They are:

1) <u>GREEN ZONE -- PRE-AUTHORIZATION FOR DISPERSANT APPLICATION</u>

The Green zone is defined as any offshore water within federal Region IV in which <u>ALL</u> of the following three conditions apply: 1) the waters are not classified within a "Yellow" or "Red" zone; 2) the waters are at least three miles seaward of any shoreline, and 3) the waters are at least 10 meters in depth.

Within the Green zone, the USCG, EPA, DOC, DOI, and the affected state(s) agree that the decision to apply dispersants rests solely with the pre-designated USCG OSC, and that no further approval, concurrence or consultation on the part of the USCG OSC with EPA, DOC, DOI or the State(s) is required.

For documentation purposes, the Dispersant Use "Documentation" Form, found in Appendix VII of this document will be included in the post-incident report, and will be available to EPA, DOC, DOI, and the affected State(s), at their request, when dispersant application operations commence.

All dispersant operations within the Green zone will be conducted in accordance with the Protocols outlined in section III of this policy. Additionally, the USCG OSC will make every reasonable effort to continuously evaluate the application of dispersants within the Green zone, and will allow RRT IV agencies and the affected State(s) the opportunity to comment.

Note: Special Case for West Coast of Florida

Florida state waters extend seaward into the Gulf of Mexico to a distance of nine miles whereas all other state coastal waters in RRT IV, including Florida's east coast, extend seaward to a distance of three miles. No case-by-case approval will be required or considered necessary from EPA, DOI, DOC, or the State of Florida for waters greater than 10 meters in depth that extend seaward in exc3ss of three miles on Florida's west coast unless otherwise designated as meeting the criteria for a case-by-case zone.

2) <u>YELLOW ZONE -- WATERS REQUIRING CASE-BY-CASE APPROVAL</u>

The Yellow zone is defined as any waters within federal Region IV which have not been designated as a "Red" zone, and in which **<u>ANY</u>** of the following conditions apply:

a) The waters fall under State, or special federal management jurisdiction. This includes any waters designated as marine reserves, National Marine Sanctuaries, National or State Wildlife Refuges, units of the National Park Service, or proposed or designated Critical Habitats.

b) The waters are within three miles of a shoreline, and/or falling under state jurisdiction.

c) The waters are less than 10 meters in depth.

d) The waters are in mangrove or coastal wetland ecosystems, or directly over living coral communities, which are in less than 10 meters of water. Coastal wetlands include submerged algal beds and submerged seagrass beds.

Where a Letter of Agreement is in effect between the USCG, EPA, DOI, DOC, and the affected State(s), the policy for pre-authorization established under the provisions of said LOA shall preempt the policy herein established for areas otherwise designated as falling within the Yellow zone. Established State LOAs are provided in appendix II of this Dispersant Use Plan. In the event that a Letter of Agreement is not in effect for an area falling within the Yellow zone, or the desired use of dispersants would modify existing agreements, the USCG will request authorization for dispersant use according to the following procedures.

If the USCG OSC believes dispersants should be applied within the Yellow zone, a request for authorization must be made to the RRT IV representatives of the EPA, DOI, DOC, and the affected State(s). The information contained on the documentation/application form in appendix VII must be provided to the RRT members. The OSC is only granted authority to conduct dispersant operations in the Yellow zone when concurrence has been given by EPA and the affected State(s), and after consultation with DOC and DOI.

RRT IV members will respond to the OSC's request for authorization within four hours. If a decision by RRT members cannot be reached within four hours, the OSC should be notified and informed of the delay, and the reasons behind it.

As with all dispersant use under this Agreement, application of dispersants within the Yellow zone, if approval is granted, will be conducted in accordance with the appropriate and relevant Protocols outlined in the PROTOCOLS section. Additionally, the USCG OSC will make every reasonable effort to continuously evaluate the application of dispersants within the Yellow zone, and will allow RRT IV agencies and the affected State(s) the opportunity to comment.

3) "RED" ZONE -- EXCLUSION ZONES:

The Red zone is that area, or areas, designated by the Region IV Response Team in which dispersant use is prohibited. No dispersant application operations will be conducted at any time in the Red zone unless: 1) dispersant application is necessary to prevent or mitigate a risk to human health and safety, and/or 2) an emergency modification of this Agreement is made on an incident-specific basis.

The Region IV Response Team has not currently designated any areas as Red zones, but retains the right to include areas for exclusion in the future. States may, through the establishment of Letters of Agreement, designate Red zones in areas falling under state jurisdiction. RRT IV encourages local Area Committees to recommend to RRT IV areas for pre-approval of dispersant use within their jurisdiction.

SECTION III

Protocols

THE FOLLOWING REQUIREMENTS APPLY TO THE APPLICATION OF ANY DISPERSANTS UNDER ANY PROVISION OF THIS POLICY:

1) Dispersants will only be used when they are expected to prevent or minimize substantial threat to the public health or welfare, or to mitigate or prevent environmental damage.

2) The USCG agrees that if a decision has been made to use dispersants under the provisions of this agreement, the USCG OSC will immediately notify the Regional Response Team members representing EPA, DOI, DOC, and the affected State(s). Notification will include a copy of the Material Safety Data Sheet (MSDS) of the dispersant product chosen if the MSDS is not already included in this regional Dispersant Plan. Additionally, notification will include, at a minimum:

a. Date, Time and Location of the incident
b. Type and amount of oil discharged;
c. Area affected;
d. The projected area of impact of the oil if not dispersed;
e. Reasons why mechanical or physical removal of the oil is not feasible, or will not on its own provide the optimal response method.
f. Dispersant to be used.
g. On-scene weather, wind, and forecasted weather.

3) The USCG agrees to make every effort to continuously evaluate the decision to use dispersants by considering the advice of the EPA, DOI, DOC, and the affected State(s), other members of the Region IV Regional Response Team, and any other agencies, groups or information sources which may be available. The use of dispersants will be discontinued if so requested by the RRT representative of the EPA, the affected State(s), DOI or DOC. Such a request may be verbal followed by written documentation.

4) The USCG OSC, must comply with all Occupational Health and Safety Administration (OSHA) regulations.

5) Barring any unforeseen circumstances (such as time constraints, safety considerations, or logistical concerns) the OSC will make every reasonable effort to provide designated representatives from the USCG, EPA, DOI, DOC and the affected State(s) with an opportunity to observe dispersant application operations. An inability to provide this opportunity will not, however, be cause for immediate cessation of application operations.

6) Monitoring will be conducted as feasible in order to help evaluate the decision to continue dispersant application and to document results. Recommended monitoring procedures are addressed in Appendix IV.

7) Prior to commencing application operations, an on-site survey will be conducted, in consultation with natural resource specialists, to determine if any threatened or endangered species are present in the projected application area or otherwise at risk from dispersant operations. Measures will be taken to prevent risk of any injury to wildlife, especially endangered or threatened species. Additional and ongoing survey flights in the area of application will be conducted as appropriate. The Right Whale Critical Habitat along portions of coastal Georgia and Florida, as outlined in the Section 7 consultation with NMFS in appendix III, is of particular concern during December through March. During this time, the Right Whale Early Warning System should be contacted prior to dispersant operations to determine if there have been recent sightings of whales in the planned operational area. Avoidance procedures as outlined in the consultation must be followed during any dispersant application.

8) When dispersant application is proposed in a pre-approved area that is adjacent to or very near a more shallow area (less than 10M), due consideration shall be given to the trajectory of the dispersed oil. If state or federal rersources in adjacent shallow areas would be at risk, consultation with the resource trustee must be conducted. Appendix I contains maps showing to 10M depth contour to be used as a general reference. Nautical or bathemmetric charts should be consulted for more detail.

9) Any use of dispersants requires that a post-incident report be provided by the OSC, or a designated member of the OSC's staff, within 45 days of dispersant application operations. Recommendations for changes or modification to this Dispersant Use policy may be presented in the report, if appropriate. This report will be presented at a Region IV Regional Response Team meeting, if so requested by the RRT.

10) Only those products specifically listed in the EPA National Contingency Plan's (NCP's) Product Schedule as dispersants will be considered for use during dispersant application operations. (See appendix VI)

11) Information on the Documentation/Application Form in appendix VII shall be completed for all dispersant applications and provided to RRT IV members in a timely manner for documentation and informational purposes.

12) The dispersant use decision elements contained in section VII shall be reviewed by the OSC and used to help guide the decision to use or request the use of dispersants.

SECTION IV

Signature Page

I hereby attest and declare that by my signature that I approve this policy for dispersant use as presented herein for the agency or government I represent on the Region IV Response Team (RRT IV).

___________//s//_____________________ __8/29/96___
Captain Richard C. Wigger (Date)
United States Coast Guard
RRT IV Co-chair

__________//s//_____________________ __8/29/96___
Mr. Myron D. Lair (Date)
United States Environmental Protection Agency
RRT IV Co-chair

________//s//_______________________ __8/30/96___
Mr. James H. Lee (Date)
U.S. Department of the Interior
Region IV Response Team representative

________//s//_______________________ __9/4/96___
Commander Gary Petrae (Date)
U.S. Department of Commerce
Region IV Response Team representative

_______//s//________________________ __8/28/96___
Ms. Linda Forehand (Date)
State of North Carolina
Region IV Response Team representative

______//s//________________________ __8/30/96___
Mr. R. Lewis Shaw (Date)
Deputy Commissioner
Environmental Quality Control
Department of Health and Environmental Control
State of South Carolina

_____//s//________________________ __8/28/96___
Dr. Albert K. Langley (Date)
State of Georgia
Environmental Protection Division
Department of Natural Resources
Region IV RRT member

_____//s//________________________ __8/27/96___
Mr. Douglas C. White (Date)
State of Florida
Region IV Response Team representative

_____//s//_______________________ __9/26/96___
Mr. E. John Williford (Date)
State of Alabama
Region IV Response Team representative

_____//s//_______________________ __8/29/96___
Mr. Robert J. Rogers (Date)
State of Mississippi
Region IV Response Team representative

APPENDIX I

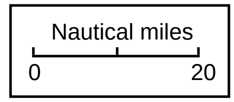
Zone Maps

In general pre-authorization exists 3 miles seaward of any land providing that the water depth is at least 10 meters deep. Some special management areas are however, excluded from pre-authorization. Any pre-authorization granted within state's waters will be addressed in a separate Letter of Agreement between the state, The USCG, the EPA, DOI, and DOC. The maps contained in this section serve as a general reference to indicate locations, distance from shore, and distance from the 10 meter contour for the pre-authorized zones throughout RRT region IV.

- **North Carolina**
- **Lower North Carolina to Upper Georgia**
- **Lower Georgia, Upper Florida East Coast**
- **Central Florida East Coast**
- **Southern Florida**
- **Central Florida West Coast**
- **Upper Florida West Coast**
- **Western Florida, Alabama, Mississippi**

Region IV Regional Response Team

Dispersant Pre-Approval Zones
prepared by NOAA



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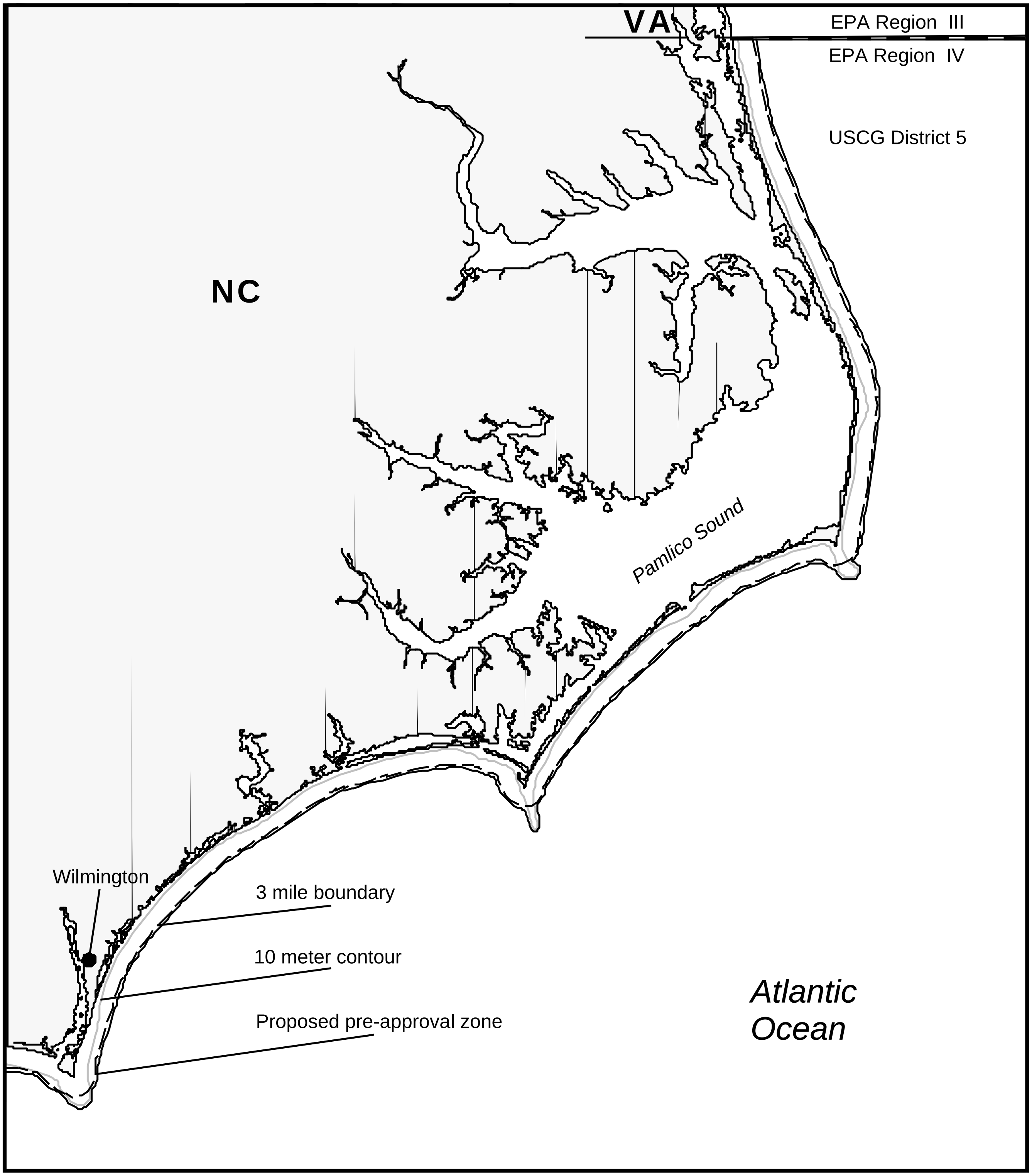
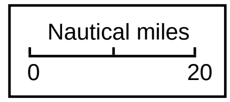


NC map

Region IV Regional Response Team

Dispersant Pre-Approval Zones
prepared by NOAA



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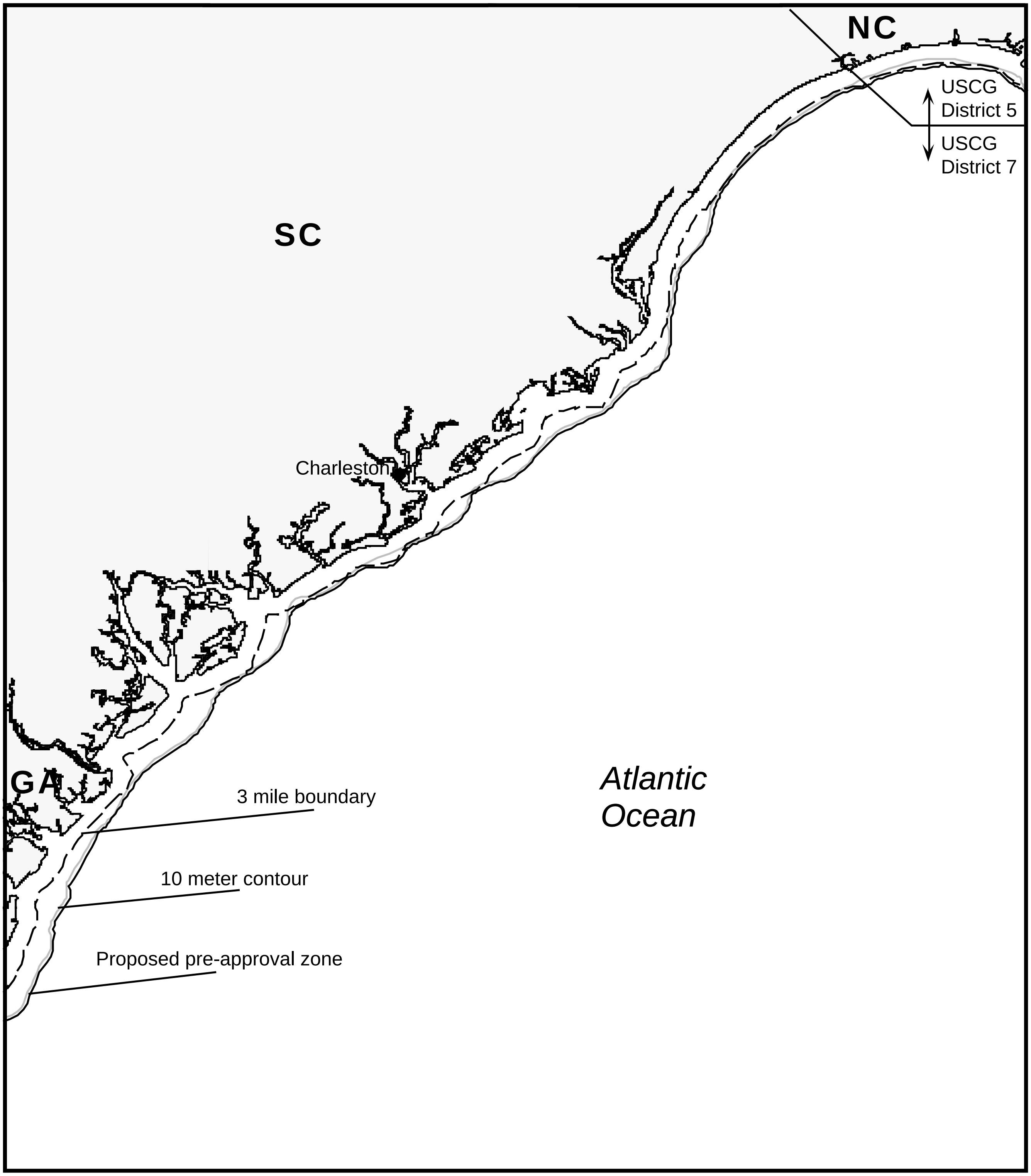
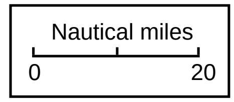


Region IV Regional Response Team

Dispersant Pre-Approval Zones
prepared by NOAA



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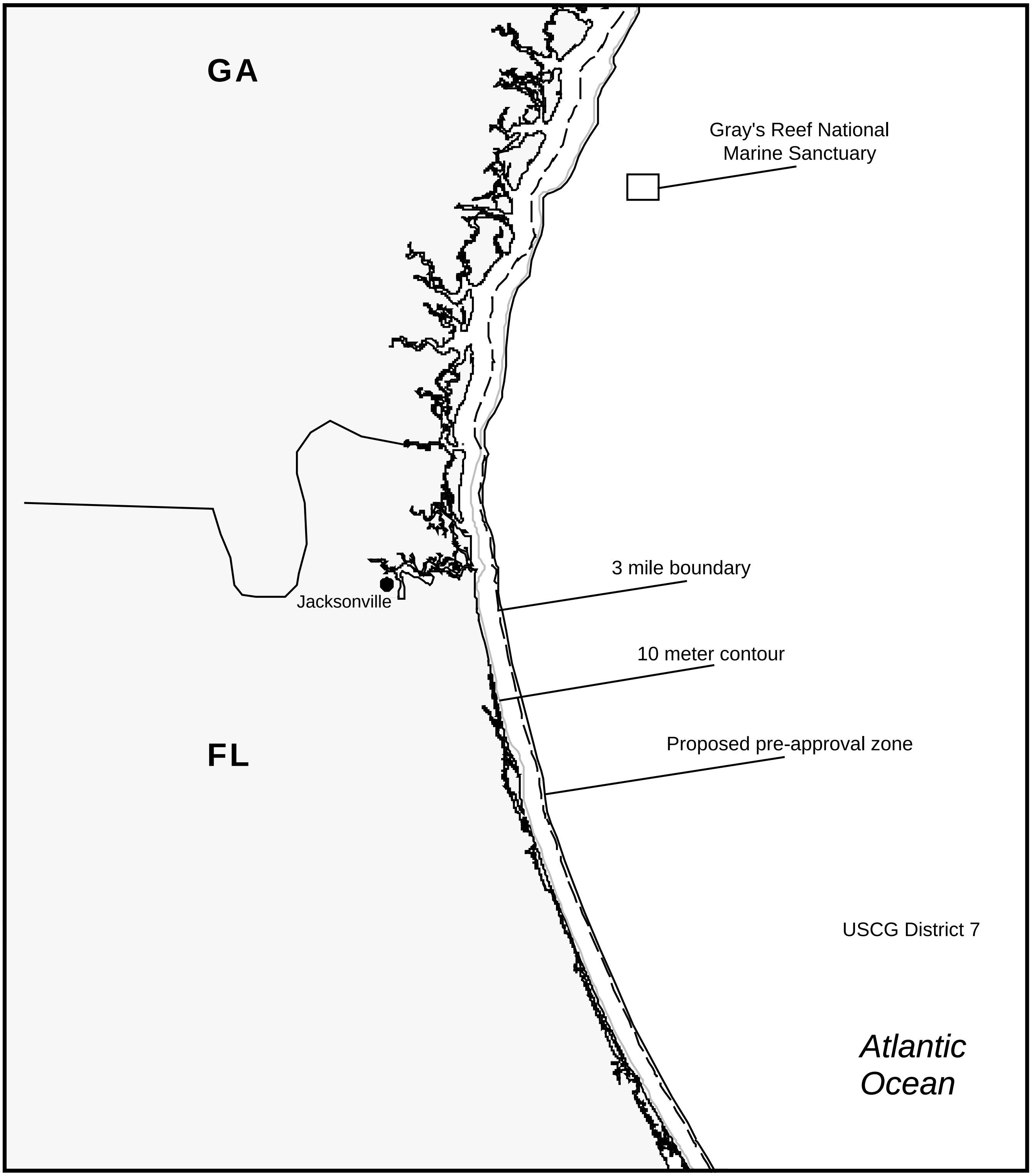
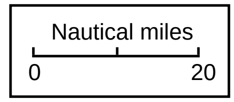


Region IV Regional Response Team

Dispersant Pre-Approval Zones
prepared by NOAA



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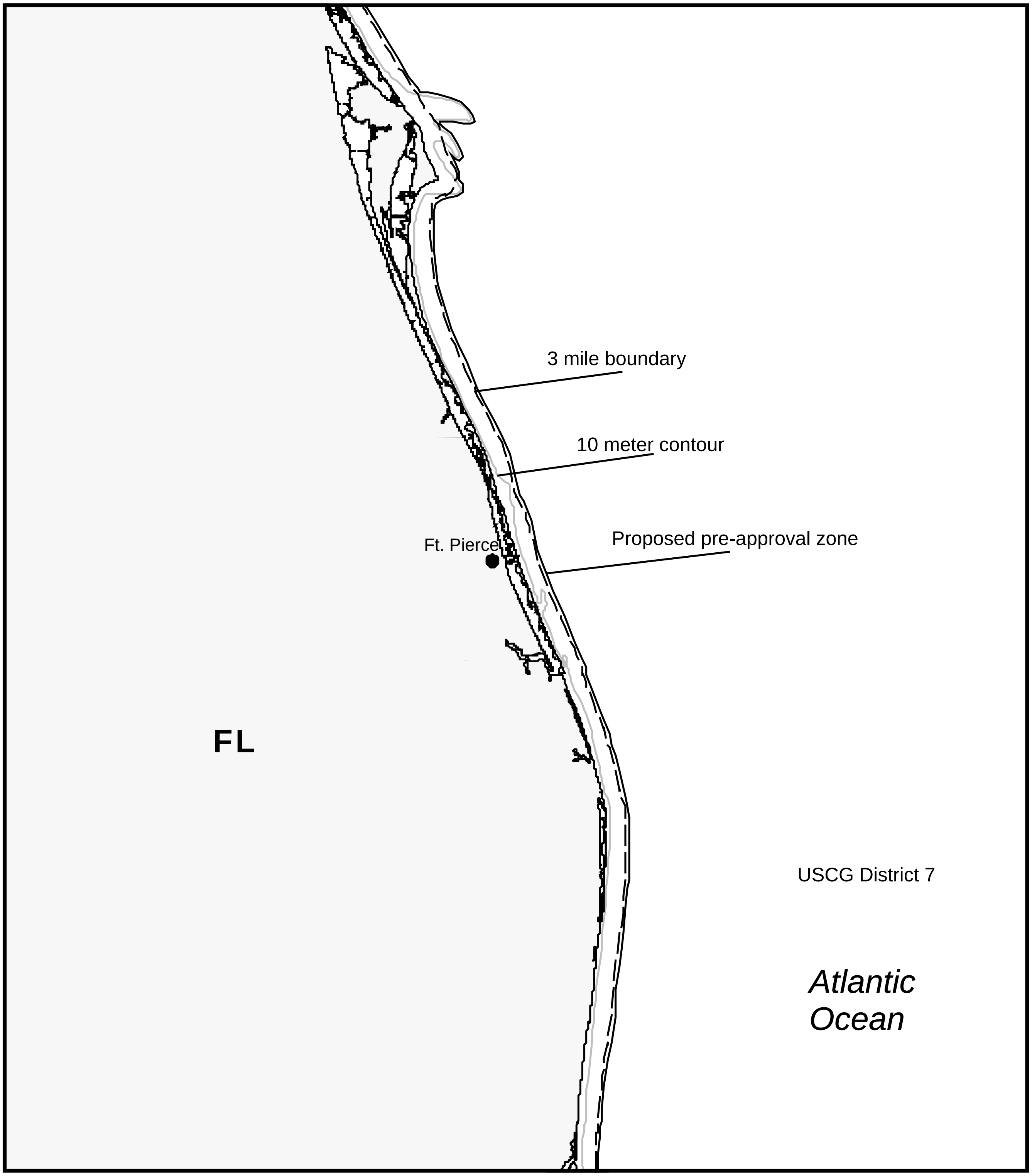


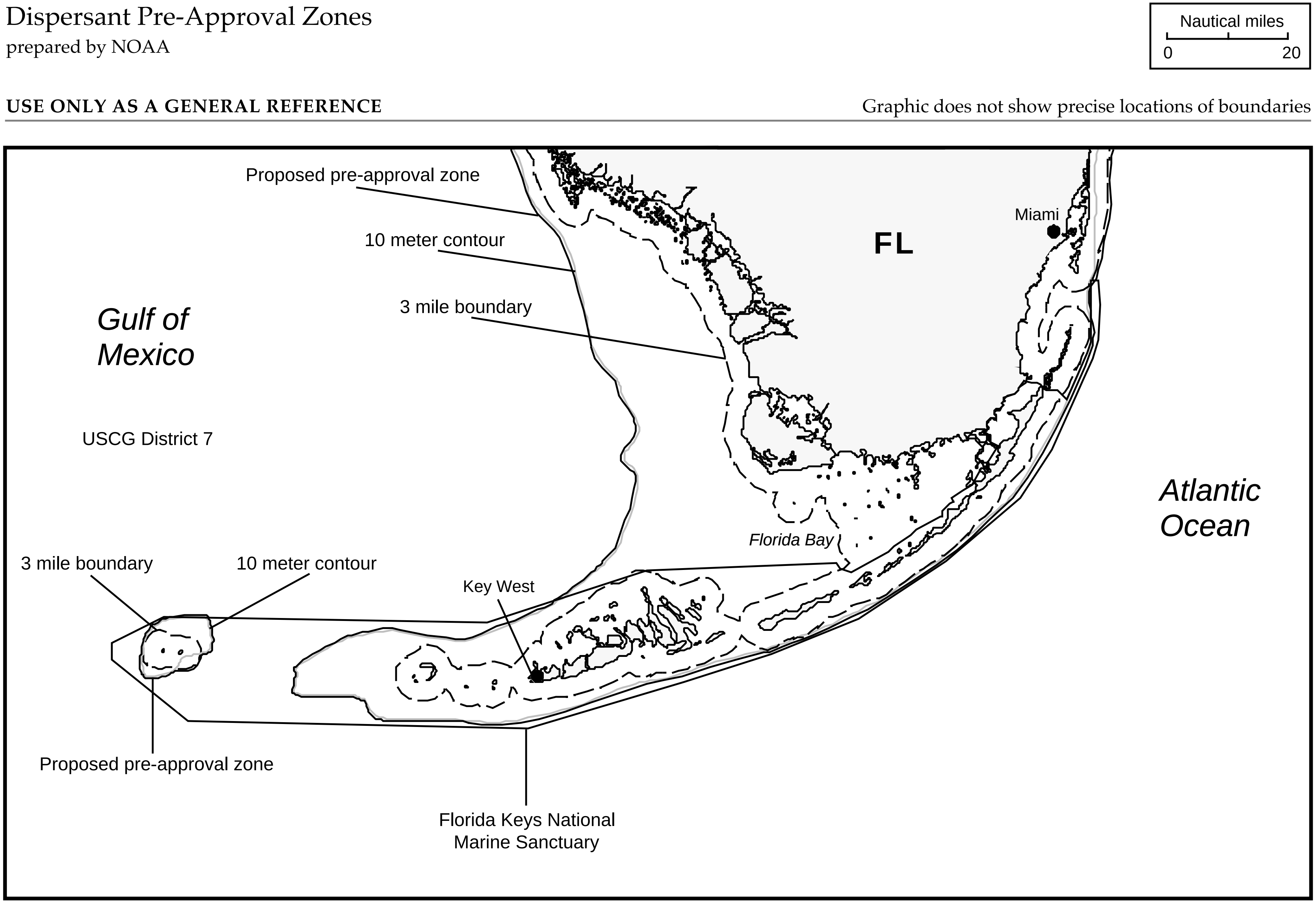
Middle Eastern Florida map

Region IV Regional Response Team

Dispersant Pre-Approval Zones
prepared by NOAA

USE ONLY AS A GENERAL REFERENCE

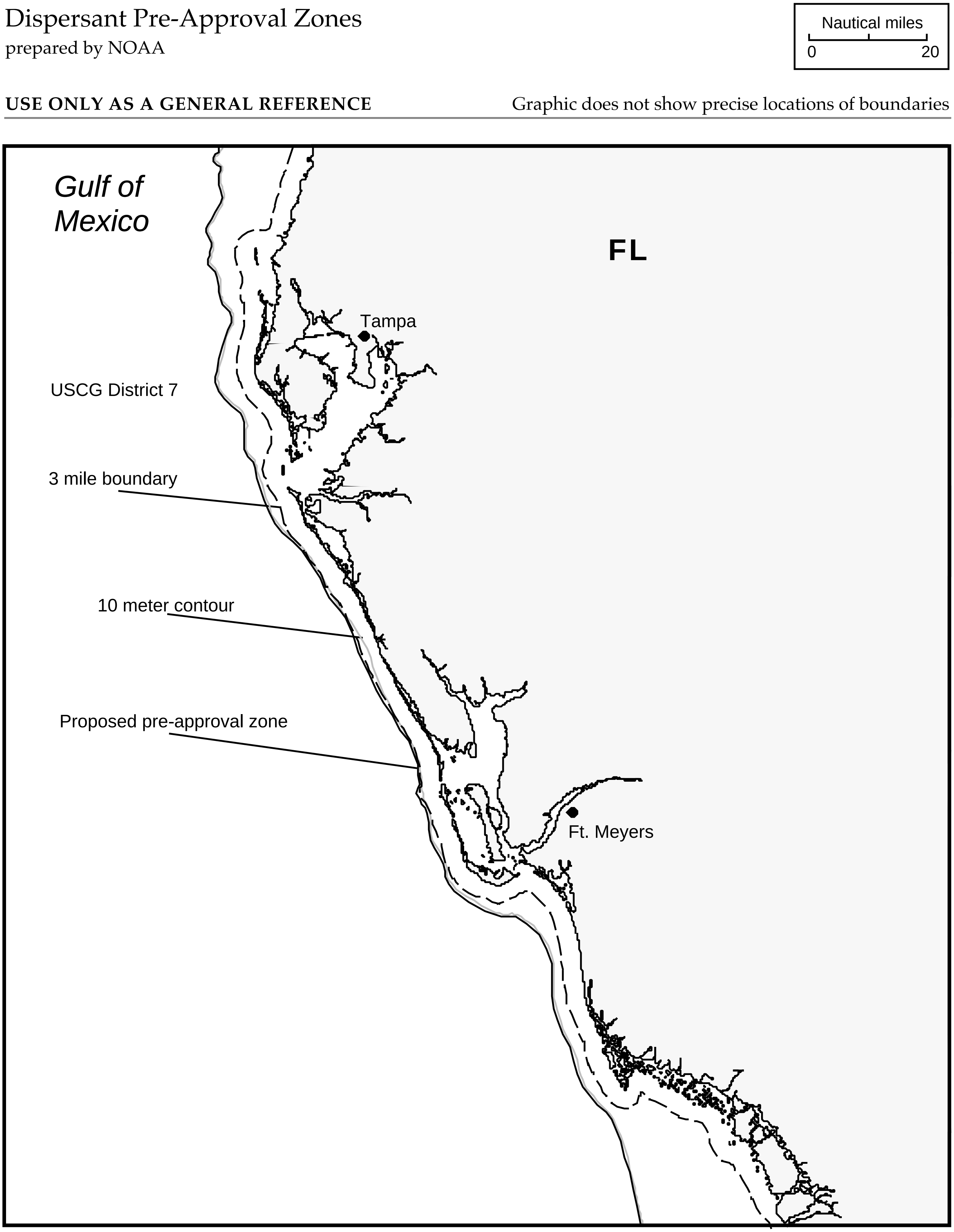
Graphic does not show precise locations of boundaries



Region IV Regional Response Team

Dispersant Pre-Approval Zones
prepared by NOAA

USE ONLY AS A GENERAL REFERENCE Graphic does not show precise locations of boundaries



Middle Western Florida map

Region IV Regional Response Team

Dispersant Pre-Approval Zones

prepared by NOAA

USE ONLY AS A GENERAL REFERENCE

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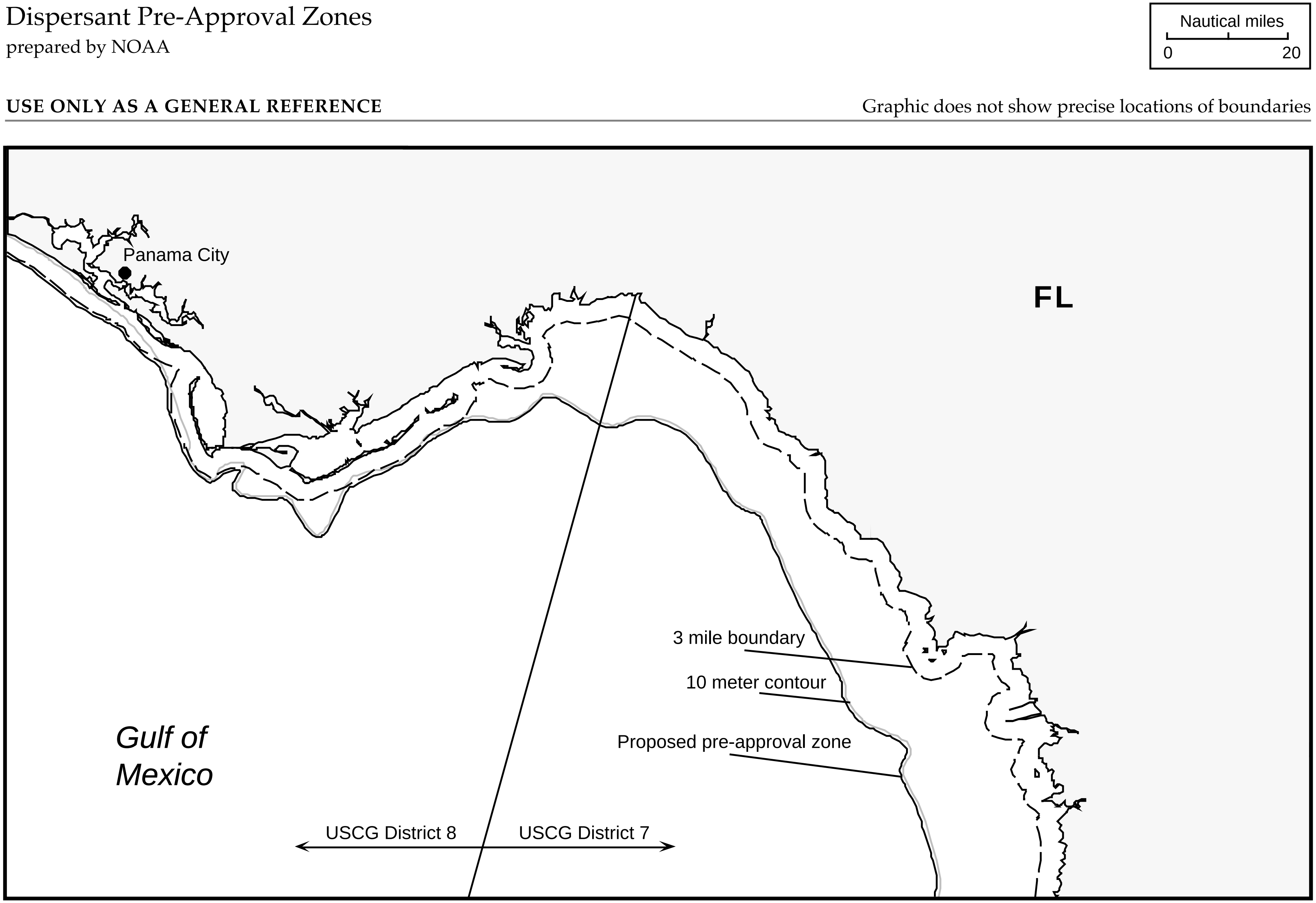

Upper Western Florida map

Region IV Regional Response Team

Dispersant Pre-Approval Zones
prepared by NOAA

USE ONLY AS A GENERAL REFERENCE

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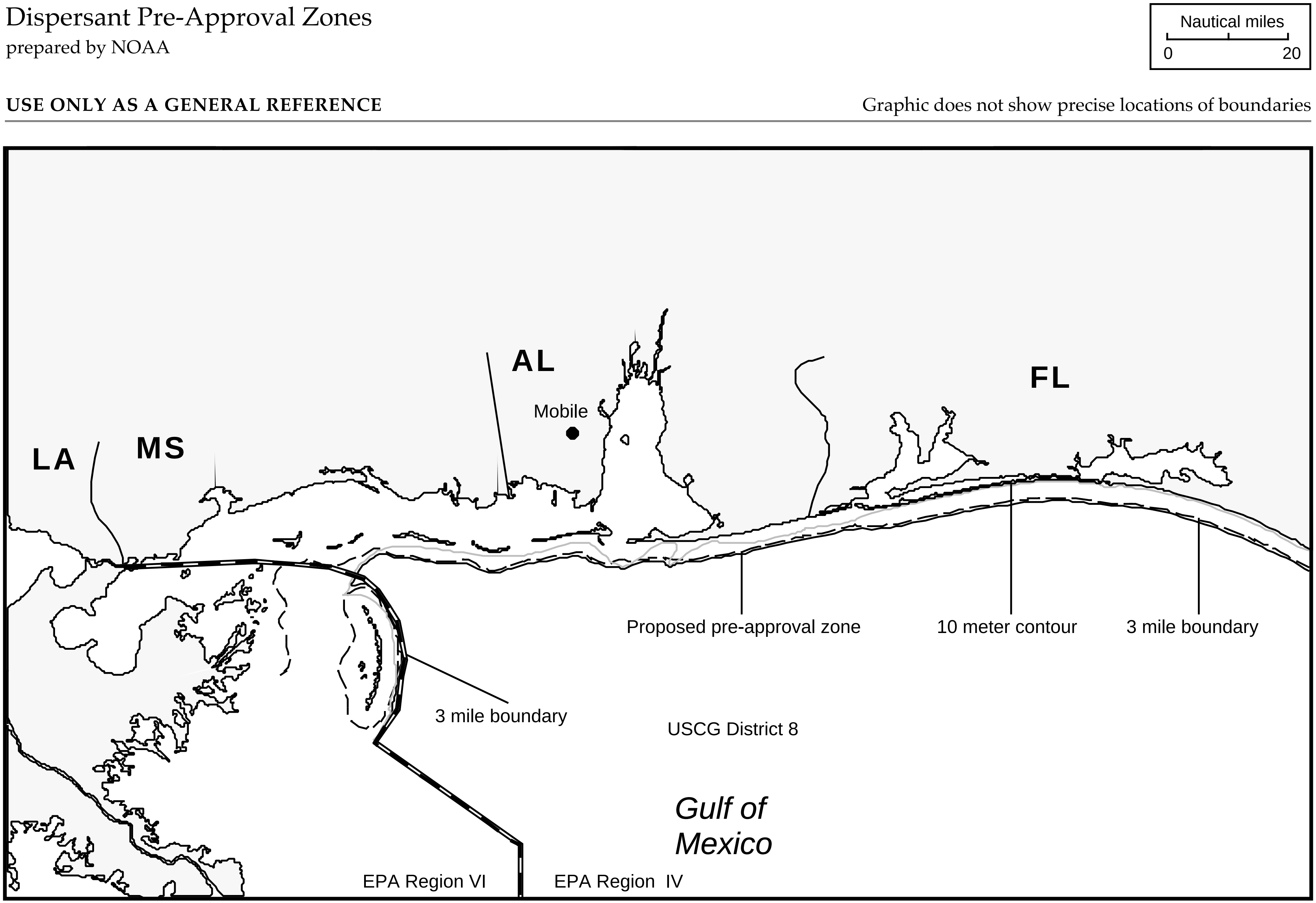

LA, MS, AL, FL map2

APPENDIX II

Letters of Agreement

Where applicable, other State and Federal Trustee documents relevant to a dispersant-use decision have also been included. Until such time as an LOA or other policy document is completed for use of dispersants within a State's waters or specially managed Federal Resource, dispersant use decisions will be made on a case-by-case basis, in accordance with this Region IV Dispersant Policy and the National Contingency Plan.

- **North Carolina**
- **South Carolina**
- **Georgia**
- **Florida**
- **Alabama**
- **Mississippi**
- **Federal Trustees**

North Carolina

No LOA or special agreement is in place for North Carolina at this time.

South Carolina

No LOA or special agreement is in place for South Carolina at this time.

Georgia

LETTER OF AGREEMENT
ON LIMITED USE OF DISPERSANTS
DURING OIL DISCHARGES OCCURRING OR AFFECTING STATE WATERS
AMONG REGION IV REGIONAL RESPONSE TEAM REPRESENTATIVES OF THE: U.S. COAST GUARD (USCG) -- SEVENTH DISTRICT,
U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA),
U.S. DEPARTMENT OF THE INTERIOR (DOI)
U.S. DEPARTMENT OF COMMERCE (USDOC)
AND THE STATE OF GEORGIA

I. PURPOSE

The U. S. Environmental Protection Agency (EPA), U.S. Department of Commerce (DOC), U.S. Department of the Interior (DOI), the U.S. Coast Guard (USCG) and the State of Georgia recognize that, while mechanical removal is the preferred method of dealing with oil discharges into the waters of the State of Georgia, in certain instances the physical containment, collection, and removal of the oil may not be possible, and the effective use of dispersants must be considered to prevent a substantial threat to public health or welfare, or to minimize environmental and/or economic damages. Accordingly, the above said agencies hereby grant the USCG On-Scene Coordinator (OSC) approval to authorize the use of dispersants as an oil spill countermeasure in or on the waters of the State of Georgia, within the following parameters.

II. AUTHORITY

Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) provides that States, with the concurrence of the EPA, DOC, and DOI representatives to the Regional Response Team, may pre-approve the application of dispersants by the USCG OSC. The Governor of the State of Georgia has designated the Secretary of the Department of Natural Resources to coordinate State approval for proper usage of dispersants for response to oil spills. Commandant, U.S. Coast Guard has designated the USCG Captain of the Port as the OSC for oil discharges in the coastal zone. The authority to order the use of dispersants on oil discharges granted in this Agreement is vested solely in the individual who is the predesignated USCG OSC. This authority may not be delegated.

This Letter of Agreement is intended only to improve the management of existing oil spill responsibilities and improve coordination between agencies. Neither this Letter of Agreement, nor any actions to implement it, shall create, or shall be construed to create, any right or benefit, substantive or procedural (including without limitation any right or benefit under the Administrative Procedure Act), legally enforceable by any party against the United States or the State of Georgia, their agencies, or instrumentalities, officers, employees, or any other person.

III. AREA OF DESIGNATED PRE-APPROVAL IN GEORGIA STATE WATERS

The predesignated USCG OSC is granted authorization to apply dispersants as an oil spill countermeasure in the waters of the State of Georgia according to the following guidelines. No further approval from the State, the EPA, or other agencies is required to conduct dispersant application operations within these pre-approved areas subject to the "Provisions" listed below and the following conditions:

Dispersants shall not be applied in, on, or over waters containing reefs; waters designated as marine reserves; in a National Marine Sanctuary, National or State Wildlife Refuge; in proposed or designated Critical Habitat; in mangrove areas; or waters in coastal wetlands; except with the prior and express concurrence of the State, EPA, DOC, and DOI. Coastal wetlands include: submerged algal beds (rocky or unconsolidated bottom) and submerged sea grass beds.

Dispersants shall not be applied in harbors, bays, rivers, lakes, or other inland waters.

Dispersants may be used as an oil spill countermeasure in open waters in the State of Georgia that are 30 feet or greater in depth excluding the Gray's Reef National Marine Sanctuary. The sanctuary is described on NOAA nautical chart 11509 and is bounded by the following coordinates, beginning at 31 deg. 21' 45"N, 80 deg. 55' 17"W commencing then to coordinate 31 deg. 21' 45"N, 80 deg. 55' 17"W commencing then to coordinate 31 deg. 25' 15"N, 80 deg. 49' 42"W then to 31 deg. 21' 45"N, 80 deg. 49' 42"W then back to point of origin.

IV. PROVISIONS

1) Dispersants may be used on all discharges when their use will save human life. The following additional conditions assume risk to human life is not a factor.

2) Unless specifically noted otherwise, the Protocols outlined in the "Letter of Agreement for Use of Dispersants in Federal Waters" apply to the use of dispersants in waters of the State of Georgia.

3) If a decision has been made to apply dispersants in Georgia waters, under the authority granted by this Agreement, the OSC will immediately notify the Region IV Response Team representatives of the State, EPA, DOC, and DOI. This notification will include, at a minimum:

   a. Date, Time and Location of the incident;
   b. Type and amount of oil discharged;
   c. Area affected;
   d. The projected area of impact of the oil if not dispersed;
   e. Reasons why mechanical removal or in-situ burning of the oil is not feasible, or will not on its own provide the optimal response method.
   f. Dispersant to be used.
   g. On-scene weather, wind, and forecasted weather.

4) Any official request, by a Trustee representative of anyof the above said agencies, to discontinue dispersant application operations, if submitted in a timely fashion to the OSC, will be grounds for immediate cessation of dispersant operations.

5) Monitoring of dispersant application operations shall be performed in accordance with stated Region IV Regional Response Team policy.

6) The EPA maintains a list of mitigating agents such as dispersants on the Product Schedule List in the National Contingency Plan. Any product to be used as a dispersant under this Agreement must be registered, as a dispersant, on this List.

V. AMENDMENTS

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

VI. CANCELLATION

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

VII. SIGNATURE PAGE

________//s//_________________ ____1/30/96___
Captain Gerald Abrams DATE
Chief, Marine Safety Division
Seventh Coast Guard District
Co-Chair, Region IV RRT

_______//s//__________________ ___8/10/95___
Mr. Myron D. Lair DATE
Director, Removal and
Emergency Preparedness Programs
U.S. Environmental Protection Agency
Co-chair, Region IV RRT

______//s//_________________________ ___2/2/96____
Mr. Jim Lee DATE
U.S. Department of the Interior
Region IV RRT member

_____//s//___________________________ ___2/5/96___
Ms. Denise Klimas DATE
U.S. Department of Commerce
Region IV RRT member

____//s//___________________________ ___7/31/95___
Dr. Albert K. Langley DATE
State of Georgia
Environmental Protection Division
Department of Natural Resources
Region IV RRT member

Florida

No LOA or special agreement is in place for Florida at this time.

Alabama

No LOA or special agreement is in place for Alabama at this time.

Mississippi

No LOA or special agreement is in place for Mississippi at this time.

Federal Trustees

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Gray's Reef National Marine Sanctuary
10 Ocean Science Circle
Savannah GA 31411

March 9, 1994

Mr. Waynon Johnson
NOAA-Hazmat
c/o US EPA, Waste Division
345 Courtland St, NE
Atlanta, GA 30365

Dear Mr. Johnson;

We have reviewed the draft Letter of Agreement on the use of dispersants in waters off the State of Georgia. In accordance with Title III of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, this office is responsible for protection and preservation of the live bottom ecosystem and other natural resources of the Gray's Reef National Marine Sanctuary.

We recognize that the use of dispersants may be warranted in certain circumstances at the sanctuary and we do not oppose consideration and their application when necessary. However we do not consider it appropriate to preauthorize their use in any circumstances as approved by the On Scene Coordinator. Therefore to ensure that decisions on the use of dispersants in the sanctuary are made on a case by case basis and receive the concurrance of this office, we request that Gray's Reef National Marine Sanctuary be excluded from the areas subject to preapproval under the terms of this agreement. The sanctuary is described on nautical chart 11509 and is bounded by the following coordinates, beginning at 31° 21' 45"N, 80° 55' 17"W commencing to coordinate 31° 25' 15"N, 80° 55' 17"W to coordinate 31° 25' 15"N, 80° 49' 42"W then to 31° 21' 45"N, 80° 49' 42"W then back to the point of origin.

Thank you for the opportunity to review this document. If you have any questions, please contact me or Lt. Cheryl Callahan at (912) 598-2345.

Sincerely,

Reed E. Bohne

Reed Bohne
Manager

APPENDIX III

Biological Assessments and Section 7 Consultations for Threatened and Endangered Species

This appendix addresses concerns for biological resources and critical habitats as identified by the resource trustees from NMFS and USFW.

- **National Marine Fisheries Service (NMFS)**
- **United States Fish and Wildlife Service (USFWS)**

Biological Assessment of Effects on Listed Species of Region IV Regional Response Team Oil Spill Dispersant Use Policy

Description of Proposed Action

The proposed action is adoption of a Region IV Regional Response Team (RRT IV) policy for dispersant use in ocean and coastal waters in response to offshore oil spills. This RRT IV Dispersant Use Policy preauthorizes limited use of dispersants by the pre-designated United States Coast Guard(USCG) On-Scene Coordinator (OSC) on oil discharges impacting Federal waters and other specifically designated areas as outlined in individual Letters of Agreement (LOA) with states within Federal Region IV jurisdiction. In general, pre-authorization is granted three miles seaward of land providing waters are at least ten meters deep. Some special management areas are excluded from pre-authorization. The Dispersant Use Policy implements Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) and is signed by the USCG, U.S. Environmental Protection Agency (USEPA), U.S. Department of Interior (USDOI), the U.S. Department of Commerce (USDOC), and the coastal states of RRT IV (North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi).

The Dispersant Use Policy recognizes that, under certain circumstances, timely and complete physical containment, collection, and removal of oil discharges may not be possible. In such cases, the use of dispersants may reduce risk to the environment and human health. By breaking a cohesive surface slick into small droplets that disperse into the water column, dispersants can prevent an offshore oil slick from contaminating wildlife and critical habitat in nearshore and shoreline areas as well as minimize exposure of wildlife at the water surface.

Because effective use of dispersants has a limited and normally small window of opportunity, RRT IV strongly recommends that dispersant application begin as soon as possible following an oil spill when appropriate. Accordingly, employment of dispersants usually requires that authorization for use be given prior to a spill incident. Within areas pre-authorized for dispersant use by the Policy, further consultation by the United States Coast Guard On-Scene Coordinator is not required, provided the appropriate RRT agencies are immediately notified and the applicable protocols are followed. The Dispersant Use Plan is not intended to exclude or replace the use of mechanical, in-situ burning, or other open-water cleanup methods but to enable and encourage the use of all appropriate techniques in the strategy to remove oil from the water surface and, thereby, minimize environmental impacts of a spill.

Prior to beginning a dispersant application, an on-site survey will be conducted to determine if any threatened or endangered species are present in the area or otherwise at risk from dispersant operations. Appropriate natural resource specialists familiar with local resource concerns and representing the resource trustee will be consulted prior to conducting disperant operations to determine if any threatened or endangered species are at risk from dispersant operations. Measures will be taken to prevent risk of injury to any wildlife, especially listed species. Examples of potential protection measures include temporary employment of deterrent techniques and physical removal of individuals of listed species under the approval of the trustee agency. If the risk to listed species cannot be eliminated or reduced sufficiently, dispersants will not be applied unless they are necessary to prevent a serious threat to human safety.

If a decision to use dispersants is made, the Federal OSC will immediately notify the USEPA, USDOC, USDOI, and appropriate state(s) through RRT representatives. Dispersant application will be discontinued if so requested by an RRT representative. A post-incident briefing will be held within 45 days following a dispersant application to exchange information on its effectiveness and effects and to determine whether changes to the Dispersant Use Policy are necessary.

Description of Pre-authorization Area

Three zones have been established to delineate locations and conditions under which dispersant application operations may take place in waters of Federal Region IV as follows:

1) Green Zone: Pre-authorization for Dispersant Application

Green Zone is defined as any offshore water within Federal Region IV in which ALL of the following conditions apply:

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

b) the waters are at least three miles form any shoreline, and falling outside of any state's jurisdiction; and

c) the water is at least ten meters deep.

Within the Green zone, the USCG, USEPA, DOC, DOI, and affected state(s) agree that the decision to apply dispersants rests solely with the pre-designated USCG OSC, and that no further approval, concurrence, or consultation on the part of the USCG OSC with EPA, DOC, DOI or the state(s) is required.

All dispersant operations within the Green zone will be conducted in accordance with the Protocols outlined in the Dispersant Use Policy.

2) Yellow Zone: Waters Requiring Case-by-Case Approval

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

a) the waters fall under State or Federal special management jurisdiction. This includes any waters designated as marine reserves, National Marine Sanctuaries, national or state wildlife refuges, units of the National Park Service, or proposed or designated critical habitats;

b) the waters are within three miles of a shoreline, and/or fall under state jurisdiction;

c) the waters are less than ten meters deep;

d) the waters are in mangrove or coastal wetland ecosystems, or directly over coral reefs which are in less than 10 meters of water. Coastal wetlands include submerged algal and seagrass beds.

Where a Letter of Agreement is in effect between the USCG, EPA, DOI, DOC, and the affected state(s), the policy for pre-authorization established under the provisions of said LOA shall preempt the Policy herein established for areas otherwise designated as falling within the Yellow zone. When an LOA is not in effect for an area falling within the Yellow zone, the USCG will request authorization for dispersant use according to the following procedures:

If the USCG OSC believes dispersants should be applied within the Yellow zone, a request for authorization must be submitted to the RRT IV representatives of the EPA, DOI, DOC, and the affected state(s) according to the procedures in Appendix I of the Dispersant Use Policy for requesting approval in areas not pre-authorized. The OSC is granted authority to conduct dispersant operation in the Yellow zone only when concurrence has been given by EPA and the affected state(s), and consultation with DOC and DOI has been completed.

As with all dispersant use under the LOA, application of dispersants within the Yellow zone, if approval is granted, will be conducted in accordance with the appropriate and relevant Protocols outlined in the Dispersant Use Policy. Additionally, the USCG OSC will make every reasonable effort to continuously evaluate the application of dispersants within the Yellow zone, and will allow RRT IV agencies and the affected State(s) the opportunity to comment.

3) Red Zone: Exclusion zones:

The Red zone includes areas designated by the Region IV Response Team in which dispersant use is prohibited. No dispersant application operations will be conducted at any time in the Red zone unless:

a) dispersant application is necessary to prevent or mitigate a risk to human health and safety, and/or

b) an emergency modification of this LOA is made on an incident-specific basis.

The Region IV Response Team has not designated any areas as Red zones but retains the right to include areas in the future if deemed appropriate. States may, through the establishment of Letters of Agreement, designate Red zones in areas falling under state jurisdiction.

Description of Oil Dispersants

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

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

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

By dispersing oil into the water column, the spreading or dilution becomes three-dimensional. The subsurface oil concentration initially increases, but diminishes rapidly with distance and time due to physical transport processes. This is in contrast to untreated oil concentrated at the water surface, which can coalesce in surface convergence zones even after it has spread out to very low concentrations. The highest concentration of chemically dispersed oil typically occurs in the top meter of water during the first hour following treatment (Rycroft et. al., 1994). Available data suggest that concentrations of more than ten parts per million (ppm) of dispersed oil are unlikely beyond ten meters (depth) of the slick and that even within one meter depth of the slick, concentrations rarely exceed 100 ppm. The continuous mixing and dilution capabilities of open water lead to uniformity and are sufficient to rapidly reduce these concentrations. Field studies show that water column concentrations decline to undetectable or background levels within several hours following application of a dispersant (SEA, 1995). Under untreated slicks, oil concentrations typically range from a few parts per million to less than 0.1 ppm, diminishing with depth and time.

The dispersed oil droplets, ranging in size from microns to a few millimeters, break down by natural processes, such as biodegradation. Microbial biodegradation of oil appears to be enhanced by dispersal because of the larger surface area available as compared to a surface slick. Dispersants also prevent formation of tarballs and oil-in-water emulsions (mousse), which tend to be resistant to biodegradation due to their low surface area. The chemical dispersants applied, like the oil droplets, are diluted by diffusion and convective mixing. Much of the solvent fraction evaporates immediately after the dispersing is applied. The surfactants are readily biodegraded.

Description of Listed Species Present

Cetaceans

Endangered cetaceans that occur in the area under considerations include four mysticete species: right, humpback, finback, and sei whales. Right whales (*Eubaleana glacialis*) are of greatest concern because they are the most severely depleted large whale species and because they often feed by skimming the surface of the water, primarily on dense concentrations of zooplankton. Right whales occur in the area primarily in winter and calve in the coastal waters of Georgia and northeast Florida (NMFS, 1990). Humpback whales (*Megaptera novaeangliae*) occur in the area most commonly during their winter breeding season. Krill and small schooling fishes are the mainstay of the humpback's diet. Finback whales (*Balaenoptera physalus*) winter in the area, primarily in offshore waters, and feed on small schooling fishes, pelagic crustaceans, and squid (NMFS, 1989). Sei whales (*Balaenoptera borealis*) occur in the northern part of the area and generally skim feed on surface plankton, small schooling fishes, and squid. These baleen whale species are all opportunistic feeders and may feed at or near the surface (McKenzie and Nicolas, 1988).

One endangered odontocete, the sperm whale (*Physeter macrocephalus*) occurs in the area and is most likely to be found at the edge of the continental shelf or in deep oceanic waters. They tend to inhabit areas with a water depth of 600 meters or more and are uncommon in waters less than 300 meters deep. Sperm whales are deep diving and feed primarily on squid and deep water fishes.

Sea Turtles

Six listed sea turtle species occur in the area under consideration. Kemp's (Atlantic) ridley, leatherback, and hawksbill sea turtles are endangered. Kemp's ridley (*Lepidochelys kempii*), the most endangered of these species, occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. Adults are most frequently sighted off southwestern Florida. This species is a shallow-water benthic feeders, preying largely on crabs (USFWS and NMFS, 1992). Young Kemp's ridleys use sargassum mats and seagrass beds for refuge and foraging (Ernst *et al*., 1994). Leatherback turtles (*Dermochelys coriacea*) occur throughout the area and have been reported to nest on beaches in Florida and, to a lesser extent, Georgia and North Carolina. Leatherback nesting in the U.S. Caribbean is reported in the Virgin Islands (St. Croix, St. Thomas, St. John) and Puerto Rico, including Islas Culebra, Vieques, and Mona (NMFS, 1992). Leatherbacks are considered to be a highly pelagic species but occasionally enter the shallow coastal waters of bays and estuaries. They may concentrate near and follow drifting schools of jellyfish, their primary prey (NMFS, 1992). Hawksbill sea turtles (*Eretmochelys imbricata*) are predominantly tropical. Adult hawksbills characteristically inhabit shallow rocky areas and coral reefs but also occur in mangrove-bordered bays, estuaries, and lagoons and occasionally in deep waters. Juveniles occupy the deeper water pelagic environment, often associated with floating patches of sargassum mats. Hawksbill turtles are omnivorous opportunists and seem to prefer invertebrates, particularly sponges (Ernst *et al*., 1994).

Green, loggerhead, and olive (Pacific) ridley sea turtles are listed as threatened. Atlantic green sea turtles *(Chelonia mydas*) occur in U.S. Atlantic waters around the U.S. Virgin Islands, Puerto Rico, and along the continental U.S. from Texas to Massachusetts. They are endangered in Florida and threatened elsewhere. They nest along the east coast of Florida and in smaller numbers in the U.S. Virgin Islands, Puerto Rico and along the Florida panhandle. Important nesting areas in Florida include Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties. Their preferred habitat appears to be lagoons and shoals with an abundance of marine grasses. Adult green sea turtles are primarily herbivorous, foraging on algae and seagrasses; juveniles may eat a variety of invertebrates as well. Areas that are known as important feeding areas for green turtles in Florida include Indian

River Lagoon, Florida Keys, Florida Bay, Homosassa, Crystal River and Cedar Key (NMFS, 1991a). Loggerhead turtles (*Caretta caretta*) occur throughout the area under consideration. In the western Atlantic the great bulk of loggerhead nesting occurs along the southeastern coast of the U.S., with approximately 80 percent occurring in Brevard, Indian River, St. Lucie, Martin, Palm Beach and Broward Counties in Florida (NMFS, 1991b). Loggerhead turtles also nest on beaches in North Carolina, South Carolina, Georgia, along the Gulf Coast of Florida, Alabama, and Mississippi. Loggerheads wander widely throughout the marine waters of their range. They commonly inhabit the continental shelves and estuarine environments, occurring most frequently in waters less than 50 meters deep. Hatchlings and juveniles are often found along current fronts, downswells, or eddies associated with drifting mats of sargassum (Ernst *et al*., 1994). Loggerheads are omnivores and feed on a wide variety of benthic invertebrates including crustaceans, mollusks, and sponges (NMFS, 1991b). The olive ridley (*Lepidochelys olivacea*) occurs and nests predominantly in tropical waters, including the Caribbean as far north as Puerto Rico. They usually nest in aggregations called arribadas. Olive ridleys generally inhabit protected, relatively shallow nearshore areas, typically within fifteen kilometers of mainland shores, but occasionally occurs in the open sea. They are predominantly carnivorous, preying on pelagic crabs, jellyfish, and tunicates (Ernst *et al.*, 1994).

Fish

Two listed species of anadromous fish, the shortnose sturgeon and gulf sturgeon may occur in the area under consideration. The endangered shortnose sturgeon (*Acipenser brevirostrum*) occurs in several large coastal river systems along the Atlantic coast. They are known to inhabit their natal rivers, estuaries, and the nearshore marine environment. Most migratory activities occur during winter and spring and, though shortnose sturgeon can travel considerable distances, their movements are apparently confined to estuarine and riverine environments (Gilbert, 1989). Shortnose sturgeon are benthic feeders, usually feeding in shallow muddy backwater areas with abundant vegetation and along river banks by rooting along the bottom with their snouts, indiscriminately "vacuuming" large quantities of mud and debris along with their prey. Juveniles feed mainly on benthic crustaceans and insect larvae; adults feed largely on mollusks supplemented by polychaetes and small benthic fishes in estuarine areas (Gilbert, 1989). Because shortnose sturgeon typically forage within the middle and upper reaches of the estuaries and rivers they inhabit, they are unlikely to occur in the area under consideration.

The threatened Gulf sturgeon (*Acipenser oxyrhynchus desotoi*) occurs predominantly in the northeastern Gulf of Mexico, where it ranges from the Mississippi Delta east to the Suwannee River in Florida and formerly to Tampa Bay. The species is greatly depleted throughout most of its range and now is relatively common only in a few areas. The gulf sturgeon spawns in freshwater riverine habitats from April to June and young descend to sea at about 2 to 3 years of age for winter migrations (Barkuloo, 1988). It is unknown whether they aggregate during their migrations. Data shows, however, that adults tend to enter and leave the freshwater system within very narrow time periods. Marine habitats for the gulf sturgeon are poorly known. Limited analyses of stomach content indicate that sand bottom, hard bottom, and seagrass beds are probably important habitats. In the Big Bend area of the northeastern Gulf of Mexico, these habitats occur in 70 feet of water as far offshore as 20 miles. Like the shortnose sturgeon, the gulf sturgeon is a benthic omnivore and feeds on insects, crustaceans, molluscs, annelids, and occasionally small fish (Lee, *et al*. 1980).

Johnson's Seagrass

Johnson's seagrass (*Halophila johnsonii*) has been proposed for Federal listing. It occurs in shallow lagoons from Sebastian Inlet to Biscayne Bay on the Atlantic coast of Florida. It is a small seagrass that grows only a few centimeters high (Dawes, et al., 1991).

Effects of Oil Spills on Listed Species

Cetaceans

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

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

Sea Turtles

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

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

Shortnose and Gulf Sturgeon

The anadromous shortnose and Gulf sturgeons would be most vulnerable to exposure to oil spills while moving and foraging in estuarine and nearshore marine environments. The Gulf sturgeon would also be at risk during its winter marine migrations. Because the Gulf sturgeon does little or no feeding in fresh water, its growth and reproductive potential depend entirely on the resources accumulated by feeding during winter migrations. Benthic feeders, sturgeon could ingest contaminated sediments, organisms, or vegetation if oil settles to the sea floor. The ability of sturgeon to sense and avoid oil contamination is unknown. Ingestion of contaminated food and sediments could lead to general body deterioration, lower reproductive potential, and lower viability of offspring (Barkuloo, 1988). If Gulf sturgeon do aggregate during their winter migrations, as some data indicates, significant portions of the population could be affected by a major oil release impacting aggregation areas.

Johnson's Seagrass

Oil can penetrate into plants where it travels in the intercellular spaces and possibly also in the vascular system. The oil damages cell membranes and may enter the cells. Oil contamination may reduce transpiration rate, reduce photosynthesis, increase respiration, and inhibit translocation. The severity of these effects depends in part on the constituents in the oil and extent of exposure (Baker, 1970)

Analysis of Biological Effects of Proposed Action

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

Many of the species listed in Region IV rarely occur in the "Green" zone where dispersant use will be pre-authorized by the Dispersant Use Policy and so are unlikely to be adversely affected. Most sea turtles, Gulf and shortnose sturgeons, and Johnson's seagrass occur primarily the shallower, nearshore waters in the "Yellow" zone. Many of the sea turtles and cetaceans that occur more frequently in the open waters of the pre-authorized "Green" zone are present in the area seasonally, reducing the risk they would be affected. Potential effects of dispersant use on listed species that may occur in the area under consideration for pre-authorization under the RRT IV Dispersant Policy are considered below.

Direct Contact and Ingestion

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

Direct application of dispersants to birds or fur-bearing mammals would likely destroy the water-repellency and insulating capacity of fur or feathers and various components may disrupt the structural integrity of sensitive external membranes and surfaces (NRC, 1989). According to the Dispersant Use Policy, however, dispersants will not be sprayed near listed species or other wildlife. Data indicate that, in the water column, dispersant alone is unlikely to contribute significantly to adverse biological effects. Within the normal range of operating dosages, biological effects are due to the dispersed oil, not the dispersant (NRC, 1989; SEA, 1995).

Prey Contamination

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

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

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

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

If sediments become contaminated, benthic carnivores such as the listed shortnose and Gulf sturgeons could suffer chronic exposure through ingestion of oiled sediment and contaminated benthic prey populations. Benthic invertebrates may accumulate petroleum hydrocarbons from contaminated water, sediments, and food. Sediment contamination, however, is highly unlikely considering the depth and distance from shore of the area under consideration for approval of dispersant application under this Dispersant Use Policy. Furthermore, dispersed oil droplets are less likely than undispersed oil to adhere to sediment particles.

Prey Abundance: Toxicity to Zooplankton

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

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

Analysis of Alternatives

Emergency Authorization

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

Mechanical Removal

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

In-Situ Burning

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

Other Chemical Countermeasures

Other classes of open-water chemical countermeasure products currently available such as solidifiers, visco-elastomizers, herders, and demulsifiers typically satisfy very narrow oil spill response niches. Most are used to enhance mechanical recovery of small releases. It is unlikely they would be effective for large spills or under the same spill conditions dispersants can be employed. Furthermore, application of many products in these classes is still in experimental stages with regard to effectiveness and environmental effects.

No Action

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

Conclusions

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

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

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

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March 13, 1996 F/SEO13:DMB

Captain Gerald W. Abrams, USCG
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Dear Captain Abrams:

This responds to your letter, received January 31, 1996, regarding the proposed Region IV Regional Response Team (RRT IV) policies for pre-authorizing use of chemical dispersants as an oil-spill response measure. A Biological Assessment (BA) was submitted pursuant to Section 7 of the Endangered Species Act of 1973 (ESA). We have also reviewed the information contained in a draft dispersant use plan, received August 16, 1995. We concur with the finding of the BA that the proposed policy is unlikely to adversely affect endangered or threatened species under National Marine Fisheries Service (NMFS) purview or their critical habitat. We do, however, wish to make special stipulations related to designated critical habitat and to the conduct of dispersant applications in the vicinity of listed species of sea turtles and whales.

The draft dispersant use plan states that dispersant applications would only occur in pre-authorized areas (or in areas where special authorization is received), during daylight hours with good visibility, following an aerial overflight which would attempt to determine the presence of listed species. NMFS recognizes that little data is available on the effects of oil and dispersed oil on sea turtles and marine mammals, but also agrees that offshore dispersal of oil slicks can reduce adverse impacts of oil spills to these species and their habitats. NMFS is concerned, however, about the possibility of harm to listed species from short-term exposure to very high concentrations of dispersant -- from the toxic properties of the dispersant solvents as well as caustic or toxic properties of the dispersant chemical itself. Dispersant application should therefore <u>not</u> be conducted in close proximity to any individuals of listed species of whale or sea turtle. A horizontal distance of 100 yards for vessel-based dispersant application and 500 yards for aerial dispersant application should be maintained from any sighted individuals.

In addition, we do have special concerns regarding burning in the designated critical habitat for the severely endangered northern right whale along the coast of Georgia and Florida (see enclosed Federal Register notice). This area includes waters designated as Green and Yellow zones in the dispersant use plan. The following measures should be adopted in the right whale critical habitat between December 1 and March 31:

(1) On-Scene Coordinators or their designees should contact the right whale early warning system (EWS) for information on the most recent sightings of right whales. NMFS has previously furnished contact information for the EWS to the Jacksonville and Savannah Marine Safety Offices.

(2) Should whales be present, no attempts to relocate, deter, or "haze" the animals should be made for the purpose of dispersant application. The location of dispersant applications should maintain the minimum separation distances specified above. Personnel from the EWS may attempt to harass whales out of the area, when possible, in order to minimize the potential for injury to the animals either from oil or response operations.

This concludes consultation responsibilities under Section 7 of the ESA. Consultation should be reinitiated, however, if new information reveals impacts of the identified activity that may affect listed species, a new species is listed, new critical habitat is designated, or the activity is subsequently modified. In addition, when an On-Scene Coordinator exercises the authority to apply chemical dispersants, please forward us a copy of the post-incident briefing document prepared by the OSC. We will review the briefing document to determine whether reconsultation is necessary.

If you have any questions, please contact LTJG David Bernhart, Fishery Biologist, at 813/570-5312.

Sincerely yours,

Andrew J. Kemmerer
Regional Director

Enclosure

cc: F/PR2
File: 1514-22-h2-1995.

[Federal Register: June 3, 1994]

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 226

[Docket No. 930363-4145, I.D. 012793B]

Designated Critical Habitat; Northern **Right Whale**

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Final rule.

SUMMARY: NMFS is designating critical habitat for the northern **right whale** (Eubalaena glacialis). The designated habitat includes portions of Cape Cod Bay and Stellwagen Bank, the Great South Channel (each off the coast of Massachusetts), and waters adjacent to the coasts of Georgia and the east coast of Florida. This designation provides notice to Federal agencies and the public that a listed species is dependent on these areas and features for its continued existence and that any Federal action that may affect these areas or features is subject to the consultation requirements of section 7 of the Endangered Species Act (ESA).

EFFECTIVE DATE: July 5, 1994.

ADDRESSES: Requests for copies of this rule should be addressed to the Director, Office of Protected Resources, National Marine Fisheries Service (NMFS), 1335 East-West Highway, Silver Spring, MD 20910.

FOR FURTHER INFORMATION CONTACT: Michael Payne, Protected Species Management Division, NMFS, 301/713-2322; Charles Oravetz, Southeast Regional Office, NMFS, 813/893-3141; or Doug Beach, Northeast Regional Office, NMFS, 508/281-9254.

SUPPLEMENTARY INFORMATION:

Background

Right whales, Eubalaena spp., are the most endangered of the large **whale** species, brought to extremely low levels by commercial whaling. **Right** whales were the earliest targets of whaling and, although they have been protected world-wide from commercial whaling by international agreements since 1935, **right whale** populations still remain extremely depleted. The global population of **right** whales is comprised of two separate species, one each in both the northern and southern hemisphere, and several stocks or populations within each hemisphere. The majority of **right** whales occur in the southern hemisphere (the southern **right whale**, E. australis) and are considered a separate species from the **right whale** in the northern hemisphere (E. glacialis).

At least two populations of northern **right** whales, an eastern and a western population, occur, or have occurred, in the North Atlantic. The eastern North Atlantic population may be nearly extinct. Between 1935-1985, there were only 21 possible sightings in the eastern North Atlantic, totaling 45 individuals (Brown, 1986). Furthermore, Brown (1986) considered only five of these sightings (seven individual whales) to be confirmed. In the western North Atlantic, the known distribution and abundance of **right** whales indicate a ``best available'' population estimate of 300-350 individuals. Despite the low abundance and known anthropogenic factors affecting total mortality (Kraus, 1990), the western North Atlantic stock is the largest in the Northern Hemisphere. This population stands to benefit most from recovery actions (NMFS, 1991; Kenney, Winn and Macaulay, 1994).

Like other baleen whales, the western North Atlantic population of **right** whales (hereafter referred to as the northern **right whale**) is migratory. The known distribution and migratory pattern has been previously summarized by Kraus (1985); Winn, Price and Sorensen (1986); Gaskin (1987, 1991); and by Kraus et al. (1986). The five primary habitats used by northern **right** whales during their annual migration, as described by Kenney, Winn and Macaulay (1994), include the following three areas off the eastern coast of the United States: (1) A spring/ early summer feeding and nursery area for a majority of the population in the Great South Channel (GSC), (2) a late winter/spring feeding and nursery area for a small portion of the population in Cape Cod Bay (CCB), and (3) a winter calving ground and nursery area in the coastal waters of the southeastern United States (SEUS); and the following two areas located in Canadian waters: (4) a summer/fall feeding and nursery area for some animals, including nearly all mother/calf pairs, in the lower Bay of Fundy; and (5) a summer/fall feeding ground, with almost exclusively mature individuals, on the southern Nova Scotian shelf.

The northern **right whale** was listed as endangered on June 2, 1970 (35 FR 8495). Section 9 of the ESA prohibits the taking of endangered species, and section 7 requires Federal agencies to ensure that their actions are not likely to jeopardize either threatened and endangered species. For species listed prior to 1978, when Congress required that critical habitat be designated, concurrently with the listing, critical habitat may be designated although such designation is not required. Section 4(f) of the ESA also requires the responsible agency to develop and implement a recovery plan for listed species, unless such a plan would not promote the conservation and recovery of the species. NMFS determined that a recovery plan would promote the conservation of the northern **right whale**. Accordingly, the Assistant Administrator for Fisheries (AA) appointed a Recovery Team consisting of experts on **right** whales from the private sector, academia and government. A Recovery Plan for the Northern **Right Whale** was approved by NMFS in December, 1991 (NMFS, 1991).

NMFS was petitioned by the **Right Whale** Recovery Team to designate critical habitat for the northern **right whale** on May 18, 1990. A Federal Register notice was published on July 12, 1990 (55 FR 28670), requesting information and comments on the petition. Of those agencies, organizations, and private groups that commented, most responded favorably to the designation of the three areas in the U.S. as critical habitat for the northern **right whale**. The comments received were considered and incorporated as appropriate by NMFS in the proposed rule to designate critical habitat for northern **right** whales. The proposed rule was published on May 19, 1993 (58 FR 29186), and provided for a 60-day comment period. NMFS also completed an Environmental Assesment (EA) pursuant to the National Environmental Policy Act (NEPA), to evaluate both the environmental and economic impacts of the proposed critical habitat designation. The EA resulted in a finding of no significant impact for the proposed action.

During the comment period, NMFS received several requests for public hearings on the proposed designation. Public hearings were held in Boston, MA, on August 25, 1993; in Port Canaveral, FL, on August 24, 1993; and in Brunswick, GA, on August 25, 1993 (58 FR 41454, Aug. 4, 1993). The comment period was extended until August 31, 1993, to allow commenters the opportunity to respond to concerns voiced at the public hearings. After consideration of public comments, and based on the best available scientific information, NMFS is designating critical habitat for the northern **right whale** as described in the proposed rule.

Definition of Critical Habitat

``Critical habitat'', as defined in section 3(5)(A) of the ESA, and the term ``conservation'', as defined in section 3(3) of the ESA, were provided in the preamble to the proposed rule (58 FR 29186, May 19, 1993).

Essential Habitat of the Northern **Right Whale**

Biological information for the northern **right whale** can be found in the Recovery Plan (NMFS, 1991), and in recent scientific literature (Winn, Price and Sorensen, 1986; Kenney et al., 1986; Wishner et al., 1988; Mayo and Marx, 1990; Payne et al., 1990; Kraus and Kenney, 1991; Kraus et al., 1993; Kenney, Winn and Macauley, 1994). The physical and biological habitat features of the critical habitat are discussed herein.

Foraging Habitat of the Northern **Right Whale**

Right whales have been characterized principally as ``skim'' feeders (Kawamura, 1974; Nemoto and Kawamura, 1977). They subsist primarily on dense swarms of calanoid copepods, notably Calanus finmarchicus in the North Atlantic (Mitchell, 1975; Watkins and Schevill, 1979; Winn, Price and Sorensen, 1986; Wishner et al., 1988; Mayo and Marx, 1990; Kraus and Kenney, 1991). Northern **right** whales are also known to prey on other similar sized zooplankton. Two other zooplankton species preyed upon by northern **right** whales in CCB include Pseudocalanus minutis and Centropages spp. (Mayo and Marx, 1990). A strong positive correlation between the abundance of **right** whales in the southern Gulf of Maine and densities of C. finmarchicus has been described by Kenney et al. (1986), Wishner et al. (1988), Payne et al. (1990), and Kenney, Winn and Macauley (1994). The two recorded time intervals when **right** whales were most abundant in the CCB/Stellwagen Bank area (April 1970, reported by Watkins and Schevill, 1982; and during 1986, reported by Payne et al., 1990) were during periods of observed peak densities of copepods.

While the size and density of copepod patches are important to the feeding energetics of **right** whales, so are the relative proportions of adult copepods within each patch (Kenney et al., 1986; Wishner et al., 1988). Although the feeding ecology of **right** whales is likely more complex than previously thought (Mayo and Marx, 1990), dense aggregations of older, caloric-rich copepods seem to be the required characteristics for energetically successful foraging by **right** whales. If copepods in these caloric-rich, adult developmental stages are not available to northern **right** whales in sufficient densities, there may be insufficient prey available in the remaining developmental stages (independent of abundance) to provide **right** whales with the required energy densities (as described by Kenney et al., 1986) to meet the metabolic and reproductive demands of the **right whale** population in the western North Atlantic (Kenney et al., 1986; Payne et al., 1990).

Foraging Habitat: The overall spatial requirements for **right** whales are not well defined; however, the distribution pattern observed for northern **right** whales indicates that four of the five principal habitats occupied by **right** whales in the western North Atlantic are used for foraging, and possibly reproductive activities: The GSC, CCB, the Bay of Fundy, and the Scotian Shelf. Neither feeding nor courtship behavior has been observed along the SEUS. Scientists believe that subadult and adult baleen whales fast, or feed rarely, during the winter calving period.

Based on observed distribution patterns compared to oceanographic conditions, scientists speculate that the topographic and seasonal oceanographic characteristics of foraging areas are conducive to the dense growth of zooplankton. These high-use areas may comprise the minimal space required for normal foraging behavior that will support the northern **right whale** population. The Department of Fisheries and Oceans (Canada) has already designated two foraging areas as **right whale** sanctuaries--one in the Bay of Fundy and another on the Scotian Shelf. The remaining two foraging habitats, the GSC and CCB, are found in the United States and are included as critical habitat for the northern **right whale**.

Great South Channel: The GSC is a large funnel-shaped bathymetric feature at the southern extreme of the Gulf of Maine between Georges Bank and Cape Cod, MA. The GSC is one of the most used cetacean habitats off the northeastern United States (Kenney and Winn, 1986). The channel is bordered on the west by Cape Cod and Nantucket Shoals, and on the east by Georges Bank. The channel is generally deeper to the north and shallower to the south, where it narrows and rises to the continental shelf edge. To the north, the channel opens into several deepwater basins of the Gulf of Maine. The V-shaped 100-m isobath effectively delineates the steep drop-off from Nantucket Shoals and Georges Bank to the deeper basins. The average depth is about 175 m, with a maximum depth of about 200 m to the north.

The GSC becomes thermally stratified during the spring and summer months. Surface waters typically range from 3 to 17 deg.C between winter and summer. Salinity is stable throughout the year at approximately 32-33 parts per thousand (Hopkins and Garfield, 1979). Much of the bottom is comprised of silty, sandy sediments, with finer sediments occurring in the deeper waters.

The late-winter/early spring mixing of warmer shelf waters with the cold Gulf of Maine water funneled through the channel causes a dramatic increase in faunal productivity in the area. The zooplankton fauna found in these waters are typically dominated by copepods, specifically C. finmarchicus, P. minutus, C. typicus, C. hamatus, and Metridia lucens. From the middle of winter to early summer, C. finmarchicus and P. minutus are the dominant species, which together made up between 60 and 90 percent of the samples described by Sherman et al. (1987). In late spring, C. finmarchicus alone makes up 60 to 70 percent of the copepod community. In the second half of the year, both species of Centropages dominate the waters, accounting for about 75 percent of all copepod species sampled.

The GSC **right whale** distribution was described by Kenney, Winn and Macaulay (1994), and the following, unless otherwise cited, is taken from that manuscript. **Right** whales occur in the GSC on a strictly seasonal basis--in the spring, with a peak in May. Only in 1986 and 1987 were a small number of **right** whales present throughout most or all of the summer. This corresponds to the atypical copepod density maxima in the GSC and southern Gulf of Maine described by Wishner et al. (1988) and Payne et al. (1990). The main area of GSC **right whale** distribution has been in the central basin, generally in waters deeper than 100 m. There is a persistent thermal front, which roughly parallels the V-shaped 100-m isobath typically slightly south of that isobath in 60-70 m of water. The front divides stratified waters with warmer surface temperatures to the north of the front from tidally mixed water with cooler surface temperatures over the shallower area south of the front (Wishner et al., 1988; Brown and Winn, 1989). **Right** whales occur in the stratified waters north of the front, and Brown and Winn (1989) showed that **right whale** sightings were non-randomly distributed relative to the front, but were at a median distance from it of about 11 km. Although there are variations between years, the ``typical'' pattern is for the primary **right whale** aggregation to occur in the central to western portion of the basin. Within any one year, the general area of major aggregation is remarkably stable. A gradual southward shift in the center of distribution occurs as the season progresses.

Single-day abundance estimates for the GSC, uncorrected for animals missed while submerged, ranged up to 179 individuals (Kenney, Winn and Macauley, 1994). The total number of photographically identified northern **right** whales is now 319, eliminating those known to have died, but including some that have not been sighted for several years and that may be dead (Kraus et al., 1993). Therefore, it is likely that a significant proportion of the western North Atlantic **right whale** population uses the GSC as a feeding area each spring, aggregating to exploit exceptionally dense copepod patches. Given that not all of the 300-350 **right** whales are seen in U.S. shelf waters each season, it is very likely that most, if not all, of the northern **right whale** population use the GSC within any given season, and that every 2-3 years, the entire population of 300-350 northern **right** whales in the northwest Atlantic may pass through the GSC.

Cape Cod Bay: The CCB is a large embayment on the U.S. Atlantic Ocean off of the State of Massachusetts that is bounded on three sides by Cape Cod and the Massachusetts coastline from Plymouth, MA, south. To the north, CCB opens to Massachusetts Bay and the Gulf of Maine. CCB has an average depth of about 25 m, and a maximum depth of about 65 m. The deepest area of CCB is in the northern section, bordering Massachusetts Bay.

The general water flow is counter-clockwise, running from the Gulf of Maine south into the western half of CCB, over to eastern CCB, and back into the Gulf of Maine through the channel between the north end of Cape Cod (Race Point) and the southeast end of Stellwagen Bank, a submarine bank that lies just north of Cape Cod. Flow within the bay is driven by density gradients caused by freshwater river run-off from the Gulf of Maine (Franks and Anderson, 1992a, 1992b; Geyer et al., 1992) and by a predominantly westerly wind.

Thermal stratification occurs in the bay during the summer months. Surface water temperatures typically range from 0 to 19 deg.C throughout the year. Salinity is fairly stable at around 31-32 parts per thousand. Much of the bottom is comprised of unconsolidated sediments, with finer sediments occurring in the deeper waters (Davis, 1984). In shallow areas, or where there is sufficient current, sediments tend to be coarser.

Northern **right** whales were ``rediscovered'' in the CCB in the early 1950s. **Right** whales have been seen in Massachusetts waters in most months (Watkins and Schevill, 1982; Schevill, Watkins and Moore, 1986; Winn, Price and Sorensen, 1986; Hamilton and Mayo, 1990). However, most sightings occurred between February and May, with peak abundance in late March (Mayo, 1993). Schevill, Watkins and Moore (1986) reported 764 sightings of **right** whales between 1955 and 1981 in CCB. More than 70 whales were seen in one day in 1970. Hamilton and Mayo (1990) reported 2,643 sightings of 113 individual **right** whales in Massachusetts waters, with a concentration in the eastern part of CCB. A number of **right** whales, including cow-calf pairs, remained in CCB and Massachusetts Bay during the summers of 1986 and 1987. This was attributed to atypically dense concentrations of C. finmarchicus in those years, and low abundances of sandlance, Ammodytes spp., a planktivorous finfish that also preys on copepods and may be competing with **right** whales for copepod prey during recent years (Payne et al., 1990).

The late-winter/early spring zooplankton fauna of CCB consists primarily of copepods, represented predominantly by two species, Arcartia clausi and A. tonsa. Samples taken in the daytime indicated greater densities of copepods at greater depths. The copepod C. finmarchicus is found throughout inshore CCB waters at densities of 100 individuals per cubic meter from April through June (Mayo and Marx, 1990). However, Mayo and Marx (1990) found that the density of surface zooplankton samples collected in the path of feeding **right** whales during mid-winter was significantly higher than for the samples taken where whales were absent (median = 3,904 organisms/m\3\). The threshhold value below which feeding by northern **right** whales is not likely to occur in CCB is approximately 1,000 organisms/m\3\ (Mayo and Marx, 1990). Although year-to-year variation in the composition of zooplankton was found, feeding **right** whales were associated with patches of zooplankton that were dominated by C. finmarchicus, P. minutus, C. spp. and by cirripede (barnacle) larvae. These authors suggested that, after arrival in CCB when prey is at a maximum (or at least at a consistently acceptable level), the whales select the densest patches of copepods (Mayo and Marx, 1990).

Calving and Nursery Habitat of Northern **Right** Whales

Cape Cod Bay: Schevill, Watkins and Moore (1986) reported 21 sightings of small calves in 12 of the 26 years of their CCB study, including two calves that may have been born in CCB. Therefore, the CCB may occasionally serve as a calving area, but it is more recognized for being a nursery habitat for calves that enter into the area after being born most likely in, or near, the SEUS. Mead (1986) identified Massachusetts waters as second only to the SEUS for documented **right whale** calf sightings. Hamilton and Mayo (1990) observed a total of 30 calves between 1979 and 1987, associated with 21 mothers. Schevill, Watkins and Moore (1986) and Hamilton and Mayo (1990) documented observations of mating behavior and nursing in CCB.

Southeast United States (SEUS): The coastal waters off Georgia and northern Florida (the area described as the SEUS) average about 30 m in depth with a maximum depth of about 60 m. The deepest waters occur along the coast of Florida, just south of Cape Canaveral. Seasonal water temperatures and salinity for this area are higher than in northern waters. This is a transition area separating subtropical from the more temperate southeastern marine communities. Large, cyclic changes in abundance and dominance of plankton species occur seasonally and annually. Annual variation may be so great that short-term monitoring studies may not be sensitive enough to assess the temporal variability of the plankton community. The recorded preferred food of the northern **right whale**, C. finmarchicus, does not occur in these waters, and the area is not considered a foraging area for northern **right** whales.

Between 1989-1992, 31 calves were observed within the SEUS, representing 76 percent of the total number of calves (n = 41) reported from the North Atlantic during that period (Kraus et al., 1993). The calving season extends from late November through early March with an observed peak in January. The 30' blocks of latitude within the SEUS having the greatest density of adult and juvenile **right** whales occurred in waters from Brunswick, GA to Jacksonville Beach, FL (Kraus et al., 1993). The presence of females with calves was primarily limited to the coastal waters between 27 deg.30' and 32 deg.00'N latitudes. This is consistent with distributions reported by Kraus and Kenney (1991) using historical sighting data through 1989.

Since 1980, 153 northern **right** whales have been individually identified from surveys conducted in SEUS waters. This represents 48 percent of the known northern **right whale** population of 319 whales. During this period, 125 of the **right** whales observed in the SEUS have also been sexed using criteria described in Kraus et al. (1993). Of the 96 adults observed, 91 were females, one was a male, and the sex of the remaining four was not determined. These 91 females represent 74 percent of all the photo-identified females who have been reproductively active since 1980. The observed frequency of occurrence of females in the SEUS is significantly greater than the expected 1:1 sex ratio characteristic of the overall population. This demonstrates that the population is segregated by sex at this time of the year, and that the SEUS is used predominantly by females, and females with calves, although several juvenile males have also been observed in recent years. Based on the number of calves and females with calves in the SEUS since 1980, Kraus et al. (1993) consider the SEUS as the primary calving area for the population.

Environmental Correlates to **Right Whale** Distribution in the SEUS: Environmental features that have been correlated with the distribution of northern **right** whales throughout the SEUS include water depth, water temperature, and the distribution of **right whale** cow/calf pairs and the distance from shore to the 40-m isobath (Kraus et al., 1993).

The average water depth at sighting was 12.6 m (SD = 7.1). This shallow water preference is consistent with that recorded for southern **right** whales with calves (Payne, 1986). Also, the significant correlation between the distribution of northern **right** whales and the distance from shore of the 40-m isobath (referred to as the inner (0-20-m) and middle (20-40-m) shelf by Atkinson and Menzel, 1985) indicates that **right** whales in the SEUS are using the nearshore edge of the widest part of the broad shallow-water shelf characteristic of the Georgia-Florida Bight. The inner shelf is dominated by tidal currents, river inflow, and interaction with the coastal sounds. The middle shelf, which is dominated by winds, has less interaction with the coastal environment but is influenced on the outer margins by the Gulf Stream (Atkinson and Menzel, 1985). This use of the inner and nearshore-middle shelf area by **right** whales may provide maximum protection from the wave action that occurs over the outer margins of the shelf. Therefore, the occurrence of cow/calf pairs in coastal waters of the SEUS may be due, at least in part, to the bathymetry that affords protection from large waves and rough water. The strong winds and offshore wave activity in the winter SEUS is minimized nearshore by the relatively shallow, very long underwater shelf (extending almost 105 km offshore) (Kraus et al, 1993).

The average temperature of 30' blocks of latitude where **right** whales have occurred is significantly cooler than those blocks of latitude within the SEUS where **right** whales were not observed (14.5 deg.C vs. 18.5 deg.C) (Kraus et al., 1993). The inner shelf is not affected by the Gulf Stream during the period when **right** whales are present; therefore sea-surface temperature decreases as one moves from the Gulf Stream towards shore. It is difficult to separate the effects of temperature from depth and proximity to shore, but sighting data indicate that northern **right** whales clearly prefer a band of relatively cool water (10-13 deg.C) within the SEUS. This band is affected by the nearshore processes, including cooler freshwater runoff and discharge, as described in several chapters of Atkinson, Menzel and Bush (1985). Although little information is available on **right whale** physiology, it is hypothesized that the metabolic rate of the **whale** is affected by water temperature (Kraus and Kenney, 1991). The cooler, coastal water may provide **right** whales with the optimum thermal balance for calving by cooling the female at a time when offshore, Gulf stream affected warmer waters may be too warm for a female with maximum fatty layers prior to parturition and nursing. At the same time, the coastal waters may be warm enough not to cause problems for a neonate, considering that the insulating layer of a neonate for the first few weeks is minimal, as compared to the adult.

Courtship activities have been observed throughout most of the range of the northern **right whale**, except within the SEUS (Kraus, 1985).

Activities That May Affect Essential Habitat

Northern **right** whales are no longer observed in certain areas where they once were found, such as Delaware Bay, New York Bight and Long Island Sound (NMFS, 1991). The absence of **right whale** sightings in these areas may be due to several factors, including: Increased human activities, habitat degradation, insufficient quantities of prey due to habitat or natural alterations in the physical environment, extinction of an independent breeding group that used these areas or contraction of the species' range as the population has decreased (NMFS, 1991).

There exists a wide range of human activities that may impact the designated critical habitat for northern **right** whales (NMFS, 1991, 1992). Resource uses in the critical habitat areas are currently, and have been historically, dominated by vessel traffic and fisheries. Vessel activities can change **whale** behavior, disrupt feeding practices, disturb courtship rituals, disperse up food sources and injure or kill whales through collisions. Thirty-two percent of the known strandings of northern **right** whales since 1970 have been caused by human activities (Kraus, 1990; NMFS, 1992).

Vessels that operate in the areas being designated as critical habitat include recreational and commercial fishing vessels, commercial transport vessels, passenger vessels, recreational boats, **whale**-watching boats, research vessels and military vessels (e.g., surface ships and submarines). Helicopters and low-altitude aircraft also fly over the critical habitat. Results of human activities that occur within or near the designated critical habitat for northern **right** whales, and that may disrupt the essential life functions that occur there, include, but are not limited to:

1. Mortality due to collisions with large vessels: Seven percent of northern **right** whales identified have propeller scars from a large vessel (NMFS, 1992);

2. Entanglement and mortality due to commercial fishing activities: More than one-half of all cataloged animals have scars indicative of entanglements with fishing gear, resulting in scars, injuries, and death. Fishing nets and associated ropes may become entangled around a flipper, at the gape of the mouth, or around the tail (Kraus, 1985, 1990). Gill nets are believed to be the primary cause of scars and injuries related to fishing gear, although whales have also become entangled in drift nets and lines from lobster pots, seines and fish weirs (Kraus, 1985). Fishing practices and locations may need to be managed more closely when the fishing season overlaps with the presence of **right** whales.

3. Possible habitat degradation through pollution, sea bed mining, and oil and gas exploration: Exploration and development for oil, gas, phosphates, sand, gravel, and other materials on the outer continental shelf may impact northern **right whale** habitat through the discharge of pollutants (such as oil, drilling muds and suspended solids); noise from seismic testing, drilling and support activity; and disturbance of the environment through vessel traffic and mining rig activity. If these types of activities are proposed, their timing and location may also require special management considerations, including the establishment and maintenance of buffer zones.

4. Pollutants may also affect phytoplankton and zooplankton populations in a way that decreases the density and abundance of specific zooplankton patches on which northern **right** whales feed. In addition, pollution may affect the feeding patterns and habitat use of other components of the marine ecosystem, which in turn could impact food and habitat availability for the northern **right whale**. Pollutants may also have direct toxic effects on the **whale**. Monitoring of known and potential pollution and discharge sources in this essential habitat may be necessary to insure that these sources are not affecting prey species abundance or composition, or the northern **right whale**'s ability to gain maximum benefit from use of the area.

Turbulence associated with vessel traffic may also indirectly affect northern **right** whales by breaking up the dense surface zooplankton patches in certain **whale** feeding areas. Special vessel traffic management or restrictions may be necessary in certain areas when northern **right** whales are present.

5. Possible harassment due to **whale**-watching and other vessel activities; and

6. Possible harassment due to research activities (on permitted sites and during specified times throughout the year).

The effect of any of these activities on individual whales or on their habitat could have consequences that may impede the recovery of the northern **right whale** population. Therefore, special management considerations may be required to protect these areas and promote the recovery of the northern **right whale**. The following are some, but not necessarily all, of those activities that occur in each of the designated critical habitat areas.

Cape Cod Bay: In CCB, vessel traffic associated with the Cape Cod Canal, the Boston Harbor traffic lanes, dredging and disposal traffic, recreational boating, commercial fishing and **whale**-watching activities comprise the majority of the vessel activity in the immediate area. Of these, recreational boating, commercial fishing and **whale**-watching contribute greatly to the level of activity in the critical habitat.

Recreational boating begins with the onset of warmer months, particularly in June. Commercial fishing vessels and gear are dominated by the lobster industry, which does not typically begin its season until the middle of June. **Whale**-watching boats, ferries and other vessels increase activity in the area with the onset of warmer weather and the tourist season, which typically begins in May or June and ends no later than November.

Discharges from municipal, industrial and non-point sources, dredging activities, dredge spoil disposal and sewage disposal may degrade essential habitat in Massachusetts Bay/northern CCB. The cumulative effects to baleen whales (including **right** whales) by these activities may affect the northern **right whale** in Massachusetts Bay/northern CCB.

Great South Channel: In the GSC, vessel traffic and fisheries constitute the majority of activities within the critical habitat area. However, in this area, these activities are not contingent on warm weather. Shipping vessel traffic lanes for Boston Harbor are used throughout the year to import and export metal, salt, fuel and a variety of other products. Similarly, the commercially important fishing grounds on Georges Bank involve year-round vessel traffic from the mainland through **right whale** essential habitat to the fishing grounds. The bottom-trawl is the most dominant type of fishing gear used in this area. It is not known whether the bottom-trawl, or any other type of fishing gear, has an impact on the whales' habitat. Mesh sizes used in this area do not pose an immediate threat to the whales' planktonic food supply.

Southeast United States: Vessel traffic and fisheries are the major activities in the SEUS calving grounds. Major commercial shipping and military ports operate throughout the winter/calving area. The majority of commercial fishing vessels that use the inshore waters to harvest shrimp and other commercially important species use these and other neighboring ports as well. Recreational boating traffic is also fairly extensive.

Expected Impacts of Designating Critical Habitat

A critical habitat designation directly affects only those actions authorized, funded, or carried out by Federal agencies. Federal agencies that may be affected by critical habitat designation of these areas include, but are not necessarily limited to, the U.S. Coast Guard, Environmental Protection Agency, U.S. Army Corps of Engineers, NMFS (including the New England Fishery Management Council (NEFMC) and South Atlantic Fishery Management Council), National Ocean Service, Office of Coastal Zone Management, Minerals Management Service and the U.S. Navy. For a discussion of the expected impacts and significance of critical habitat designation, see ``Significance of Designating Critical Habitat'' in the proposed rule (58 FR 29187, May 19, 1993).

Consideration of Economic and Other Factors

NMFS prepared an EA on its proposed designation of critical habitat, based on the best available information, that described the environmental and economic impacts of alternative critical habitat designations. The economic impacts considered in this analysis were only those incremental economic impacts specifically resulting from a critical habitat designation, above the economic and other impacts attributable to the listing of the species, or resulting from authorities other than the ESA. Listing a species under the ESA provides significant protection to the species' habitat through the no-jeopardy standard of section 7 and, to a lesser extent, the prohibition against taking of section 9, both of which requires an analysis of harm to the species that can include impacts to habitat of the species. Therefore, the additional direct economic and other impacts resulting from the critical habitat designation are minimal. In general, the designation of critical habitat reinforces the substantive protection resulting from the listing itself.

Designation of critical habitat in these areas may result in an increase in administrative time and cost to Federal agencies that conduct, authorize or fund projects in the designated areas. However, these agencies are currently required to address habitat alteration issues in section 7 consultations, and as a result, any increase in administrative time or cost is expected to be minimal.

Designated Critical Habitat; Essential Features

NMFS, by this final rule, designates areas essential for the reproduction, rest and refuge, health, continued survival, conservation and recovery of the northern **right whale** population. The following areas are designated as critical habitat:

Great South Channel: The area designated as critical habitat in these waters is bounded by the following coordinates: 41 deg.40'N/ 69 deg.45'W; 41 deg.00'N/69 deg.05'W; 41 deg.38'N/68 deg.13'W; 42 deg.10'N/68 deg.31'W.

Cape Cod Bay: The area designated as critical habitat in these waters is bounded by the following coordinates: 42 deg.04.8'N/ 70 deg.10.0'W; 42 deg.12'N/70 deg.15'W; 42 deg.12'N/70 deg.30'W; 41 deg.46.8'N/70 deg.30'W; and on the south and east, by the interior shoreline of Cape Cod, MA.

Southeastern United States: The area designated as critical habitat in these waters encompasses waters between 31 deg.15'N (approximately located at the mouth of the Altamaha River, GA) and 30 deg.15'N (approximately Jacksonville, FL) from the shoreline out to 15 nautical miles offshore; and the waters between 30 deg.15'N and 28 deg.00'N (approximately Sebastian Inlet, FL) from the shoreline out to 5 nautical miles.

Modifications to this critical habitat designation may be necessary in the future as additional information becomes available.

References

Most references used in this final designation can be found in the Final Recovery Plan for **Right** Whales (NMFS, 1991), and in the EA. Additional references found in the preamble to this rule are available upon request (see ADDRESSES).

Comments and Responses

NMFS solicited information, comments and recommendations from concerned government agencies, the scientific community, industry and the general public (58 FR 29186, May 19, 1993). NMFS considered and incorporated, as appropriate, all comments received during the comment period (ending on August 31, 1993) and all comments received during public hearings on the proposed rule prior to making this final designation.

During the comment period and at the public hearings, NMFS received a total of 35 sets of comments from regional and national environmental organizations; county, state and Federal agencies; and associations representing regional commercial and sport fisheries. NMFS also received more than 50 written and oral presentations (at public hearings) regarding the proposed designation of critical habitat for northern **right** whales.

Comments received by NMFS generally fell into one of the following categories: (1) Those who were in favor of the designation as it was proposed; (2) those who were in favor of the proposed designation, but recommended that additional regulatory actions be taken at the time of designation to protect northern **right** whales; (3) those who were in favor of designating critical habitat for northern **right** whales, but recommended expanding the boundaries of the critical habitat; (4) those who were not in favor of the designation because it was not necessary, given the protective measures for **right** whales that are being implemented through section 7 of the ESA; and (5) those who were not in favor of the critical habitat designation because it may lead to further restrictions on a specified activity.

Most comments received by NMFS from private individuals, environmental organizations, and state agencies supported the critical habitat designation for northern **right** whales. Several commenters suggested that the proposed rule lacked clear conservation measures to ensure the recovery of the northern **right whale**. Many of the recommendations were duplicative of those of other commenters; therefore, individual comments were combined and addressed together below, unless otherwise specified.

Comment 1: One commenter recommended that NMFS designate a Northern **Right Whale** Recovery Plan Implementation Team for the coastal calving grounds off Florida and Georgia. The commenter further suggested representative agencies and organizations that might participate on this team.

Response: On August 26, 1993, NMFS convened a meeting to discuss the monitoring program that needed to be in place to protect northern **right** whales on their winter ground, prior to their winter arrival. During this meeting, the Southeastern U.S. **Right Whale** Recovery Plan Implementation Team was formed. The team consists of representatives from the Georgia Department of Natural Resources (Chairman); Florida Department of Environmental Protection; NMFS/Southeast Fisheries Center and Southeast Regional Office; U.S. Navy, Naval Air Station, Jacksonville, FL; U.S. Navy, Submarine Group, Kings Bay, GA; Georgia Ports Authority; Canaveral Port Authority; Glynn County Commission, Glynn County, GA; University of Georgia; U.S. Army Corps of Engineers (ACOE), South Atlantic Division; U.S. Environmental Protection Agency (EPA); Port of Fernandina, Fernandina, FL; and the U.S. Coast Guard.

NMFS is also coordinating the development of a **Right Whale** Recovery Plan Implementation Team for the Northeastern United States. Recovery Plan implementation for the northern **right whale** has been ongoing at some level within NMFS, Northeast Region (NER), since December 1990, and has involved agency staff and scientific experts in the area. The most recent Massachusetts Water Resources Authority outfall Biological Opinion (issued September 8, 1993), and associated conservation recommendations, are part of the recommendations and programs that have been instituted in the NER that address **Right Whale** Recovery Plan tasks. The Northeast Implementation Team will address the possible cumulative impacts to **right** whales from all activities in Massachusetts Bay.

Comment 2: Several organizations recommended that NMFS implement an early warning system, consisting of daily surveys (from December 1 through March 31) of the known wintering grounds. Several organizations also recommended that monitoring be conducted along the migratory route of this species.

Response: ``Early warning systems'' for **right** whales in the southeast United States were first developed through ESA section 7 consultations between NMFS and ACOE, Jacksonville District, as a result of dredging operations at the Navy's submarine channel at Kings Bay, GA; the Port of Fernandina, FL; the Port of Jacksonville, FL; the Naval facilities at Mayport, FL; a navigation channel at St. Augustine, FL; and numerous beach disposal projects using offshore disposal sites throughout this area. Measures to protect **right** whales have included daily aerial surveys at the time that the dredges are in operation during the calving season. If a **right whale** is seen within a 16-kilometer (k) radius of dredge and disposal areas, dredges and support vessels are required to carry an observer during daylight hours and to reduce speeds at night to reduce the likelihood of a collision with a **whale**. However, these precautions were only in place while the dredging operations were being conducted, not throughout the entire winter calving period. Therefore there were gaps in the aerial survey coverage, and thus in protective measures for the whales.

In December 1993, the U.S. Navy and the U.S. Coast Guard provided funding to conduct aerial surveys during the remainder of the time that the whales were in the calving area; the area of concern from the Savannah River south to approximately Jacksonville, FL, was surveyed through March 1994. The ACOE will continue to provide coverage during those periods when hopper dredges are active. Therefore, the **whale** sightings are passed on to appropriate agencies if a survey finds whales in or near a navigational channel, vessels are asked to proceed at minimum safe operational speeds and communicate locations of the **whale** so other vessels can avoid them. This procedure will continually be reviewed and revised through efforts of the Southeast Implementation Team. NMFS intends to continue cooperative efforts with the U.S. Navy, U.S. Coast Guard, the ACOE, and the implementation team to conduct daily aerial surveys throughout the calving season and to operate the early warning system to reduce the likelihood of ship strikes.

It is unlikely that **right** whales can be monitored throughout their range for the purpose of protecting them from ship strikes. NMFS is developing a research program that may include satellite tracking of tagged northern **right** whales to determine those areas (winter and summer) where **right** whales occur, but which are unknown at this time.

Comment 3: The following comments were made by several commenters. They all address additional activities that the commenters felt should be developed to protect **right** whales, or activities that should be prohibited, restricted or modified, primarily in the SEUS, to protect the whales further. These comments are addressed together.

a. Many commenters indicated that restrictions or modifications of shipping lanes and shipping practices need to be made at the time of designation. The suggested modifications or changes included the seasonal relocation of shipping lanes, a requirement that vessels entering or leaving ports adjacent to the **right whale** winter grounds use direct routes (perpendicular to the shoreline at the port entrance) from December 1 through March 31, restriction of shipping and vessel speeds to allow whales to avoid oncoming ships or allow ships to avoid hitting whales, and a requirement of dedicated onboard observers to maintain watch so that vessel collisions with **right** whales are avoided when ships are transiting through **right whale** wintering habitats during months when the whales occupy these habitats.

b. Several commenters recommended the development of education programs for shipping and public interests. Others suggested that NMFS provide to the shipping companies illustrated instructions (in many languages) on the importance of protecting **right** whales in these waters, and on safe vessel operation in the winter calving areas. They further suggested that these instructions be posted for the crews of all ships operating in U.S. waters, and that these safety measures should be enforced. It was suggested that the U.S. Coast Guard should include **whale** safety in its small boating course, and in required courses for commercial captains and boat operators.

c. Several commenters suggested that NMFS should define **right whale** critical habitat boundaries on NOAA navigational charts, and the notice of the designation and occurrence of whales need to be included seasonally in the Notice to Mariners and other publications, alerting shipping interests to the potential presence of **right** whales in the area at certain times.

d. Several commenters recommended that NMFS ban dredging and seabed mining in the **right whale** calving grounds and feeding grounds, and along the entire migratory route. Many comments supported restrictions on dredging, if necessary, to protect **right** whales; gas and oil exploration and the dumping of contaminated waste within the calving areas described by the critical habitat boundaries; dumping of contaminated dredge spoils and industrial waste; and the construction of submerged or emergent structures within known **right whale** habitats.

e. Several commenters suggested that the discharge of pollutants at the mouths of rivers that empty into the calving grounds should be monitored for possible effects on the habitat.

Response: Regarding comments 3a.-3c., the Southeastern U.S. **Right Whale** Recovery Plan Implementation Team (see Comment 1) formed committees to examine many of the issues discussed in the comments. Committees that were formed cover the following topics: Education/ Awareness; Early Warning Surveys/Communication; Funding of Surveys; Research; and Relocation of Ocean Disposal Sites. A second meeting of the Implementation Team occurred on December 14, 1993; the following updates from each of the committees are summarized from that meeting.

Education/Awareness Committee: The Canaveral Port Authority developed an endangered species pamphlet covering whales, manatees and turtles, which is being distributed regionally. As a group, the Port Authorities developed a series of posters describing the time **right** whales are in their waters, a phone number to contact if a **whale** is seen, and mention of **right whale** habitat. This poster is being distributed by the harbor pilots when they board a vessel for navigation.

A standard brochure on **right** whales in the SEUS has been developed with input from the Georgia DNR, Florida DEP, New England Aquarium and others. The brochure is designed for boaters (commercial and public), but is also to be given to ship masters by harbor pilots. The Port

Authorities, U.S. Coast Guard, U.S. Navy, Georgia DNR and Florida DEP can use this brochure to increase public awareness and education. Financial support for this brochure comes from the participating agencies.

The Georgia DNR and U.S. Coast Guard developed a local Notice to Mariners about **right whale** calving grounds. This notice is broadcast four times daily by the U.S. Coast Guard on VHF. Broadcasts ran from December 6, 1993, through March 31, 1994. A slightly longer version is published in the local Weekly Notice to Mariners. This notice may also be published daily, along with the tides and weather, in regional newspapers. The Annual Notice to Mariners also has information on this subject.

Several press releases were issued beginning when the first **right** whales were sighted on December 4, 1993. A regional press release was also issued describing the implementation team, members, persons to contact if a **whale** is seen and other information on the need for protection of **right** whales in the SEUS.

The University of Georgia is surveying local groups to ensure that there is no duplication in the development of educational materials on **right** whales, and to provide a network to combine and coordinate efforts.

The Savannah Area Chamber of Commerce suggested that treating a sighted **right whale** as though it were another ship (slowing down, changing course and anchoring to avoid collisions with **right** whales) should be formalized for all ports in the southeast (i.e., treating **right** whales as vessels under the nautical rules of the road). They further stated that injury to, and interference with, **right** whales can best be avoided by continuing the education of ship's captains, and through ongoing cooperation between the port, its pilots and the Georgia DNR.

Early Warning and Communication Committee: An early warning network has been developed with aerial surveys at the core of the network (see Comment 2). A communication flow chart has been developed to illustrate how information regarding **whale** sightings should be channeled between the appropriate agencies/groups. This is currently considered the best communication scheme for relaying **right whale** sightings from aircraft to land-based stations, and back to surface vessels. This communication network is essential to the early warning system and alerts mariners to the presence of **right** whales in the SEUS. Information disseminated by this system is updated daily as whales are located during the aerial surveys.

Regarding Comment 3d., many of the suggested activities may be authorized, funded or conducted by Federal agencies. The responsible Federal agency active within the range of the northern **right** whales is required to consult with NMFS regarding its projects and activities under section 7 of the ESA. If the activity is found likely to jeopardize the continued existence of the species, directly or through habitat degradation, reasonable and prudent alternatives would be offered that could include restrictions. Even if the activity is not likely to jeopardize the continued existence of the species, NMFS is required to provide an incidental take statement that identifies the impact of any incidental taking of northern **right** whales by the action agency, and specifies reasonable and prudent measures, and terms and conditions that must be complied with, to minimize such takings. These measures may include restrictions upon the activity. In addition, private entities are prohibited from taking an endangered species pursuant to section 9 of the ESA, which may include harm to the species caused by habitat degradation. In this regard, such activities are already prohibited as a result of listing.

Regarding Comment 3e., NMFS agrees that discharge of pollutants at the mouths of rivers that empty into the calving grounds should be monitored for possible effects on the habitat. A designation of critical habitat may assist Federal agencies in evaluating the potential environmental impacts of their activities on northern **right** whales and their critical habitat. The designation may also help focus state and private conservation and management efforts in those areas.

Comment 4: Two commenters recommended that a ``distance buffer'' be established around northern **right** whales. One recommended that a minimum approach distance of 100m to 300m should be established for all vessels around **right** whales.

The second commenter recommended that NMFS establish around every northern **right whale**, in any area designated as critical habitat, a 500m radius ``protection zone,'' and prohibit any vessel or person from entering or knowingly remaining within this zone. The commenter further suggested that such a buffer zone is consistent with similar rules already adopted by NMFS and cited as examples the minimum distance rule for humpback whales (Megaptera novaeangliae) in Hawaii (50 CFR 222.31) and the 5.5 k buffer zone established around Steller sea lion (Eumetopias jubatus) rookeries and major haulouts in Alaska (50 CFR 226.12). The commenter continued that such protection zones for the area designated in Cape Cod Bay and Stellwagen Bank would be consistent with existing Massachusetts regulations (322 CMR 12.00 et seq.), which require that no one approach or remain within 500m of a **right whale** in state waters.

Response: In both cases, the purpose of the suggested buffer zones would be to ensure that northern **right** whales are undisturbed as much as possible throughout their range, and to keep vessels far enough away so that there is no danger of a collision between whales and vessels. Critical habitat designations reflect specific determinate geographical areas containing physical or biological features essential to the conservation of the species. While NMFS recognizes that the area around each **whale** is important, it is not appropriately the subject of a critical habitat designation. Rather, such buffer zones should be established through separate rulemaking, similar to the special prohibitions for humpback whales in Hawaii.

Comment 5: One commenter suggested that NMFS implement research and monitoring programs focused on: (1) Behavioral changes (of northern **right** whales) associated with the possible impacts of vessel traffic, noise and whalewatching; or (2) the effects of dredging activities and their associated vessel traffic, siltation and noise in the southeastern United States through continued observation of dredge activity and aerial surveys of **right** whales in and adjacent to buffer zones around dredging operations; (3) the impact of pollution on phytoplankton and zooplankton abundance--specifically the impact of the Boston Harbor effluent outfall; and (4) the effects of whalewatching activities on the northern **right whale**. The commenter recommended that, if necessary, NMFS promulgate regulations to mitigate the effects of these activities.

Response: In addition to the monitoring program implemented by the Southeast Implementation Team, NMFS is developing a 3-5 year research plan that will focus on research needs identified as priorities in the Northern **Right Whale** Recovery Plan. The current research program is the result of several meetings that occurred on April 14-15, 1992, in Silver Spring, MD; June 18, 1993, in Brunswick, GA; and July 16, 1993, in Silver Spring. These meetings established the following research priorities:

a. To determine the wintering location(s) of most northern **right** whales in the northwest Atlantic through the deployment of satellite tags on selected female **right whale**;

b. to determine daily movements within the wintering/calving area. Tagging with VHF tags in the SEUS could determine the daily movements of these animals. This information could be useful to develop a long-term monitoring program to reduce ship strikes in the SEUS;

c. to determine the unknown location of a third summering area. There are three matrilineal stocks of northern **right** whales recognized. One of the stocks does not visit the Bay of Fundy, but is seen in the GSC and CCB during spring, and in the SEUS in winter. Satellite tracking a tagged female from the third matriline (these have already been determined from mtDNA analyses and photoidentification) in the GSC or CCB in the spring might lead to the location of the other summer location of northern **right** whales in the North Atlantic.

d. to identify ``bottlenecks'' in the rate of recovery. The reasons for the northern **right whale**'s low reproductive rate relative to southern hemisphere **right** whales are unknown. One theory is that there is too much inbreeding as a result of the extremely depleted population. The extent of inbreeding can be determined from genetic/molecular identification through mtDNA biopsy sampling and sexing using molecular techniques; and

e. to determine the best location and methods to monitor recovery of this population.

NMFS is not considering broad-based whalewatching regulations at this time, but may consider minimum approach distances specific to northern **right** whales as part of the recovery planning process (see Response to Comment 3).

Comment 6: One commenter stated that collisions with ships and entanglement in fishing gear may be rare from the perspective of total fishing activity and vessel traffic in the various areas. However, at least two **right** whales were struck and killed in the past 3 years. That means that about 2 percent (a much higher rate for calves) of the **right** whales known to occur in the area since late 1989 have been killed by a collision with a vessel. This percentage may underestimate the actual percentage struck during the period because many whales, including calves, have been seen with propeller scars. In the view of the commenter, this information demonstrates a significant risk from the perspective of **right** whales in this area, especially since the threat is concentrated on the reproductive core of the population and the calves, essential for population recovery.

The commenter recommended that NMFS expand the proposed critical habitat designation to include conservation measures that would reduce the likelihood of **right** whales being struck by vessels or becoming entangled in fishing gear. The commenter continued that the designation of critical habitat will serve as a warning to those who operate ships in these areas that steps must be taken to reduce the risk of collision with **right** whales. While finding the steps already taken by harbor pilots, ports authorities, the U.S. Navy, the U.S. Coast Guard, ACOE and others to be encouraging, the commenter believed that more needs to be done.

Response: NMFS recognizes that the loss of each northern **right whale** has a measurable impact on this population. The first priority of the Southeast Implementation Team was to develop a program to reduce or eliminate ship strikes throughout the whales' wintering area.

Also, the New England Fishery Management Council (NEFMC) has restricted all commercial fishing in Gulf of Maine Groundfish Area I, which roughly covers the GSC, because of the importance of the area for haddock spawning from February 1 to May 31, since 1986. The haddock no longer spawn in that area, but NMFS and the NEFMC have recommended leaving the closure in place for all gillnet gear to protect the northern **right whale**, and other **whale** species that use that area in the spring.

NMFS will continue to focus recovery/management efforts on ways to reduce human-induced mortality as a result of ship strikes and entanglement.

Comment 7: One commenter stated that the continued availability of these areas for use by northern **right** whales is critical to the survival of the species. The commenter further stated that under the authority of the Massachusetts Wetlands Protection Act, Massachusetts has already designated the portion of CCB critical habitat that occurs in Massachusetts waters as ``Estimated Habitat'' for a State-listed wetland wildlife species. Estimated habitat, under the Code of Massachusetts Regulations (CMR), 310 CMR 10.37, is defined as the estimated geographical extent of the habitats of State-listed species for which an occurrence within the last 25 years has been accepted by the Massachusetts Natural Heritage and Endangered Species Program and incorporated into its official database.

The commenter also stated that regulations have already been promulgated by Massachusetts law to prohibit vessels from approaching within 500m of a **right whale** in State waters. Fishery measures that reduce the risk of entanglements of marine mammals with fixed gear such as lobster gear and gillnets have also been adopted in Massachusetts. There are moratoria on gillnet and lobster licenses, a limit on the number of lobster pots per fisherman and limits on the length of lobster pot trawls and gillnets. Further restrictions on gillnets, some to complement what the NEFMC is considering to reduce by-catch of harbor porpoise, Phocoena phocoena, are being considered.

The commenter believed, however, that a designation of critical habitat at the Federal level would extend comprehensive, interjurisdictional protection to the **right whale**, a correct approach to conserving the species. The commenter further stated that since, the proposed rule said ``fishing practices and locations may require special management considerations when the timing of the fishing season and the presence of the northern **right whale** overlap,'' NMFS should work closely with Massachusetts and the NEFMC to assess the need for, and nature of, special management considerations.

Response: NMFS recognizes and appreciates the efforts of the Commonwealth of Massachusetts to protect the northern **right whale**. NMFS is establishing a Northeast Implementation Team for the Recovery Plan (see Response to Comment 5). It is the intent of NMFS to work closely with these teams to determine for, and effectiveness of, special management measures.

Comment 8: One Federal agency supported the proposed critical habitat designation for the northern **right whale**, but was concerned that NMFS would be the Federal agency listed as having management responsibilities within the boundaries of Cape Cod National Seashore.

Response: Designation of critical habitat does not create management responsibilities for NMFS, nor does it give NMFS primary jurisdiction over Federal lands included in the critical habitat designation. While a Federal agency may undertake an activity that may affect either the listed species or critical habitat, and may be required to consult with NMFS pursuant to section 7, it is the action agency that decides whether to initiate consultation. Likewise, the action agency determines whether and in what manner to proceed with the action in light of its section 7 obligations and NMFS' biological opinion (See 50 CFR 402.15). NMFS' role is advisory in nature.

For example, while NMFS has responsibility over this listed species, the National Park Service (NPS) at Cape Cod National Seashore has major responsibilities for the long-term preservation of Cape Cod's natural resources, including this federally listed endangered species. As such, the NPS at Cape Cod National Seashore has management responsibilities within the proposed area of critical habitat that overlaps with the legislative boundary of the Cape Cod National Seashore. NMFS believes that the NPS and NMFS can work together on issues pertaining to the northern **right whale**.

Comment 9: One commenter suggested that two of the proposed critical habitat areas violate the prohibition on habitat designation outside the jurisdiction of the United States. The proposed critical habitat designation in the GSC and portions of the SEUS exceed the 12 nautical mile territorial sea recognized by the United States.

Response: The regulations state that ``critical habitat shall not be designated within foreign countries or in other areas outside of the United States jurisdiction'' (50 CFR 424.12(h)). The critical habitat designation falls within the 200 mile exclusive economic zone of the United States, and therefore is not outside of U.S. jurisdiction. Furthermore, critical habitat designation may impact the activities of Federal agencies, which are defined as ``all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas'' (50 CFR 402.02).

Comment 10: Several commenters suggested that the northern boundary of the critical habitat, as recommended by the Recovery Team and proposed by NMFS (58 FR 29186, May 19, 1993), be extended further northward to 32 deg. N latitude, approximately the mouth of the Savannah River. Based on data examined since the Recovery Team reviewed and recommended the critical habitat boundaries that were proposed in the critical habitat designation, the commenter stated that sightings corrected for effort (i.e., the number of **right** whales counted per survey mile since 1984) indicate that the number of **right** whales per mile of transect off St. Catherines Island, GA, was comparable to the number observed off Melbourne and Daytona Beach, FL, and greater than that off St. Augustine, FL, areas within the proposed critical habitat.

Several other commenters requested that no extension of the critical habitat include the mouth of the Savannah River be incorporated into a final designation until verified information on the presence of the **right whale** is publicly provided and a public hearing is held in Savannah, GA, so that the public can have an opportunity to comment. They further urged that any boundary modification be justified on firm scientific grounds, showing significant benefits to **right whale** recovery.

Response: NMFS believes that the most important winter/calving areas known are within the boundaries identified as critical habitat in the proposed rule. The greatest number and highest densities of **right** whales have been observed in the Cape Canaveral region, with the second highest number occurring at the Georgia-Florida border. It is clear, however, that northern **right** whales occur outside this area, including near the mouth of the Savannah River, during the winter calving period and during their late-winter/spring migration northward.

The monitoring conducted around the mouth of the Savannah River during 1992/1993, and the near-daily monitoring conducted during the winter of 1993/1994 from Savannah south throughout the SEUS to approximately Jacksonville, FL, can be used to examine this issue. In these 2 years of monitoring near the mouth of the Savannah River (total approximately 90 days, 20 in 1992/1993 and approximately 70 thus far in 1993/1994) only four **right** whales have been sighted. The first sighting, on December 12, 1993, was of three whales moving south. These whales were resighted the following day near Brunswick, GA. The second and third sightings were also followed by resightings off Brunswick. In these cases, the time between resightings was only a few days, indicating that the whales were not remaining near the Savannah River but traveling through the area toward the core of the sighting distribution. Based on these data, NMFS sees no need to include the area as critical habitat at this time. NMFS recognizes that the sighting data is based on only 2 years of information, and that distributions between years can vary dramatically. NMFS will continually examine sighting data and may modify critical habitat boundaries in the future if warranted by additional sighting information.

Comment 11: One commenter suggested that there is a lack of data offered by NMFS supporting the presence of a substantial **right whale** population off the Cape Canaveral Florida coast (south of False Cape). The commenter cited information in the Recovery Plan for the Northern **Right Whale**, which indicates that only four sightings within the 5nm proposed habitat have been recorded south of the False Cape area prior to 1989, and questioned whether this is sufficient data on which to base a designation.

Response: The lack of sightings at the southern end of the designated SEUS area is explained, at least in part, by low sampling effort in that area. Sightings corrected for effort indicate that the area around Cape Canaveral may be used by **right** whales to a greater extent than presented by Kraus and Kenney (1991) and discussed in the Recovery Plan. The data do not support removal of the area from consideration.

Given the need to monitor and manage activities that might impact northern **right** whales in the area of Cape Canaveral, NMFS believes that it is appropriate to designate this area as critical habitat. The seasonal use, and extent of use, of any area will be considered during the ESA section 7 process on a case-by-case basis, but at present the area in question represents the southern limit to the only known calving area for this species, and is therefore considered critical.

Comment 12: Another Federal agency supported the proposed designation and submitted comments from the particular perspectives of the Gray's Reef National Marine Sanctuary (GRNMS) and the recently designated Stellwagen Bank National Marine Sanctuary (SBNMS).

The GRNMS lies to the north and east of the proposed critical habitat boundary in coastal Georgia; and the commenter recommended that the boundary of the proposed critical habitat be extended northward and seaward to include GRNMS. The commenter stated that Grays Reef is particularly vital to the critical habitat designation because the waters off Georgia and northern Florida serve as calving grounds for this species. The commenter also stated that personnel at GRNMS could provide additional resources for observing and monitoring these whales as part of the Sanctuary's routine operations, as well as provide substantial support to the education and outreach objectives listed in the Northern **Right Whale** Recovery Plan.

The commenter continued by stating that the recently designated SBNMS overlaps slightly with the proposed critical habitat area (at the northern end of CCB). The commenter felt that the proposed designation, in conjunction with the implementation of the SBNMS, would provide additional opportunities for coordinated efforts to enhance the potential for recovery of this critically endangered marine species. Also, some or all of the ``special management considerations or protections'' identified in the proposed designation as being potentially required to protect and promote the recovery of the northern **right whale** population using the Stellwagen Bank environment (i.e., vessel traffic, fishing, pollution, mining and gas exploration) are also addressed by the SBNMS management plan. With the exception of fishing, these activities are currently either regulated directly, or are listed as subject to sanctuary regulation.

Furthermore, the Marine Protection, Research and Sanctuaries Act (title III), as amended in 1992, established the requirement for consultation between the Secretary of Commerce (NOAA) and any Federal agency proposing to undertake an activity in the vicinity of a National Marine Sanctuary that may result in adverse impacts on sanctuary resources or qualities, including private activities authorized by licenses, leases or permits. Such consultation must occur prior to initiation of the proposed activity. From the perspective of administrative structure, therefore, there are opportunities for both NMFS and NMSP to coordinate their programmatic objectives.

Response: NMFS does not believe that extending the boundary of the SEUS critical habitat seaward to include the GRNMS is necessary (see Response to Comment 10). However, NMFS does agree that the Grays Reef program could provide additional monitoring of these whales, substantial support to the education and outreach objectives listed in the Northern **Right Whale** Recovery Plan and additional opportunities for coordinated efforts to enhance the potential for recovery of this critically endangered marine species.

Comment 13: A commenter recommended that NMFS designate Delaware Bay as critical habitat for the northern **right whale**, stating that Delaware Bay is habitat that is representative of the historic geographical and ecological distribution of the species.

Response: The criteria specified under 50 CFR 424.12 to be considered in designating critical habitat, and described in the preamble to the proposed designation, must consider the requirements of the species, including habitats that are representative of the historic geographical and ecological distributions of the species. Section 3(5)(A)(ii) of the ESA states that areas outside the current geographical range of a species can be designated if the Secretary determines that such areas are essential for the conservation of the species. The regulations to the ESA interpret this provision to mean that the Secretary shall designate as critical habitat areas outside the geographic area presently occupied by a species only when a designation limited to its present range would be inadequate to ensure the conservation of the species (50 CFR 424.12(c)). Even where the area is presently occupied by the species, section 3(5)(c) states that, with certain exceptions determined by the Secretary, ``critical habitat shall not include the entire geographic area which can be occupied by the * * * species.''

Although known to have been used by **right** whales, it is not completely understood to what extent Delaware Bay was used, or whether this area would ever have been considered critical habitat. It is known, however, that the area is now bypassed by northern **right** whales during their annual movements. NMFS believes that the current high-use areas are identified in this rule, but recognizes that the areas designated represent the minimal space required by **right** whales to ensure population growth. Designating Delaware Bay as critical habitat would not enhance the likelihood of recovery for this species. If evidence to the contrary becomes available, critical habitat boundaries can be modified.

Comment 14: Several commenters did not oppose the designation of the critical habitat designation for the northern **right whale**, but were concerned with the ``general'' language of the proposed designation and felt there was no real need for it. Rather, they felt that a public awareness program for shipping interests is sufficient. They further expressed concern that the language of the preamble to the proposed designation stating that ``habitats will be given special consideration in section 7 consultations'' would become a vehicle to attack offshore dredge disposal and port expansion. The commenters requested that NMFS reconsider the need for the proposed designation as it applies to the southern coastal area, given that there is already an active task force working to prevent collisions between vessels and the northern **right whale** and that the other protections of the ESA still apply.

Finally, one of the commenters wanted the channel, fairways to sea lanes, disposal sites, access routes to disposal sites and nearshore berm areas in the SEUS to be excluded from the critical habitat designation. The commenter noted that these areas can be excluded if the overall benefits of exclusion outweight the benefits of designation, unless the exclusion results in the extinction of the species.

Response: Federal agencies active within the range of the northern **right** whales are already required to consult with NMFS regarding projects and activities that may affect the species pursuant to section 7 of the ESA. Federal agencies are required to evaluate their activities with respect to northern **right** whales and to consult with NMFS prior to engaging in any action that may affect the critical habitat to ensure that their actions are not likely to result in its destruction or adverse modification. Regarding the SEUS critical habitat specifically, these actions are being reviewed by the Southeast Implementation Team, through section 7 consultations and agreements already in place, and through the expanded efforts of the Implementation Team to reach the private and public sectors.

Finally, frequent travel by commercial vessels in these areas represents a considerable threat to northern **right** whales. Therefore, NMFS does not agree that corridors frequently traveled by vessels within the designated critical habitat should be excluded.

Comment 15: One federal agency was concerned that the proposed designation was neither appropriate nor necessary to preserve the species. The commenter felt that the current proposal merely designates areas of highest concentration of the whales and lists their characteristics, rather than considers the physical or biological features that are essential to the conservation of the species. To warrant critical habitat designation, the commenter felt that a better understanding of the species' biological and physical requirements is needed.

Response: NMFS agrees that critical habitat designation must include areas meaningful to the specie's conservation. Consequently, NMFS is not designating the northern **right whale**'s entire range, which was suggested by several commenters, but is focusing attention on particular areas that have essential features and that may be in need of special management consistent with the ESA and implementing regulations. The section of this preamble entitled ``Essential Habitat of the Northern **Right Whale**'' has been expanded from the proposed rule to address those biological and physical features and to identify those principal constituent elements, such as feeding sites, breeding grounds and calving areas within the designated areas, that are considered essential to the northern **right whale**. The section in the proposed designation entitled ``Need for Special Management Consideration'' summarizes the justification for the designation of these three special areas.

NMFS has concluded, based on the best available scientific evidence and the biological and ecological needs of the species, that the areas in coastal and offshore waters that are being designated as critical habitat for northern **right** whales contain the appropriate environmental and biological characteristics required by the species to recover, and may warrant consideration of special management measures.

NMFS has also concluded that the designation of waters within the SEUS is warranted, given the geographic concentration of northern **right** whales during the winter/calving period, the extreme endangered status of this species, the importance of the area to the reproductive potential (recovery) of the species, the possible impacts of commercial activities on **right** whales that may require monitoring and the fact that this area may be in need of special management measures.

The potential for special management considerations does not necessarily mandate restriction or elimination of activities. Close monitoring of activities and additional research also constitute special management considerations. The existing information, discussed in the preamble to this final designation, supports this designation of critical habitat.

Comment 16: Another Federal agency commenter, citing the EA prepared by NMFS, stated that the direct impact of the designation affects Federal agencies and only duplicates that protection provided under the section 7 jeopardy provision. According to the commenter, the primary benefit cited for the proposed designation is increased awareness. The commenter believed that previous consultations with Federal agencies and meetings with the public have heightened awareness, and therefore, that more regulations are unnecessary. In summary, the commenter opposed the designation. However, the commenter wanted to facilitate more progressive conservation of the species and to cooperate in the development of interagency management plans to reduce impacts to the whales in high density areas. The commenter believed such measures will allow NMFS and other Federal agencies more flexibility in advancing recovery of the northern **right whale**.

Response: NMFS restates that, while designating critical habitat helps focus the attention of Federal agencies on the importance of a designated area for an endangered species, state and private agencies may also give special consideration toward conservation and management actions in these areas. A designation of critical habitat provides some incremental protection to northern **right** whales in those cases where the action may not result in a direct impact to individuals of a listed species (e.g., an action occurring within the critical area when a migratory species is not present, or when an activity is conducted outside the designated area), but may affect the critical habitat.

Finally, NMFS agrees with the commenter that a more progressive conservation program to protect this species is necessary, and that the development of interagency management plans to reduce impacts to the whales in high density areas is the best approach. Therefore, NMFS will continue to work through the Southeast Implementation Team and through ongoing section 7 consultations to advance recovery efforts for northern **right** whales in these waters. NMFS appreciates the efforts that have already been made toward protecting these animals, and believes continued research and management discussions will result in a cost-effective, flexible program that will enhance the recovery of the northern **right whale**.

Comment 17: One commenter supported reasonable activities to protect the **right whale** at an acceptable cost and understood that the designation will not, in itself, impose additional regulations affecting activities within the habitat area. The commenter shared the concerns of other port operators that designation of critical habitat may lead to adoption of rules regulating the speed and routes of commercial vessels which may cause vessels to leave these ports at great economic cost to the port.

The commenter was concerned that all proposed special management measures that could impose increased costs should be adequately evaluated to assure that resulting benefits justify those costs, and that measures are implemented in the most cost-effective manner. The commenter suggested that effective alternative protection methods with significantly less cost may exist, although it did not provide specific recommendations.

This commenter has joined together with others to institute an education and information dissemination plan designed to protect the **right whale**. The commenter believed that this cooperative effort is the method most likely to be effective in protecting the **right whale** at reasonable cost in northern Florida and southern Georgia coastal waters.

Response: NMFS does not expect any additional restrictions on use of the areas as a result of this designation. Therefore, direct economic impacts associated with this designation are expected to be minimal.

NMFS agrees that there may be alternative protection methods. The possibility of such alternatives, however, does not eliminate the need to designate critical habitat. These should be brought to the attention of the Southeast Implementation Team, which can review and evaluate them.

Comment 18: One commenter was concerned about the potential effects of this designation on beach nourishment projects done in conjunction with the ACOE. Currently the commenter and the ACOE are studying the feasibility of beach nourishment at several eroding areas of the Atlantic shoreline. The commenter continued that the potential window for beach nourishment projects has already been limited by the presence of essential nesting habitat for endangered and threatened species of sea turtle. The nesting seasons runs from May 1 through October 1 of each year, limiting the timeframe for nourishment projects to the winter months.

Another Federal agency stated that any hopper dredge restrictions implemented to avoid the December through March time period of **right whale** calving and presence in the area would be burdensome. The commenter encouraged working out a timeframe that would allow use of a hopper dredge and take into account the winter **right whale** calving season and the summer period of high abundance for Kemp's ridley turtle (Lepidochelys kempii) and manatee (Trichechus manatus) in the Kings Bay area.

Response: NMFS realizes that the present dredging period was scheduled to accommodate the presence of several species of sea turtles in these waters, and also recognizes the seasonal limits for beach nourishment projects. The present seasonal restriction on dredging is an essential management measure, given the increased densities of sea turtles in coastal waters during the warmer months.

The designation of critical habitat for **right** whales will not affect the scheduling of this activity. NMFS does not intend to alter the present schedule through this designation, but rather will continue to require the present level of monitoring of dredging activities during winter months to reduce impacts to northern **right** whales. Over the years, there have been several very near misses of **right** whales with dredges that were avoided due, at least in part, to observer coverage on the dredges.

Comment 19: Several organizations and individuals had comments regarding commercial fishing restrictions. One commenter recommended seasonal restrictions on set-gillnet fisheries and multiple trap American lobster, Homarus americanus, fisheries within known **right whale** habitat, and felt that fines and enforcement procedures for individuals violating this and other restrictions should be mandated.

Another commenter recommended that NMFS expand the rule to include conservation measures to reduce the likelihood of **right** whales being struck by boats or becoming entangled in fishing gear. Specifically, the commenter recommended that NMFS prohibit the use of unattended drift and sink gillnets in all three areas being designated as critical habitat during the seasons that **right** whales are likely to occur in the area.

Another commenter suggested that unattended use of gillnets should be prohibited from December 1 through March 31 (the time that northern **right** whales are in the area), but that commercial fishing need not be restricted on the winter grounds.

NMFS also received several comments from individuals and organizations recommending against designating critical habitat because they believed it would lead to further restrictions of fishing activities. One such commenter asserted that the desigation may eventually result in the halting of recreational fishing outside Sebastian Inlet, FL, and for that reason was opposed to designating critical habitat. Another commenter felt that the designation of critical habitat would increase regulation of commercial fishing and for that reason opposed the designation.

Another commenter stated that commercial fishermen throughout the SEUS support efforts to protect the northern **right whale** through participating in **whale** sighting programs, and by radioing positions of whales to other vessels to avoid collisions. Thus, the commenter felt declaring this area as critical habitat was not necessary to avoid collisions, and may unnecessarily affect fishermen as well as other commercial activities.

Response: As stated in the proposed critical habitat designation, the only direct impact of a critical habitat designation is through the provisions of section 7 of the ESA, which applies only to those actions authorized, funded or carried out by Federal agencies. This final critical habitat designation contains no land use or fishing regulations, and will not directly affect private activities. Even where there is Federal involvement, NMFS anticipates that this final critical habitat designation, by itself, will not restrict private activities in a manner or to an extent that these activities are not already affected as a result of the listing of this species as endangered. If, in the future, NMFS determines that restrictions on human activities are necessary to protect northern **right** whales or their habitat, such action would be preceded by an opportunity for public review and comment.

Comment 20: One commenter stated that pollutant discharges in CCB may represent a continuous source of degradation to essential habitats. Sewage discharges, dredging activities, dredge spoil disposal and non-point sources all contribute contaminants into this relatively shallow and extraordinarily productive environment. The commenter further stated that the Massachusetts Water Resources Authority (MWRA) is in the process of combining, upgrading and relocating its outfalls approximately 15km out into Massachusetts Bay, or roughly 40km to the north of the critical habitat boundary. The commenter felt that research should be continued and broadened to address all aspects of the species' biology, behavior and habitat requirements, as well as the specific sources of pollution that threaten to diminish the quality of the habitat for northern **right** whales.

The commenter stated that in CCB there is a need to establish a water quality monitoring program that focuses on endangered species and incorporates sampling of critical parameters at the appropriate spatial and temporal scales.

Response: As previously stated, NMFS is coordinating the development of a **Right Whale** Recovery Plan Implementation Team that will address the possible impacts to **right** and humpback whales from activities in Massachusetts Bay that may affect CCB (see Comment 5).

Comment 21: One Federal agency outlined those protective measures that have been developed over the years through ESA section 7 consultations with NMFS and commended the efforts of NMFS, Southeast Regional Office, in initiating discussions with EPA, Region IV, to propose moving the Kings Bay ocean dredged material disposal site closer to the navigation channel. A closer disposal site would reduce the distance traveled by hopper dredges, thereby reducing the potential for collisions with **right** whales.

The commenter did not anticipate additional restrictions on these activities because of the critical habitat designation.

Response: NMFS will continue to work with all Federal agencies through the section 7 consultation process on all protected species issues to ensure the continued recovery and protection of endangered and threatened species.

Classification

It has been determined that this rule is not significant for purposes of E.O. 12866.

NOAA Administrative Order 216-6 states that critical habitat designations under the ESA generally are categorically excluded from the requirements to prepare on EA or Environmental Impact Statement. However, in order to more clearly evaluate the minimal environmental and economic impacts of critical habitat designation versus the alternative of a no-critical habitat designation, NMFS has prepared an EA. Copies of the EA are available on request (see ADDRESSES).

List of Subjects in 50 CFR Part 226

Endangered and threatened species.

Dated: May 27, 1994.
Charles Karnella,
Acting Program Management Officer, National Marine Fisheries Service.

For the reasons set forth in the preamble, 50 CFR part 226 is amended as follows:

PART 226--DESIGNATED CRITICAL HABITAT

1. The authority citation for part 226 continues to read as follows:

Authority: 16 U.S.C. 1533.

2. New Sec. 226.13 is added to subpart B to read as follows:

Sec. 226.13 North Atlantic Ocean.

Northern **Right Whale** (Eubalaena glacialis)

(a) Great South Channel. The area bounded by 41 deg.40' N/69 deg.45' W; 41 deg.00' N/69 deg.05' W; 41 deg.38' N/68 deg.13' W; and 42 deg.10' N/68 deg.31' W (Figure 6 to part 226).

(b) Cape Cod Bay, Massachusetts. The area bounded by 42 deg.04.8' N/70 deg.10' W; 42 deg.12' N/70 deg.15' W; 42 deg.12' N/70 deg.30' W; 41 deg.46.8' N/70 deg.30' W and on the south and east by the interior shore line of Cape Cod, Massachusetts (Figure 7 to part 226).

(c) Southeastern United States. The coastal waters between 31 deg.15' N and 30 deg.15' N from the coast out 15 nautical miles; and the coastal waters between 30 deg.15' N and 28 deg.00' N from the coast out 5 nautical miles (Figure 8 to part 226).

3. Figures 6 through 8 are added to part 226 to read as follows:

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<GRAPHIC><TIFF>TR03JN94.038

<GRAPHIC><TIF1>TR03JN94.039

<GRAPHIC><TIF2>TR03JN94.040

[FR Doc. 94-13500 Filed 6-2-94; 8:45 am]
BILLING CODE 3510-22-C

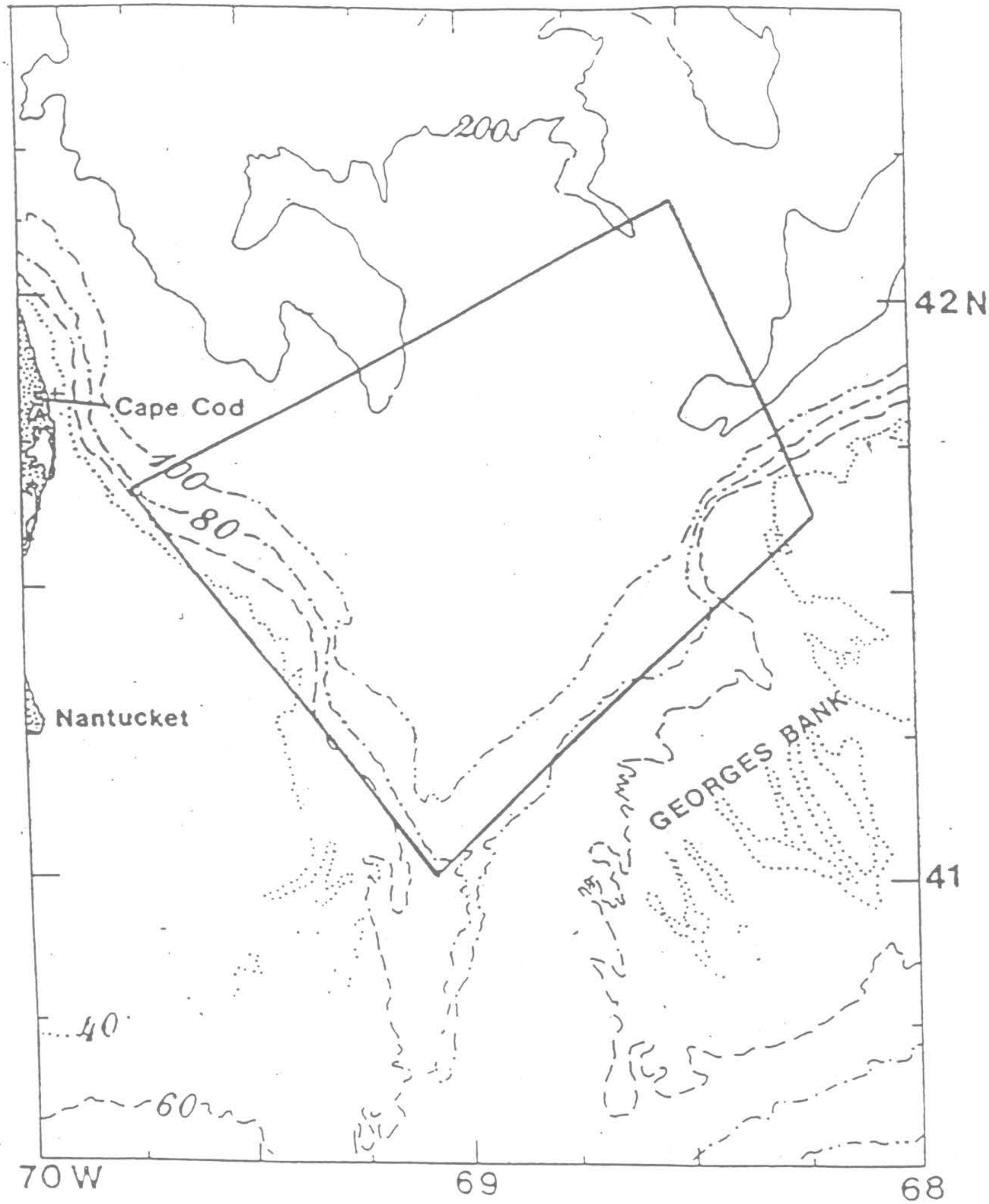

Figure 6. The area designated as critical habitat in the Great South Channel includes the area bounded by 41°40'N/69°45'W; 41°00'N/69°05'W; 41°38'N/68°13'W; and 42°10'N/68°31'W.

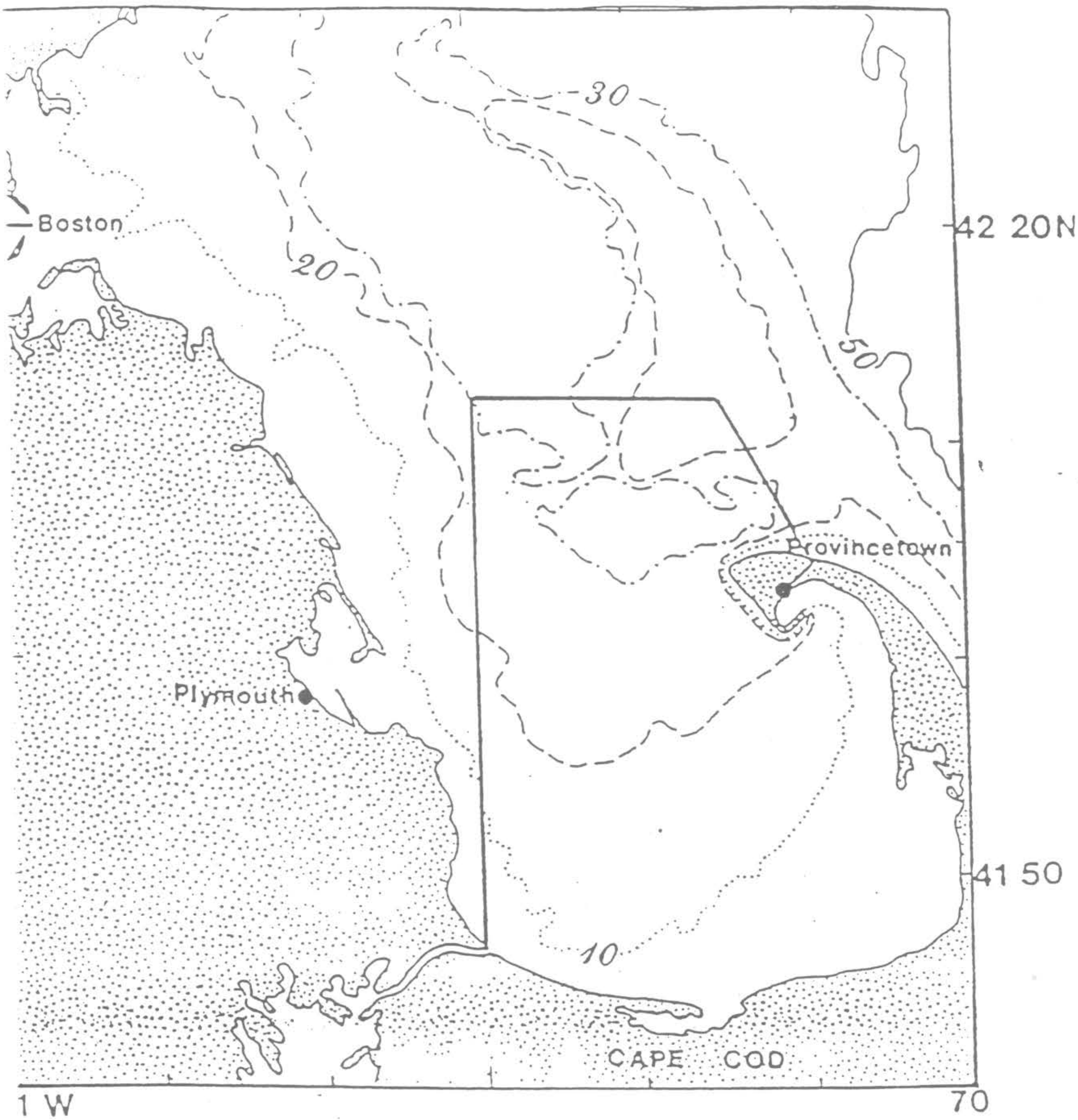

Figure 7. The area designated as critical habitat in Cape Cod Bay/Massachusetts Bay includes the area bounded by 42°04.8'N/70°10'W; 42°12'N/70°15'W; 42°12'N/70°30'W; 41°46.8'N/70°30'W; and on the south and east by the interior shore line of Cape Cod, MA.

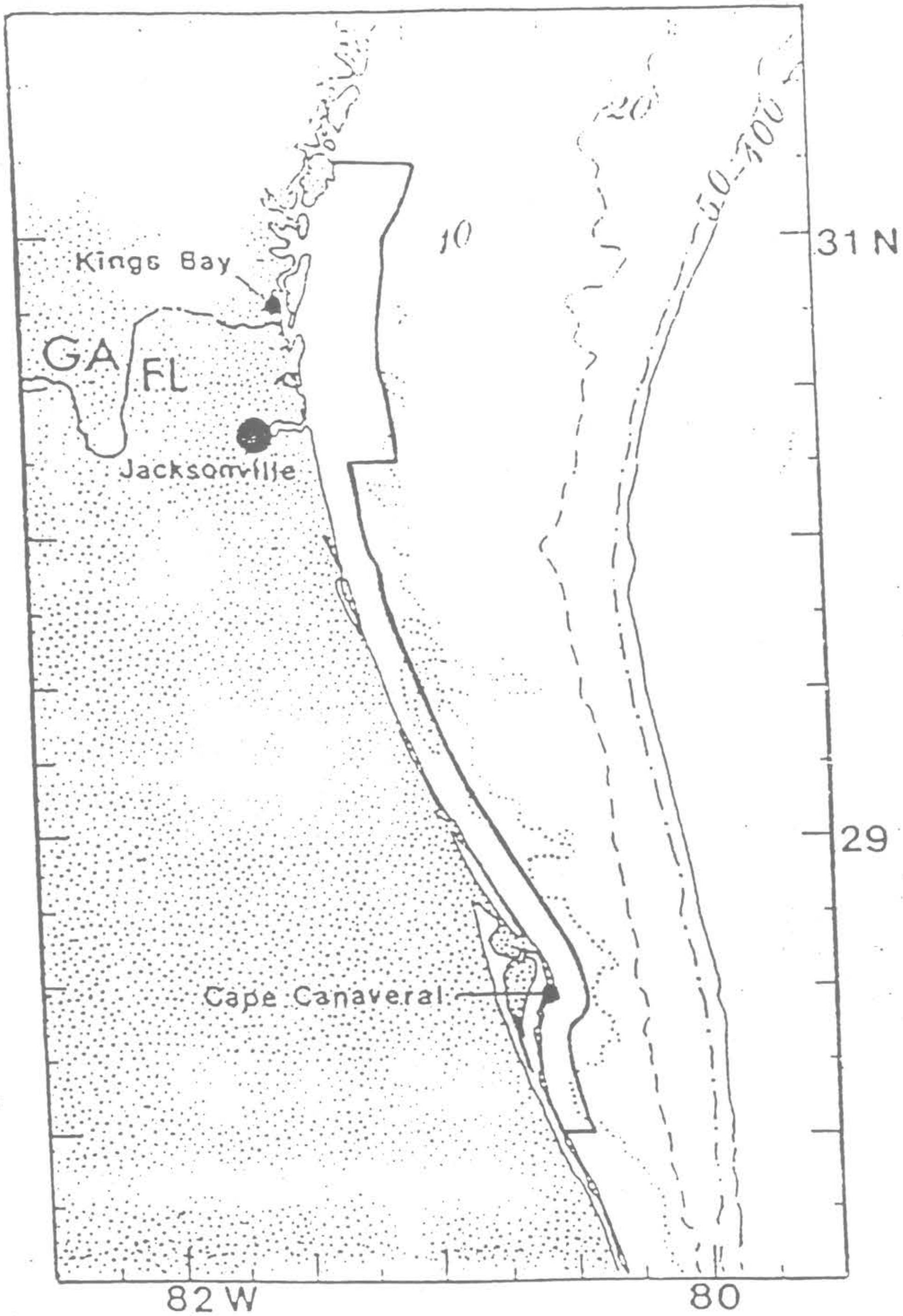

Figure 8. The area designated as critical habitat in the Southeastern United States includes waters between 31°15'N (approximately located at the mouth of the Altamaha River, GA) and 30°15'N (approximately Jacksonville, FL) from the shoreline out to 15 nautical miles offshore, and the waters between 30°15'N and 28°00'N (approximately Sebastian Inlet, FL) from the shoreline out to 5 nautical miles.

[FR Doc. 94-13500 Filed 6-2-94; 8:45 am]

BILLING CODE 3510-22-C

Fax Transmission

National Marine Fisheries Service • Southeast Regional Office • 9721 Executive Center Drive N., St. Petersburg, FL 33702

Protected Species Management Branch
Phone: 813-570-5312
Fax: 813-570-5517

To:	LCDR Brad Benggio	**Date:**	October 2, 1995
Fax #:	305-530-7932	**Pages:**	3, including this cover sheet.
From:	David Bernhart		
Subject:	EWS and Species List		

COMMENTS:
Species lists for the Atlantic and Gulf coasts of Florida are attached. These lists apply throughout EPA Region IV.

Regarding the Right Whale Early Warning System (EWS) contact number: The EWS observation team is selected and contracted each year. (In the past, the New England Aquarium has been the contractor.) Consequently, the observation team's number changes yearly. Each year, then, area response plans will have to be updated with the new contact phone numbers for the EWS. To obtain the EWS contact number, you should call Georgia Department of Natural Resources, Non-game Wildlife Program, at 1-800-272-8363. Please note that this is not a 24-hour number, and should be contacted at or prior to the beginning of the right whale calving season in December, rather than in the event of an actual response situation.

If you have any questions regarding the species list or contact procedures, please give me a call.

Biological Assessment of Effects on Listed Species of Region IV Regional Response Team Oil Spill Dispersant Use Policy

Description of Proposed Action

The proposed action is adoption of a Region IV Regional Response Team (RRT IV) policy for dispersant use in ocean and coastal waters in response to offshore oil spills. This RRT IV Dispersant Use Policy preauthorizes limited use of dispersants by the pre-designated United States Coast Guard(USCG) On-Scene Coordinator (OSC) on oil discharges impacting Federal waters and other specifically designated areas as outlined in individual Letters of Agreement (LOA) with states within Federal Region IV jurisdiction. In general, pre-authorization is granted three miles seaward of land providing waters are at least ten meters deep. Some special management areas are excluded from pre-authorization. The Dispersant Use Policy implements Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) and is signed by the USCG, U.S. Environmental Protection Agency (USEPA), U.S. Department of Interior (USDOI), the U.S. Department of Commerce (USDOC), and the coastal states of RRT IV (North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi).

The Dispersant Use Policy recognizes that, under certain circumstances, timely and complete physical containment, collection, and removal of oil discharges may not be possible. In such cases, the use of dispersants may reduce risk to the environment and human health. By breaking a cohesive surface slick into small droplets that disperse into the water column, dispersants can prevent an offshore oil slick from contaminating wildlife and critical habitat in nearshore and shoreline areas as well as minimize exposure of wildlife at the water surface.

Because effective use of dispersants has a limited and normally small window of opportunity, RRT IV strongly recommends that dispersant application begin as soon as possible following an oil spill. Accordingly, employment of dispersants usually requires that authorization for use be given prior to a spill incident. Within areas pre-authorized for dispersant use by the Policy, further consultation by the United States Coast Guard On-Scene Coordinator is not required, provided the appropriate RRT agencies are immediately notified and the applicable protocols are followed. The Dispersant Use Policy is not intended to exclude or replace the use of mechanical, in-situ burning, or other open-water cleanup methods but to enable and encourage the use of all appropriate techniques in the strategy to remove oil from the water surface and, thereby, minimize environmental impacts of a spill.

Prior to beginning a dispersant application, an on-site survey will be conducted to determine if any threatened or endangered species are present in the area or otherwise at risk from dispersant operations. Appropriate natural resource specialists familiar with local resource concerns and representing the resource trustee will be consulted prior to conducting dispersant operations to determine if any threatened or endangered species are at risk from dispersant operations. Measures will be taken to prevent risk of injury to any wildlife, especially listed species. Examples of potential protection measures include temporary employment of deterrent techniques and physical removal of individuals of listed species under the approval of the trustee agency. If the risk to listed species cannot be eliminated or reduced sufficiently, dispersants will not be applied unless they are necessary to prevent a serious threat to human safety.

If a decision to use dispersants is made, the Federal OSC will immediately notify the USEPA, USDOC, USDOI, and appropriate state(s) through RRT representatives. Dispersant application will be discontinued if so requested by an RRT representative. A post-incident briefing will be held within 45 days following a dispersant application to exchange information on its effectiveness and effects and to determine whether changes to the Dispersant Use Policy are necessary.

Description of Pre-authorization Area

Three zones have been established to delineate locations and conditions under which dispersant application operations may take place in waters of Federal Region IV as follows:

1) Green Zone: Pre-authorization for Dispersant Application

Green Zone is defined as any offshore water within Federal Region IV in which ALL of the following conditions apply:

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

b) the waters are at least three miles form any shoreline, and falling outside of any state's jurisdiction; and

c) the water is at least ten meters deep.

Within the Green zone, the USCG, USEPA, DOC, DOI, and affected state(s) agree that the decision to apply dispersants rests solely with the pre-designated USCG OSC, and that no further approval, concurrence, or consultation on the part of the USCG OSC with EPA, DOC, DOI or the state(s) is required.

All dispersant operations within the Green zone will be conducted in accordance with the Protocols outlined in the Dispersant Use Policy.

2) Yellow Zone: Waters Requiring Case-by-Case Approval

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

a) the waters fall under State or Federal special management jurisdiction. This includes any waters designated as marine reserves, National Marine Sanctuaries, national or state wildlife refuges, units of the National Park Service, or proposed or designated critical habitats;

b) the waters are within three miles of a shoreline, and/or fall under state jurisdiction;

c) the waters are less than ten meters deep;

d) the waters are in mangrove or coastal wetland ecosystems, or directly over coral reefs which are in less than 10 meters of water. Coastal wetlands include submerged algal and seagrass beds.

Where a Letter of Agreement is in effect between the USCG, EPA, DOI, DOC, and the affected state(s), the policy for pre-authorization established under the provisions of said LOA shall preempt the Policy herein established for areas otherwise designated as falling within the Yellow zone. When an LOA is not in effect for an area falling within the Yellow zone, the USCG will request authorization for dispersant use according to the following procedures:

If the USCG OSC believes dispersants should be applied within the Yellow zone, a request for authorization must be submitted to the RRT IV representatives of the EPA, DOI, DOC, and the affected state(s) according to the procedures in Appendix I of the Dispersant Use Policy for requesting approval in areas not pre-authorized. The OSC is granted authority to conduct dispersant operation in the Yellow zone only when concurrence has been given by EPA and the affected state(s), and consultation with DOC and DOI has been completed.

As with all dispersant use under the LOA, application of dispersants within the Yellow zone, if approval is granted, will be conducted in accordance with the appropriate and relevant Protocols outlined in the Dispersant Use Policy. Additionally, the USCG OSC will make every reasonable effort to continuously evaluate the application of dispersants within the Yellow zone, and will allow RRT IV agencies and the affected State(s) the opportunity to comment.

3) Red Zone: Exclusion zones:

The Red zone includes areas designated by the Region IV Response Team in which dispersant use is prohibited. No dispersant application operations will be conducted at any time in the Red zone unless:

a) dispersant application is necessary to prevent or mitigate a risk to human health and safety, and/or

b) an emergency modification of this LOA is made on an incident-specific basis.

The Region IV Response Team has not designated any areas as Red zones but retains the right to include areas in the future if deemed appropriate. States may, through the establishment of Letters of Agreement, designate Red zones in areas falling under state jurisdiction.

Description of Oil Dispersants

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

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

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

By dispersing oil into the water column, the spreading or dilution becomes three-dimensional. The subsurface oil concentration initially increases, but diminishes rapidly with distance and time due to physical transport processes. This is in contrast to untreated oil concentrated at the water surface, which can coalesce in surface convergence zones even after it has spread out to very low concentrations. The highest concentration of chemically dispersed oil typically occurs in the top meter of water during the first hour following treatment (Rycroft et. al., 1994). Available data suggest that concentrations of more than ten parts per million (ppm) of dispersed oil are unlikely beyond ten meters (depth) of the slick and that, even within one meter depth of the slick, concentrations rarely exceed 100 ppm. The continuous mixing and dilution capabilities of open water lead to uniformity and are sufficient to rapidly reduce these concentrations. Field studies show that water column concentrations decline to undetectable or background levels within several hours following application of a dispersant (SEA, 1995). Under untreated slicks, oil concentrations typically range from a few parts per million to less than 0.1 ppm, diminishing with depth and time.

The dispersed oil droplets, ranging in size from microns to a few millimeters, break down by natural processes, such as biodegradation. Microbial biodegradation of oil appears to be enhanced by dispersal because of the larger surface area available as compared to a surface slick. Dispersants also prevent formation of tarballs and oil-in-water emulsions (mousse), which tend to be resistant to biodegradation due to their low surface area. The chemical dispersants applied, like the oil droplets, are diluted by diffusion and convective mixing. Much of the solvent fraction evaporates immediately after the dispersant is applied. The surfactants are readily biodegraded.

Description of Listed Species Present

Sea Turtles

Six listed sea turtle species occur in the area under consideration. Kemp's (Atlantic) ridley, leatherback, and hawksbill sea turtles are endangered. Kemp's ridley (*Lepidochelys kempii*), the most endangered of these species, occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. Adults are most frequently sighted off southwestern Florida. This species is a shallow-water benthic feeder, preying largely on crabs (USFWS and NMFS, 1992). Young Kemp's ridleys use sargassum mats and seagrass beds for refuge and foraging (Ernst *et al*., 1994). Leatherback turtles (*Dermochelys coriacea*) occur throughout the area and have been reported to nest on beaches in Florida and, to a lesser extent, Georgia and North Carolina. Leatherback nesting in the U.S. Caribbean is reported in the Virgin Islands (St. Croix, St. Thomas, St. John) and Puerto Rico, including Islas Culebra, Vieques, and Mona (Boulon *et al*., 1992). Leatherbacks are considered to be a highly pelagic species but occasionally enter the shallow coastal waters of bays and estuaries. They may concentrate near and follow drifting schools of jellyfish, their primary prey (NMFS, 1992). Hawksbill sea turtles (*Eretmochelys imbricata*) are predominantly tropical. Adult hawksbills characteristically inhabit shallow rocky areas and coral reefs but also occur in mangrove-bordered bays, estuaries, and lagoons and occasionally in deep waters. Juveniles occupy the deeper water pelagic environment, often associated with floating patches of sargassum mats. Hawksbill turtles are omnivorous opportunists and seem to prefer invertebrates, particularly sponges (Ernst *et al.*, 1994).

Green, loggerhead, and olive (Pacific) ridley sea turtles are listed as threatened. Atlantic green sea turtles *(Chelonia mydas*) occur in U.S. Atlantic waters around the U.S. Virgin Islands, Puerto Rico, and along the continental U.S. from Texas to Massachusetts. They are endangered in Florida and threatened elsewhere. They nest along the east coast of Florida and in smaller numbers in the U.S. Virgin Islands, Puerto Rico and along the Florida panhandle. Important nesting areas in Florida include Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties. Their preferred habitat appears to be lagoons and shoals with an abundance of marine grasses. Adult green sea turtles are primarily herbivorous, foraging on algae and seagrasses; juveniles may eat a variety of invertebrates as well. Areas that are known as important feeding areas for green turtles in Florida include Indian River Lagoon, Florida Keys, Florida Bay, Homosassa, Crystal River and Cedar Key (NMFS, 1991a). Loggerhead turtles (*Caretta caretta*) occur throughout the area under consideration. In the western Atlantic the great bulk of loggerhead nesting occurs along the southeastern coast of the U.S., with approximately 80 percent occurring in Brevard, Indian River, St. Lucie, Martin, Palm Beach and Broward Counties in Florida (NMFS, 1991b). Loggerhead turtles also nest on beaches in North Carolina, South Carolina, Georgia, along the Gulf Coast of Florida, Alabama, and Mississippi. Loggerheads wander widely throughout the marine waters of their range. They commonly inhabit the continental shelves and estuarine environments, occurring most frequently in waters less than 50 meters deep. Hatchlings and juveniles are often found along current fronts, downswells, or eddies associated with drifting mats of sargassum (Ernst *et al*., 1994). Loggerheads are omnivorous and feed on a wide variety of benthic invertebrates including crustaceans, mollusks, and sponges (NMFS, 1991b). The olive ridley (*Lepidochelys olivacea*) occurs and nests predominantly in tropical waters, including the Caribbean as far north as Puerto Rico. They usually nest in aggregations called arribadas. Olive ridleys generally inhabit protected, relatively shallow nearshore areas, typically within fifteen kilometers of mainland shores, but occasionally occurs in the open sea. They are predominantly carnivorous, preying on pelagic crabs, jellyfish, and tunicates (Ernst *et al.*, 1994).

West Indian Manatee

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

Like other sirenians, manatees are aquatic herbivores and feed on a wide variety of submerged, emergent, floating, and shoreline vegetation. In saltwater, they feed primarily on several species of seagrass, including turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoal grass (*Haladule wrightii*). Manatees also may eat some species of algae, mangrove leaves, and red mangrove seedlings. They have been known to haul themselves partially out of the water to consume bank vegetation. In freshwater, manatees feed on a variety of plants, including *Hydrilla verticillata*, algae, and water hyacinth (*Eichhornia crassipes*). Movements and aggregations of manatees, which spend several hours each day feeding, can be correlated with the distribution of seagrasses and vascular freshwater aquatic vegetation (Reynolds and Odell, 1991).

The Florida manatee occurs along the Atlantic and Gulf Coasts of Florida, inhabiting bays, estuaries, rivers, and coastal areas where seagrasses and other vegetation are abundant. The primary range along the Atlantic Coast of Florida extends from the St. Johns River in northeastern Florida southward to the Miami area. Few manatees occur in the Florida Keys or in Florida Bay. Along the Gulf Coast of Florida, manatees are abundant in the waters of the Everglades National Park and their range extends northward to the Suwannee River in summer and sporadically westward. During warm summer months, manatees have been known to travel as far north as Chesapeake Bay and as far west as Mississippi and Louisiana. Especially during cold weather, manatees tend to congregate near natural warm springs at Crystal River on the Gulf Coast and Blue Spring State Park on the St. Johns River on the Atlantic Coast of Florida. They also are drawn to warm water discharged from power plants including those at Cape Canaveral, Fort Lauderdale, Port Everglades, Riviera, Fort Myers, and Tampa Bay. Manatees also congregate near freshwater sources such as river mouths. The Indian River Lagoon is an important feeding area. Though manatees rarely venture into deeper, ocean waters, they have been reported in locations as far offshore Florida as the Dry Tortugas Islands. At an estimated population of around 1000 in Florida waters, the Florida manatee is at very serious risk of extinction (USFWS, 1989).

The Antillean manatee occurs in Puerto Rico and very rarely in the Virgin Islands. Manatees routinely cross between the islands of Puerto Rico in the area under consideration. As in other areas in the Caribbean basin, the distribution of Antillean manatees in Puerto Rico is not uniform and is most likely related to the distribution of freshwater resources, seagrass beds, and sheltered areas. In some areas, seasonal shifts in local abundance appear to correlate with the rainy season in that manatees tend to move downstream when water levels drop in the dry season. Surveys indicate most manatees are seen along the eastern and southcentral coasts of Puerto Rico and tend to congregate near the Roosevelt Roads Naval Station on the eastern end of the island (Rathbun and Possardt, 1986).

Brown Pelican

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

Significant U.S. breeding populations of the eastern brown pelican occur primarily in Florida and South Carolina. Eastern brown pelicans usually nest in early spring and summer and many spend the winter close to their nesting areas (USFWS, 1980). No nesting of brown pelicans has been documented in Mississippi, though large numbers of birds are known to occur there. They occur most commonly nearshore (Zone B area) but also frequent areas farther from shore (Zone A) in large numbers during the summer when food is plentiful, such as around fishing vessels (Goldman, 1995).

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

Roseate Tern

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

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

Piping Plover

The piping plover (*Charadrius melodus*) is a shorebird that breeds only in North America in three geographic regions. The Atlantic population, listed as threatened, breeds along the Atlantic Coast from Newfoundland south to South Carolina. This population winters from North Carolina to Key West, Florida and has been reported to occur in the Caribbean Islands. Major Atlantic Coast wintering areas include the southern North Carolina coast, particularly near Morehead City, the southern coast of Georgia, and the Lower Florida Keys. In the Florida Keys the stretch from 7-mile Bridge to Bahia Honda seems to be particularly favored (USFWS, 1988) Other populations of piping plovers, apparently winter in greater abundance along the Gulf Coast than the Atlantic Coast (Nicholls, 1989). In a 1987 to 1989 survey conducted from Virginia to Louisiana, 87 percent of piping plovers observed were along the Gulf Coast from Florida to Texas. This represented an estimated 35 percent of the total breeding population and 56 percent of the Great Lakes/Great Plains population (Nicholls, 1989).

Piping plovers along the coast nest on sandy beaches above the high-tide line, sand flats at the ends of sandspits and barrier islands, gently sloping foredunes, blowout areas behind primary dunes, and washover cut into or between dunes. Nest sites are relatively flat and occur most commonly at sites with little or no vegetation, but may be found in moderately dense stands of beachgrass (*Ammophila breviligulata*). Piping plovers feed on the intertidal ocean beach, washover areas along the shorelines of isolated dune ponds, tidal flats on the lagoon side of barrier beaches, and tidal mudflats in saltmarshes. They usually feed during low or falling tides on marine worms, fly larvae, beetles, crustaceans, molluscs, and other invertebrates, sometimes obtained from intertidal wrack debris or beachgrass (USFWS, 1988).

Eskimo Curlew

The Eskimo curlew (*Numenius borealis*) is an almost extinct shorebird. It nests on the Arctic tundra and winters in South America. Eskimo curlews may occur in the area during migration in spring and fall. Its diet includes insects, crustaceans, mollusks, and worms.

Wood Stork

The wood stork (*Mycteria americana*) is an endangered wading bird that occurs along the southern Atlantic and Gulf Coasts from South Carolina in coastal shallows including cypress swamps (nesting colonies), marshes, ponds, and lagoons. Currently, U.S. breeding populations are restricted primarily to Florida, with a few rookeries also occurring in Georgia and South Carolina. The species is highly gregarious in both its nesting and feeding behavior. Wood storks usually nest in mangrove or cypress swamps, constructing their nests in the trees. Wood stork's grope feed in freshwater or brackish wetlands on small fish, crustaceans, frogs, lizards, and rodents. They will travel greater than 100 kilometers to feeding areas (USFWS, 1986).

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) occurs and is endangered in all of the Region IV states. A raptor, the bald eagle uses a large area for hunting its prey and is sensitive to chemical contaminants in the food chain. In the Southeast, fish comprise the bulk of the bald eagle's diet, though they are opportunistic feeders and supplement this with a variety of other vertebrate species, including waterfowl, sea birds, and carrion.

Bald eagles typically nest at the edge of forested areas located near open water. In the Southeast, nests are most often built high up in pine and cypress trees with a clear view of open water, though in some areas eagles nest in low mangroves. The nesting period in the Southeast usually runs from October 1 to May 15. Eagles are most vulnerable to disturbance early in the nesting period (approximately the first 12 weeks), when it may lead to nest abandonment, decreased hatching success, or decreased survival of unfledged young. Due to the relatively low reproductive rate of bald eagles, this can result in significant population impacts (USFWS, 1989b).

Peregrine Falcon

Both the endangered American peregrine falcon (*Falco peregrinus anatum*) and the recently delisted (as of October 5, 1994) Arctic peregrine falcon (*Falco peregrinus tundrius)* can occur in the area under consideration. Though no longer considered biologically threatened, the Arctic peregrine falcon remains classified as "endangered due to similarity of appearance" to protect the nearly identical endangered American peregrine falcon. In the eastern part of its range, the peregrine falcon typically uses closed or semi-enclosed deciduous habitat, usually overlooking aquatic areas. Peregrines prefer cliff ledges for nesting and for night roosting of young after they have fledged. Cut banks, hollows in trees, and building ledges are also used occasionally. They breed and nest in the spring.

The peregrine falcon is a raptor, preying chiefly on birds. In inland areas, peregrines prey primarily on medium size passerine bird species such as bluejays, flickers, meadowlarks, and pigeons. On the seacoast and islands, during migration, and at wintering grounds peregrines feed almost exclusively on smaller shorebirds and waterfowl. Peregrine falcons prefer to capture their prey in flight, diving from above at great speed (USFWS, 1980a).

Cape Sable Seaside Sparrow

The Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) is an endangered passerine species that inhabits coastal prairies near Cape Sable, Florida. The species inhabits freshwater marshes dominated by muhly grass (Muhlenbergia sp.) and forages on the ground for insects.

Black-Capped Petrel

The black-capped petrel (*Pterodroma hasitata*), currently a candidate (C2) under consideration for Federal listing, is a surface-feeding pelagic seabird that occurs seasonally, from spring to late fall, in the offshore waters of North Carolina (Lee and Socci, 1989). They spend most of their time on the open ocean except when they come ashore to breed on Caribbean Islands.

Shortnose and Gulf Sturgeon

Two listed species of anadromous fish, the shortnose sturgeon and gulf sturgeon may occur in the area under consideration. The endangered shortnose sturgeon (*Acipenser brevirostrum*) occurs in several large coastal river systems along the Atlantic Coast. They are known to inhabit their natal rivers, estuaries, and the nearshore marine environment. Most migratory activities occur during winter and spring and, though shortnose sturgeon can travel considerable distances, their movements are apparently confined to estuarine and riverine environments (Gilbert, 1989). Shortnose sturgeon are benthic feeders, usually feeding in shallow muddy backwater areas with abundant vegetation and along river banks by rooting along the bottom with their snouts, indiscriminately "vacuuming" large quantities of mud and debris along with their prey. Juveniles feed mainly on benthic crustaceans and insect larvae; adults feed largely on mollusks supplemented by polychaetes and small benthic fishes in estuarine areas (Gilbert, 1989). Because shortnose sturgeon typically forage within the middle and upper reaches of the estuaries and rivers they inhabit, they are unlikely to occur in the area under consideration.

The threatened gulf sturgeon (*Acipenser oxyrhynchus desotoi*) occurs predominantly in the northeastern Gulf of Mexico, where it ranges from the Mississippi Delta east to the Suwannee River in Florida and formerly to Tampa Bay. The species is greatly depleted throughout most of its range and now is relatively common only in a few areas. The gulf sturgeon spawns in freshwater riverine habitats from April to June and young descend to sea at about 2 to 3 years of age for winter migrations. It is unknown whether they aggregate during their migrations. Data shows, however, that adults tend to enter and leave the freshwater system within very narrow time periods. Marine habitats for the gulf sturgeon are poorly known. Limited analyses of stomach content indicate that sand bottom, hard bottom, and seagrass beds are probably important habitats (Barkuloo, 1988). In the Big Bend area of the northeastern Gulf of Mexico, these habitats occur in 70 feet of water as far offshore as 20 miles. Like the shortnose sturgeon, the gulf sturgeon is a benthic omnivore and feeds on insects, crustaceans, molluscs, annelids, and occasionally small fish (Lee, *et al*. 1980).

Crocodilians

Two listed crocodilian species occur in the area. The threatened American alligator (*Alligator mississippiensis*) occurs in lakes, swamps, marshes, and rivers in the Southeastern United States. Like all alligator species, it is confined to freshwater habitats. The endangered American crocodile (*Crocodylus acutus*) occurs in nearshore marine habitats, primarily in coastal estuaries and swamps and the tidal portions of rivers. Both species are aquatic predators that hunt a wide variety of prey including small fish, invertebrates, birds, and mammals. Alligators and a few species of crocodiles build mound-nests of vegetation and soil. Most crocodiles dig their nests in friable soils (Zug, 1993).

St. Croix Ground Lizard

The endangered St. Croix ground lizard (*Ameiva polops*) occurs in the Caribbean on Green, Protestant, and Ruth Cays. This species is predominantly terrestrial, using beach and upland forest habitats most heavily (Zug, 1993). Largely insectivorous, along the beach the St. Croix ground lizard is reported to forage among the tidal wrack, preying on amphipods and hermit crabs (USFWS, 1984).

Atlantic Salt Marsh Snake

The Atlantic salt marsh snake (*Nerodia clarkii taeniata*) is listed as threatened. It is restricted to the salt marshes of Volusia, Brevard, and possibly Indian River Counties on the Atlantic coast of Florida (USFWS, 1993). This species is restricted to brackish, tidal marshes and is most often found in association with saltwort (*Salicornia* spp.) flats and salt grass (*Distichlis spicata*)-bordered tidal creeks. The Atlantic salt marsh snake feeds primarily on small fish, but readily takes frogs when available.

Red Wolf

The endangered red wolf (*Canis rufus*) typically is found in brushy and forested areas and near river bottoms. They feed primarily on small mammals and birds, although, along the Gulf coast red wolves also feed on crabs.

Beach Mice

Five listed subspecies of beach mice occur in the area under consideration along the southern Atlantic and northwest Gulf Coasts: the Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*), Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*), Alabama beach mouse (*Peromyscus polionotus ammobates*), Southeastern beach mouse (*Peromyscus polionotus niveientris*), and Anastasia beach mouse (*Peromyscus polionotus phasma).* The St. Andrew beach mouse (*Peromyscus polionotus peninsularis*) is a candidate species for listing. Southeastern and Anastasia beach mice occur along the Atlantic Coast of Florida. Alabama, Perdido Key, Choctawhatchee, and St. Andrew beach mice occur on the Gulf coast dunes of Alabama and Florida (USFWS, 1987).

Beach mouse habitat is restricted to the primary and secondary sand dunes and scrub dunes along the ocean front. Beach mice dig burrows mainly on the lee side of the primary dunes and in other secondary and interior dunes where the vegetation provides suitable cover. It is thought that beach mice feed primarily on the seeds of beach grasses, *Panicum amarum* and *Panicum repens,* and on sea oats, *Uniola paniculata*; however, recent food habits studies indicate that insects are also an important component of their diet (Holler 1990, 1991a, 1991b; USFWS, 1987, 1989c; Moyers, 1995).

Key Deer

The Key deer (*Odocoileus virginianus clavium*),occurs primarily in the Florida Keys from Big Pine to Sugarloaf. Big Pine Key and No Name Key support the largest populations. Only islands with permanent fresh water are used consistently by the deer. The main food source of Key deer is Red Mangrove (*Rhizophora mangle*) but they also browse on other plant species (Lazell, 1989).

Other Terrestrial Mammals

Endangered terrestrial mammals endemic to the Florida Keys include the Key deer, silver rice rat, Lower Keys rabbit, and the Key Largo cotton mouse. The lower keys rabbit (*Sylvilagus palustris hefneri*) and silver rice rat (*Oryzomys palustris natator)* also occur in the Lower Keys. The Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*) occurs predominantly in the hardwood hammocks of North Key Largo. Also occurring in Florida is the Florida salt marsh vole (*Microtus pennsyvanicus dukecampelli*). These species all may feed in transition zone areas that lie seaward of high land.

Seabeach Amaranth

The seabeach amaranth (*Amaranthus pumilus*) is a threatened annual herbaceous plant in the family Amaranthaceae that grows on beaches and low active dunes along the Atlantic Coast of the United States. Though historically it occurred from Massachusetts to South Carolina, it is currently found only in New York, North Carolina and South Carolina. Essential habitat for the amaranth are sand flats above the reach of high tide but frequently disturbed by natural forces to allow only sparse vegetative cover. Its primary habitat consists of overwash flats at the accreting ends of barrier islands and lower foredunes and upper strands of non-eroding beaches. Seed production, which begins in July or August and peaks in September, yields relatively few, large seeds that are wind and water dispersed (USFWS, 1995). Seabeach amaranth moves around in the landscape as a fugitive species and occupies suitable habitat as it becomes available. Consequently, this species can experience significant spatial distribution shifts from season to season and year to year. Seabeach amaranth is extremely susceptible to habitat fragmentation and the isolation of small populations can often lead to local extirpation. The current reduction of seabeach amaranth to a portion of its former range makes it more vulnerable to population level impacts from catastrophic disturbances such as hurricanes and oil spills.

Effects of Oil Spills on Listed Species

General Effects

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

Sea Turtles

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

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

Manatees

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

Birds

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

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

Sturgeons

The anadromous shortnose and Gulf sturgeons would be most vulnerable to exposure to oil spills while moving and foraging in estuarine and nearshore marine environments. The Gulf sturgeon would also be at risk during its winter marine migrations. Because the Gulf sturgeon does little or no feeding in fresh water, its growth and reproductive potential depend entirely on the resources accumulated by feeding during winter migrations. Benthic feeders, sturgeon could ingest contaminated sediments, organisms, or vegetation if oil settles to the sea floor. The ability of sturgeon to sense and avoid oil contamination is unknown. Ingestion of contaminated food and sediments could lead to general body deterioration, lower reproductive potential, and lower viability of offspring (Barkuloo, 1988). If Gulf sturgeon do aggregate during their winter migrations, as some data indicates, significant portions of the population could be affected by a major oil release impacting aggregation areas.

Other Listed Species

Contamination of shoreline habitat or affects on key prey species populations are the major risks of impact associated with oil spills to listed species that spend most of their time on land, in freshwater, or in highly sheltered areas. This includes the listed terrestrial mammals, reptiles and the seabeach amaranth.

Along Gulf Coast areas with relatively narrow beaches, an oil spill occurring during an episode of high winds and seas (a relatively common occurrence) could result in contamination of dune habitats and severe mortality of the plant and animal species associated with them. Oil stranded on the beach face also can be remobilized later by strong surf action and winds and redeposited into the primary dunes. Consequently, an oil spill reaching the shoreline could seriously impact species such as beach mice, even though the primary habitat of these subspecies is on the lee side of the dunes and their food sources are located above the high tide line. For example, the National Park Service has described the following occurrence during a small oil spill on Horn Island, Mississippi, in September 1989:

"Several days after landfall of the Horn Island spill, strong surf action and winds combined to remobilize and distribute significant amounts of oil from the beach face up into the adjacent primary dunes. The spray generated by the wind and surf action was sufficiently oily to completely coat most of the dune vegetation, and resulted in leaf browning which persisted until the next growing season" (Zimmerman, 1990).

Dispersants can help minimize such shoreline contamination and associated ecological impacts by preventing oil from washing ashore.

Analysis of Biological Effects of Proposed Action

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

Most of the listed species do not occur in the "Green" zone where dispersant use will be pre-authorized by the Dispersant Use Policy and so are unlikely to be adversely affected. Manatees very rarely venture into the deeper offshore waters in the pre-authorization zone, except in Puerto Rico where they routinely cross between islands. Gulf and shortnose sturgeons and most sea turtle species occur primarily in shallower, nearshore waters in the "Yellow" zone. Black-capped petrels, roseate terns and brown pelicans are known to feed further offshore in the "Green" zone, but wading birds (wood stork), shorebirds (piping plover and Eskimo curlew), raptors (bald eagle and peregrine falcon), and passerines (Cape Sable seaside sparrow) are not likely to occur in the pre-authorization zone. The listed reptiles (American alligator, American crocodile, St. Croix ground lizard, and Atlantic salt marsh snake) occur primarily in terrestrial, freshwater or tidal areas. The listed terrestrial mammals (beach mice, red wolf, Key deer, silver rice rat, lower Keys rabbit, Key Largo cotton mouse, and Florida salt marsh vole) and terrestrial plant (seabeach amaranth) do not occur in the pre-authorized "Green" zone, and so are not subject to direct effects of dispersant use. Dispersant application would benefit the listed species by preventing contamination of shoreline and nearshore habitat and, concomitantly, the impacts associated with shoreline cleanup activity. For example, species such as piping plovers, peregrine falcons, and brown pelicans are known to be highly sensitive to human disturbance, especially when nesting. The primary human-related cause of mortality to manatees is collision with watercraft. Such potential nearshore impacts from cleanup activities would be minimized by preventing oil from stranding ashore.

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

Direct Contact and Ingestion

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

Direct application of dispersants to birds or fur-bearing mammals would likely destroy the water-repellency and insulating capacity of fur or feathers and various components may disrupt the structural integrity of sensitive external membranes and surfaces (NRC, 1989). According to the Dispersant Use Policy, however, dispersants will not be sprayed near listed species or other wildlife. It should be noted that some hazing and removal activities can adversely affect listed species. Such activities associated with dispersant application, if deemed appropriate, would be conducted only with full coordination with natural resource trustees and by authorized or permitted personnel.

Prey Contamination

If zooplankton, fish, and other water column or benthic organisms become oiled or accumulate oil in their tissues, they could ultimately expose species that prey upon them. Diving seabirds and several sea turtle species that occur in the area under consideration for action prey on fish and aquatic invertebrates. Prey species that occur in open waters further from shore (in the "Green" zone) where dispersant use will be pre-authorized are the primary concern. Prey species that occur in nearshore areas where dispersant use will not be pre-authorized by the Dispersant Use Policy are unlikely to be impacted.

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

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

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

If sediments become contaminated, benthic carnivores such as the listed shortnose and Gulf sturgeons could suffer chronic exposure through ingestion of oiled sediment and contaminated benthic prey populations. Benthic invertebrates may accumulate petroleum hydrocarbons from contaminated water, sediments, and food. Sediment contamination, however, is highly unlikely considering the depth and distance from shore of the area under consideration for approval of dispersant application under this Dispersant Use Policy. Furthermore, dispersed oil droplets are less likely than undispersed oil to adhere to sediment particles.

Analysis of Alternatives

Emergency Authorization

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

Mechanical Removal

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

In-Situ Burning

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

Other Chemical Countermeasures

Other classes of open-water chemical countermeasure products currently available such as solidifiers, visco-elastomizers, herders, and demulsifiers typically satisfy very narrow oil spill response niches. Most are used to enhance mechanical recovery of small releases. It is unlikely they would be effective for large spills or under the same spill conditions dispersants can be employed. Furthermore, application of many products in these classes is still in experimental stages with regard to effectiveness and environmental effects.

No Action

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

Conclusions

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

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

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

IN REPLY REFER TO:

APR 04 1996

Captain Gerald W. Abrams
U.S. Coast Guard
Marine Safety Division
909 SE. First Avenue
Miami, Florida 33131-3050

Re: FWS Log No. 4-P-95-159
Pre-approved Dispersant Use
Gulf of Mexico - MS, AL, FL
Atlantic Ocean - FL, GA, SC, NC

Dear Captain Abrams:

Thank you for your letter of January 31, 1996, transmitting a biological assessment for pre-authorization to use dispersants to treat oil spills offshore of Mississippi, Alabama, Florida, Georgia, South Carolina, and North Carolina. Pre-approval would be authorized for the Federal On-Scene Coordinator's (FOSC) limited use of dispersants to treat floating oil, when appropriate, according to an established decision table. Your letter requests the Service's review and concurrence with your determination that the proposed action would not likely adversely affect (NLAA) listed species under the responsibility of the Service. This response is provided in accordance with Section 7 of the Endangered Species Act, as amended (Act) (16 U.S.C. 1531 et seq.).

The Coast Guard's determination was based on the premise that use of dispersants within off-shore designated zones would provide a strong potential net environmental benefit during an oil spill by allowing for increased protection of nearshore, shoreline, and down-current habitat and biological resources. The use of appropriately applied dispersants is likely to result in the following: (1) a reduction of the overall, particularly chronic, impacts of oil on sensitive habitats, (2) dispersed oil being less likely than a surface slick to reach shoreline areas, (3) any dispersed oil that does move inshore being less likely to stick to shorelines and vegetation because dispersants alter the adhering property, (4) recovery of habitat is faster if the oil is dispersed before it reaches them, (5) protecting nearshore and shoreline habitats from contamination thereby protecting the species that they support, and 6) adherence to policy and procedures prepared by the Regional Response Teams (RRT) for Region IV. In general, listed species under the jurisdiction of the Service that could be affected by the proposed action inhabit coastal wetlands, aquatic, estuarine, and marine habitats. This would include listed nesting sea turtles, manatees, Gulf sturgeon, brown pelicans, shorebirds, beach mice, and the plant "seabeach amaranth."

The Coast Guard proposes to provide the FOSC with pre-authorization in accordance with Region IV RRT policy to use dispersants in response to offshore oil spills. The proposed action area encompasses the areas offshore of the States of Mississippi, Alabama, Florida, Georgia, South Carolina, and North Carolina. Three zones - zones green, yellow, and red, have been designated within the action area. The green zone is defined as any offshore area of water, within the Federal Region IV, in which the water is not classified as yellow or red; is at least 3 miles from any shoreline; falls outside of any state's jurisdiction; and the depth of which is at least 10 meters. The green zone would be considered pre-approved for dispersant use.

The yellow zone is defined as waters within the Federal Region IV that are not designated as a red or green zone; and either are within State or special management jurisdiction; are within 3 miles of a shoreline, and/or fall under State jurisdiction; and are less than 10 meters deep. The yellow zone would be considered on a case-by-case basis for dispersant use. Specific yellow zones would be pre-authorized by individual letters of agreement (LOA) between the States and the RRT IV. Specific areas that may be included in the yellow zone are identified below.

- Marine reserves,
  National Marine Sanctuaries,
- National or State wildlife refuges,
- Units of National Park Service,
- proposed or designated critical habitats, and
- waters less than 10 meters deep containing coral reefs, submerged algal beds, and coastal wetlands including mangroves areas, saltwater marshes, salt ponds and freshwater marshes.

The red zone is defined as any area designated by the Region IV RRT that prohibits dispersant use. No dispersant application operations will be conducted at any time in this zone unless dispersant application is necessary to prevent or mitigate a risk to human health and safety; or an emergency modification of an LOA is made on an incident-specific basis. Currently, there are no red zones designated in the proposed action area.

The RRT IV pre-authorization protocol for all zones requires specific actions addressing the presence of listed species in the oil spill area before dispersants can be applied. Prior to beginning dispersant use, an on-site survey will be conducted, in consultation with natural resource specialists, to determine if any listed species are present in the application area or at risk from other application operations. Measures will be taken to prevent risk of injury to any wildlife, especially endangered or threatened species. Examples of potential protective measures include: temporary employment of deterrent techniques, and physical removal of listed animals by appropriate and permitted agencies or entities. If risk to listed species cannot be eliminated or reduced sufficiently, dispersants will not be applied unless it is necessary to prevent a serious threat to human safety.

If a decision to use dispersants is made, the FOSC will immediately notify the Environmental Protection Agency, the Department of Commerce, the Department of the Interior, and the appropriate State(s) through the RRT representatives. Dispersant application will be discontinued if so requested by an RRT representative. A post-incident briefing will be held within 45 days after dispersant use to exchange information on the efficacy and effects of the operation, and to determine whether any changes to the policy are needed.

The biological assessment (BA) describes dispersants, the biology of the listed species, potential impacts of spilled oil on the listed species of concern, the potential effects of the proposed action and an analysis of alternatives to the proposed action. The descriptions of dispersants, species' biology, potential effects of an oil spill and analysis of the effects of the proposed action were adequate and thorough. The analysis of alternatives discussed the no action alternative and other oil spill cleaning methods including mechanical removal, in-situ burning, and other chemical countermeasures.

The primary objective of oil spill response is to rapidly remove as much oil as possible from the water column and to quickly remove spilled oil from the water surface, thereby reducing exposure to wildlife and preventing contamination of sensitive nearshore and shoreline habitat. Under appropriate conditions, dispersants can reduce adverse environmental impacts associated with oil spills, including harm to listed species and critical habitats. The actions or materials employed to remove the spilled oil, however, must not cause or increase environmental impacts when compared to damages from spilled oil. The BA fully addresses this issue and provides assurance within the dispersant use policy to protect listed species.

The Coast Guard determined that the proposed action would not have an adverse effect on listed species under the responsibility of the Service. This determination was based on the adherence to the RRTs' Dispersant Use Policy and the designated green, yellow, and red zones. The Service finds the BA sufficient to support a determination of "not likely to adversely affect" for the implementation of dispersant application response procedures in the Federal Region IV area. We, therefore, concur with the Coast Guard's determination.

Although this does not represent a Biological Opinion as described in Section 7 of the Act, it does fulfill the requirements of the Act relative to listed and proposed species under the responsibility of the Service. If the proposed action is modified, additional information becomes available on the potential impacts of the proposed action on listed species, or take of a species occurs as a result of an in-situ burn action, reinitiation of this consultation may be required.

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The following actions are recommended for implementation by the Coast Guard to assist in determining actual effects of oil spills and/or dispersants on listed species.

1. Revise the Pre-approval Dispersant Zone maps to include the "green, red, and yellow" zone designations by color. This would enable quick reference of the zones by pre-approval action and physical characteristics.

2. Fund a contingency study that would allow researchers to be on site immediately following a spill event where dispersants were applied. Mortally-stranded or dead species could be collected to determine if the cause of death was related to contact with the spilled oil or less obvious causes such as ingestion of contaminated prey species.

3. Undertake or fund studies on the concentration and persistence of dispersed oil in sediments. The benefits of using dispersants to protect epibenthic biota and shoreline habitats are well understood; however, their protection may come as a trade-off to long-term contamination of sediments from dispersed oil.

We appreciate your efforts in coordinating the proposed activity with us. Please contact Mr. David P. Flemming, Chief, Division of Endangered Species, at (404) 679-7096, or Ms. Lorna Patrick of the Service's Panama City, Florida Field Office at (904) 769-0552, extension 229, for additional information or coordination.

Sincerely yours,

David P. Flemming

for Sam D. Hamilton
Assistant Regional Director

Appendix IV

Dispersant Use Monitoring Program within Region IV

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

Dispersant Use Monitoring Program within Region IV

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

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

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

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

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

APPENDIX V

Equipment/Dispersant Lists

This is an up to date list of vendors who can apply dispersants and vendors who stockpile various dispersants with any applicable information pertaining to estimated response time and availability.

COAST GUARD DISTRICT SEVEN
DISPERSANT AND EQUIPMENT PROVIDER LIST (02 FEB 96)

VENDER	DISPERSANT TYPE	DISPERSANT QTY GALS	EQUIPMENT TYPE	EQUIPMENT QTY
CLEAN CARIBBEAN COOPERATIVE 2381 STIRLING ROAD FORT LAUDERDALE, FLORIDA 33312 TEL: (954) 983-9880 FAX: (954) 987-3001 POC: PAUL A. SCHULER, PRESIDENT SKIP PRZELOMSKI, OPERATIONS	COREXIT 9500/EC9500 COREXIT 9527	11,000 19,500	ADDS (C-130) (DELIVERY) BUCKET (HELO)	1 1
LOOP GALLIANO & PORT FOUCHON, LA TEL: (504) 363-9299 POC: CINDY LEBLANC	COREXIT 9527	45,300		
EXXON USA BAYTOWN, TX TEL: (713) 656-2525 POC: WAYNE ICHEE	COREXIT 9527	41,470		
AIRBORNE SUPPORT INC. BOURGE, LA TEL: (504) 851-6391 POC: HOWARD BARKER			DC-3 DC-4	2 1
910 AIRLIFT WING (ASAFR) VIENNA, OHIO TEL: (216) 392-1111 POC: LTC TERRY BIERY			C-130H (MASS SYS)	1

APPENDIX VI

Technical Product Bulletins

All available technical product bulletins for dispersants on the current EPA product schedule (September 2000) are contained herein. Inclusion of these bulletins in this Region IV Dispersant Policy does not constitute endorsement of these products.

TECHNICAL PRODUCT BULLETIN #D-1
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: MARCH 10, 1978
REVISED LISTING DATE: DECEMBER 18, 1995

"COREXIT 9527"

I. NAME, BRAND, OR TRADEMARK

COREXIT 9527

Type of Product: Dispersant (Concentrate)

II. NAME, ADDRESS AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Nalco/Exxon Energy Chemicals, LP
P.O. Box 87
Sugarland, TX 77487-0087
Phone: (281) 263-7879 (Mr. Marty Utterback)
Phone: (281) 263-7265 (Ms. Marge Walsh)
24-hour Emergency Number: ABASCO at (800) B4 A SPIL
or Nalco/Exxon at (281) 263-7200
Fax Number: (281) 263-7955

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

ABASCO
363 W. Canino Rd.
Houston, TX 77238-8573
Phone: (281) 931-4400

Nalco/Exxon Energy
Chemicals, L.P.
P.O. Box 87
Sugar Land, TX 77487-0087
Phone: (800) 333-3714

Nalco/Exxon Energy
Chemicals L.P.
P.O. Box 220
Long Beach, CA 90801
Phone: (310) 639-1553

Nalco/Exxon Energy
Chemical, L.P.
701 E. Tudor St, # 290
Anchorage, AK 99503
Phone: (907) 563-9866

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

1. Flammability:

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

2. Ventilation:

Avoid prolonged breathing of vapors. Use with ventilation equal to unobstructed outdoors in moderate breeze.
3.Skin and eye contact; protective clothing; treatment in case of contact:

Avoid eye contact. In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention. Avoid contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water, and soap if available. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention. For open systems where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles.

4.a.Maximum storage temperature: 170 F

4.b.Minimum storage temperature: -30 F

4.c.Optimum storage temperature range: 40 F to 100 F

4.d.Temperatures of phase separations and chemical changes:

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

V. SHELF LIFE

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

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

COREXIT 9527 is most effectively applied by aircraft, however, application with boat spray booms, boat fire monitors, and by hand held sprayers and back packs has been successfully done on a number of spills and trials. Aerial Spraying - Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, COREXIT 9527 is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets. Boat Spraying - COREXIT 9527 may be applied by workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Spray equipment designed to provide a five to ten percent diluted dispersant solution to the spray booms can also be used. COREXIT 9527 should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil. Recent tests have indicated that a fire monitor modified with a screen cap for droplet size may also be useful for applying COREXIT 9527. Due to the increased volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time.

System Calibration - Spray systems should be calibrated at temperatures anticipated to insure successful application and dosage control. Refer to Nalco/Exxon Energy Chemicals TECHNIFAX® TX-116 charts for calibrating application systems.

2. Concentration/Application Rate:

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

3. Conditions for Use:

As with all dispersants, timely application ensures the highest degree of success. Early treatment with Corexit 9527, even at reduced treat rates, can reduce the "mousse" forming tendencies of the spilled oil. COREXIT 9527 is useful on oil spills in salt water.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity:

Material Tested	SPECIES	LC50 (ppm)
COREXIT 9527	Menidia beryllina	14.57 96-hr
	Mysidopsis bahia	24.14 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT 9527 & No. 2 Fuel Oil (1:10)	Menidia beryllina	4.49 96-hr
	Mysidopsis bahia	6.60 48-hr
Reference Toxicant (DSS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

2. Effectiveness

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL
VENDOR LAB REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	37.4%
South Louisiana Crude	63.4%
Average of Prudhoe Bay and South Louisiana Crudes	50.4 %

U.S. EPA OFFICE OF RESEARCH AND DEVELOPMENT REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	51%
South Louisiana Crude	31%
Average of Prudhoe Bay and South Louisiana Crudes	41%

EPA is reporting these numbers as an additional reference for On-Scene Coordinators (OSCs). EPA recognizes that large discrepancies may exist between lab results. EPA is currently working on revising the Swirling Flask Dispersant Effectiveness Test to facilitate more consistent results between labs and operators.

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: 162 F

2. Pour Point: Less than -45 F

3. Viscosity:

   60 cst at 60 F
   22 cst at 100 F
   9 cst at 150 F

4. Specific Gravity:

   0.995 at 60 F
   0.975 at 100 F

5. pH: 8.2 (10% in deionized water)

6. Surface Active Agents: CONFIDENTIAL

7. Solvents: Water, Ethylene glycol monobutyl ether

8. Additives: Borate ester

9. Solubility: Not Applicable

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

COMPOUND	CONCENTRATION (ppm)
Aresenic	< 0.005
Cadmium	< 0.01
Chromium	< 1.0
Copper	< 0.2
Lead	< 0.1
Mercury	< 0.003
Nickel	< 0.1
Zinc	0.1
Cyanide	< 0.01
Chlorinated Hydrocarbons	< 0.01

TECHNICAL PRODUCT BULLETIN #D-4
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: APRIL 13, 1994
REVISED LISTING DATE: DECEMBER 18, 1995

"COREXIT 9500"

I. NAME, BRAND, OR TRADEMARK

COREXIT 9500 (EC9500A)

Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Nalco/Exxon Energy Chemicals, LP
P.O. Box 87
Sugar Land, TX 77487-0087
Phone: (281) 263-7879 (Mr. Marty Utterback)
Phone: (281) 263-7265 (Ms. Marge Walsh)
24-hour Emergency Number: ABASCO at (800) B4 A SPIL
or Nalco Exxon at (281) 263-7200
Fax: (281) 263-7955

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

ABASCO
363 W. Camino Road
Houston, TX 77238-8573
Phone: (281) 931-4400

Nalco/Exxon Energy Chemicals, L.P.
P.O. Box 87
Sugar Land, TX 77487-0087
Phone: (800) 333-3714

Nalco/Exxon Energy
Chemicals, L.P.
P.O. Box 220
Long Beach, CA 90801
Phone: (310) 639-1553

Nalco/Exxon Energy
Chemical, L.P.
701 E. Tudor St., #290
Anchorage, AK 99503
Phone: (907) 563-9866

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

1. Flammability:

IMO - Non-flammable; DOT - Non-hazardous.

2. Ventilation:

Use with ventilation equal to unobstructed outdoors in moderate breeze.
3.Skin and eye contact; protective clothing; treatment in case of contact:

Avoid eye contact. In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention. Avoid contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water, and soap if available. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention. For open systems where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles.

4.a.Maximum storage temperature: 170F

4.b.Minimum storage temperature: -30F

4.c.Optimum storage temperature range: 40F to 100F

4.d.Temperatures of phase separations and chemical changes: None

V. SHELF LIFE

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

VI. RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

COREXIT 9500 is a high performance, biodegradable oil spill dispersant concentrate that is effective on a wide range of oils. COREXIT 9500 contains the same surfactants present in COREXIT 9527 and a new improved oleophilic solvent delivery system.

Aerial Spraying - Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, COREXIT 9500 is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets. Boat Spraying - COREXIT 9500 may also be applied by workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Spray equipment designed to provide a five to ten percent diluted dispersant solution to the spray booms can also be used. COREXIT 9500 should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil. Recent tests have indicated that a fire monitor modified with a screen cap for droplet size control may also be useful for applying COREXIT 9500. Due to the increased volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time.

System Calibration - Spray systems should be calibrated at temperatures anticipated to insure successful application and dosage control. Application at sub-freezing temperatures may require larger nozzle, supply lines and orifices due to higher product viscosity. Refer to Nalco/Exxon Energy Chemical's TECHNIFAX® TX-116 charts for calibration information. 2.Concentration/Application Rate:

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

3. Conditions for Use:

As with all dispersants, timely application ensures the highest degree of success. Early treatment with COREXIT 9500, even at reduced treat rates, can also counter the "mousse" forming tendencies of the spilled oil. Thus, with the enhanced penetration capability and emulsion fighting properties, the "window of opportunity" to successfully treat the spill is increased with COREXIT 9500. COREXIT 9500 is useful on oil spills in salt water.

VII.

1. Toxicity

Material Tested	SPECIES	LC50 (ppm)
COREXIT 9500	Menidia beryllina	25.20 96-hr
	Mysidopsis bahia	32.23 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT 9500 & No. 2 Fuel Oil (1:10)	Menidia beryllina	2.61 96-hr
	Mysidopsis bahia	3.4 48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

2. Effectiveness*

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OILS
VENDOR LAB REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	45.3%
South Louisiana Crude	54.7%
Average of Prudhoe Bay and South Louisiana Crudes	50.0 %

U.S. EPA OFFICE OF RESEARCH AND DEVELOPMENT REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	49.4%
South Louisiana Crude	45.4%
Average of Prudhoe Bay and South Louisiana Crudes	47.4%

EPA is reporting these numbers as an additional reference for On-Scene Coordinators (OSCs). EPA recognizes that large discrepancies may exist between lab results. EPA is currently working on revising the Swirling Flask Dispersant Effectiveness Test to facilitate more consistent results between labs and operators.

VIII. PHYSICAL PROPERTIES

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

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

3. Viscosity: 55 cSt (at 68F)

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

5. pH: 6.4

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

7. Surface Active Agents: CONFIDENTIAL

8. Solvents: CONFIDENTIAL

9. Additives: None

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

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

COMPOUND	CONCENTRATION (ppm)
Aresenic	0.16
Cadmium	N/D
Chromium	0.03
Copper	0.10
Lead	N/D
Mercury	N/D
Nickel	N/D
Zinc	N/D
Cyanide	N/D
Chlorinated Hydrocarbons	N/D

N/D = Not detected

TECHNICAL PRODUCT BULLETIN #D-5
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: APRIL 22, 1999
REVISED LISTING DATE:

"DISPERSIT SPC 1000™"

I. NAME, BRAND, OR TRADEMARK

DISPERSIT SPC 1000™

Type of Product: Dispersant (Water Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

U.S. Polychemical Corp.
584 Chestnut Ridge Road
Chestnut Ridge, NY 10977
Phone: (914) 356-5530 (Mr. Robert E. Bergman, Jr. CFO)
Fax Number: (914) 356-6656

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

Maritime Solutions, Inc.
17 Battery Pl. Suite 913
New York, NY 10004
Phone: (212) 747-9044 (Mr. Chris Constantine / Mr. Richard Fredricks)
Fax Number: (212) 747-9240

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

1. Flammability:

IMO: Non-flammable
DOT: Non-hazardous

2. Ventilation:

None normally required. Adequate to maintain fume levels below the TLV.

3. Skin and eye contact:

Avoid prolonged contact with skin and eyes. Flush eyes with plenty of water for at least 15 minutes. Get medical attention. Wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles in case of exposure to mist.

4.a. Maximum storage temperature: 180F

4.b. Minimum storage temperature: -25F

4.c. Optimum storage temperature range: 40F to 140F

4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE

The shelf life of Dispersit SPC 1000™ is unlimited in unopened containers. Containers must be kept closed when not in use to prevent contamination.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

The dispersant may be applied by any conventional methods such as 1) aerial spraying and 2) boat spraying to accommodate weather conditions.

2. Concentration/Application Rate:

A dispersant to oil ratio ranging from 1 part dispersant to 50 parts oil to 1 part dispersant to 10 parts oil; or an application rate of about 2-10 gallons (7.6 liters- 37.9 liters) per acre (4840 square meters) is suggested. These rates will be dependent on the type of oil, degree of weathering, temperature and extent of oil slick.

3. Conditions for Use:

Timely application ensures the highest degree of successful dispersion of the oil spill.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity

Material Tested	SPECIES	LC50 (ppm)
DISPERSIT SPC 1000™	Menidia beryllina	3.5 96-hr
	Mysidopsis bahia	16.6 48-hr
No. 2 Fuel Oil	Menidia beryllina	11.6 96-hr
	Mysidopsis bahia	11.7 48-hr
DISPERSIT SPC 1000™ & No. 2 Fuel Oil (1:10)	Menidia beryllina	7.9 96-hr
	Mysidopsis bahia	8.2 48-hr
Reference Toxicant (SDS)	Menidia beryllina	6.3 96-hr
	Mysidopsis bahia	11.7 48-hr

2. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL
VENDOR LAB REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	40%
South Louisiana Crude	105%
Average of Prudhoe Bay and South Louisiana Crudes	73%

U.S. EPA OFFICE OF RESEARCH AND DEVELOPMENT REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	52%

South Louisiana Crude	49.7%
Average of Prudhoe Bay and South Louisiana Crudes	51%

EPA is reporting these numbers as an additional reference for On-scene Coordinators (OSCs). EPA recognizes that large discrepancies may exist between lab results. EPA is currently working on revising the Swirling Flask Dispersant Effectiveness Test to facilitate more consistent results between labs and operators.

VIII. MIROBIOLOGICAL ANALYSIS

Not applicable

IX. PHYSICAL PROPERTIES

1. Flash Point, ASTM D-56-87: 208F
2. Pour Point, ASTM D-97-87: < -20C
3. Viscosity, ASTM D-445-88: 144CPS, @ 68F
4. Specific Gravity, ASTM D-1298-85(90): 0.995, @ 68F
5. pH, ASTM D-1293-84(90): 10.0
6. Surface Active Agents: Anionic and non-ionic, proprietary, surfactants
7. Solvents: Proprietary, non-petroleum based
8. Additives: None
9. Solubility in Water: Complete

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

COMPOUND	CONCENTRATION (ppm)
Aresenic	< 1.00
Cadmium	< 2.00
Chromium	< 2.00
Copper	< 2.00
Lead	< 1.00
Mercury	< 0.04
Nickel	< 10.00
Zinc	< 2.00
Cyanide	N/D
Chlorinated Hydrocarbons	N/D

TECHNICAL PRODUCT BULLETIN #D-3
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: FEBRUARY 23, 1988
REVISED LISTING DATE: JANUARY 26, 1996

"MARE CLEAN 200"
(formerly Mare Clean 505)

I. NAME, BRAND, OR TRADEMARK

Mare Clean 200

Type of Product: Dispersant (Solvent-Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Taiho Industries Co. Ltd.
21-44, 2-chome, Takanawa
Minatoku, Tokyo, Japan
Phone: (81) 33-445-8111
Fax: (81) 33-443-6333
(Mr. Y. Abe)

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

Klinview Corporation
8001 Irvine Center Drive, Suite 450
Irvine, CA 92718
Phone: (714) 753-0821
Fax: (714) 753-0812
(Mr. T. Tanaka)

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

1. Flammability:

   The flash point is 212 ± 20 F

2. Ventilation:

   Is required. Use in closed room is not recommended.

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

   Use protective goggles to avoid eye contact. In case of eye contact, wash immediately with plenty of water and consult with physician.

4.a. Maximum storage temperature: 122 F

4.b. Minimum storage temperature: 21 F

4.c. Optimum storage temperature range: 32 F to 86 F

4.d. Temperatures of phase separations and chemical changes:

   Phase separation does not relate to temperatures. Chemical changes may occur at temperatures above 194

F.

V. SHELF LIFE

The shelf life of MARE CLEAN 200 is 10 years when stored indoors. (Container will deteriorate before contents.)

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Sprinkle the dispersant on the oil spill, then 5-10 minutes later stir the surface intensively. For convenience, MARE CLEAN 200 may be diluted with water if desired.

2. Concentration/Application Rate:

Use 53-66 gallons of MARE CLEAN 200 per ton of oil

3. Conditions for Use:

The performance of MARE CLEAN 200 is not affected by water salinity. At temperatures below 40 F or in case of heavy crude oil spill, MARE CLEAN 200 should be used without dilution. MARE CLEAN 200 is an effective dispersant for any liquid hydrocarbon.

VII. TOXICITY AND EFFECTIVENESS

1. TOXICITY:

Material Tested	SPECIES	LC50 (ppm)
MARE CLEAN 200	Menidia beryllina	1996 96-hr
	Mysidopsis bahia	938 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
MARE CLEAN 200 & No. 2 Fuel Oil (1:10)	Menidia beryllina	42 96-hr
	Mysidopsis bahia	9.84 48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b.EFFECTIVENESS*

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA AND PRUDHOE BAY CRUDE OILS

Oil	Effectiveness, %
Prudhoe Bay Crude	63.97%
South Louisiana Crude	84.14%
Average of Prudhoe Bay and South Louisiana Crudes	74.06%

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: 212 ± 20 F

2. Pour Point: 14 ± 10 F

3. Viscosity: 2.4 ± 5 cst at 104 F

4. Specific Gravity: 0.95 ± 0.03 at 77 F

5. pH: 7.7 ± 1.0 (10% solution)

6. Surface Active Agents:

   A mixture of sorbitan fatty acid esters, polysorbates, and polyoxyethylene fatty acid esters.

7. Solvents: Paraffinic hydrocarbons (CAS 74664-93-0)

8. Additives: None

9. Solubility: Not applicable

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

COMPOUND	CONCENTRATION (ppm)
Aresenic	< 0.50
Cadmium	< 0.100
Chromium	< 0.500
Copper	< 0.250
Lead	< 2.50
Mercury	< 0.0200
Nickel	< 0.250
Zinc	0.611
Cyanide	< 0.01

TECHNICAL PRODUCT BULLETIN #D-2
USEPA, OIL PROGRAM CENTER
ORIGINAL LISTING DATE: APRIL 22, 1985
REVISED LISTING DATE: JANUARY 26, 1996

"NEOS AB3000"

I. NAME, BRAND, OR TRADEMARK

NEOS AB3000

Type of Product: Dispersant (Hydrocarbon Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

NEOS Company Limited
Daisan Kendai Building
1-2, 3-chome Isobedori
Chuo-ku, Kobe, 651-0084 Japan
Phone: Kobe 078-331-9384
Telex: 5622293 JKNEOS J
Fax: Kobe 078-272-4649
(Mr. T. Ishii, Manager)

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

NEOS Company Limited
Daisan Kendai Building
1-2, 3-chome Isobedori
Chuo-ku, Kobe, Japan
Phone: Kobe 078-331-9381
Telex: 5622293 JKNEOS J
Fax: Kobe 078-272-4649

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

1. Flammability:

NEOS AB3000 is flammable; keep away from open flame.

2. Ventilation:

Special ventilation is not required; however, natural ventilation is recommended.

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

Contact may cause skin and eye irritation. Goggles and rubber clothing are recommended during application. In case of contact with skin or eye, flush with copious amounts of fresh water. If severe, consult a doctor.

4.a. Maximum storage temperature: 158 F

4.b. Minimum storage temperature: 32 F

4.c. Optimum storage temperature range: 50 to 140 F

4.d. Temperatures of phase separations and chemical changes:

Phase separation and chemical changes do not appear between the temperature range of 32 to 158 F.

V. SHELF LIFE

The shelf life is five (5) years.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Spray neat concentrate on the oil slick in atomized form by means of a manual pump, or spray with a pump system incorporating an ejector system for drawing concentrate from the drum or stock tank. For aerial application, use a spray boom with pressure nozzles or rotating atomizers mounted on helicopters or airplanes.

2. Concentration/Application Rate:

The application rate is 65 gallons of dispersant per ton of oil. Five (5) to fifteen (15) parts of dispersant to suctioned water is recommended for ejector systems. For aerial application, 75 to 125 gallons per ton of oil is recommended.

3. Conditions for Use:

NEOS AB3000 can be used for both fresh and sea water. It is effective with crude and residual heavy oil. The dispersant is also effective at controlling volatile emissions from the oil.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	SPECIES	LC50 (ppm)
NEOS AB3000	Menidia beryllina	91.1 96-hr
	Mysidopsis bahia	33. 48-hr
No. 2 Fuel Oil	Menidia beryllina	201.8 96-hr
	Mysidopsis bahia	11.5 48-hr
NEOS AB3000 & No. 2 Fuel Oil (1:10)	Menidia beryllina	57. 96-hr
	Mysidopsis bahia	25. 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.5 96-hr
	Mysidopsis bahia	9.3 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b.EFFECTIVENESS*

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness, %
Prudhoe Bay Crude	19.7 %
South Louisiana Crude	89.8 %

Average of Prudhoe Bay and South Louisiana Crudes 54.8 %

VIII. MICROBIOLOGICAL ANALYSIS

Not Applicable

IX. PHYSICAL PROPERTIES

1. Flash Point: No flash point to 212 F
2. Pour Point: Less than 32 F
3. Viscosity: 30.7 cSt at 104 F
4. Specific Gravity: 0.924 at 59 F
5. pH: 8.0 (5wt % aq., at 77 F)
6. Surface Active Agents: Nonionic and Cationic surfactants
7. Solvents: Paraffins
8. Additives: None
9. Solubility: Not Applicable

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

COMPOUND	CONCENTRATION (ppm)
Aresenic	< 0.1
Cadmium	< 0.1
Chromium	0.26
Copper	< 0.05
Lead	0.21
Mercury	< 0.001
Nickel	0.076
Zinc	1.1
Cyanide	< 0.05
Chlorinated Hydrocarbons	< 0.10

APPENDIX VII

Dispersant Use Decision Elements and Documentation/Application Forms

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

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

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

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

DISPERSANT USE DECISION ELEMENTS

1. Is The Product Dispersible?

Obviously, this question will be much easier to answer if responders know specifically what product was spilled.

Dispersability will be affected by several factors. Firstly, the API Gravity, (or density) of the oil must be considered. Generally, if API Gravity is 17 or above then the oil may be dispersible. Oil or products with an API Gravity above 45 are dispersible; however, because they evaporate rapidly they are generally not dispersed. One must be aware, however, that if, for example, 20,000 bbls of an oil with an API of 45 is spilled, 66% may evaporate, but there is still about 7,000 bbls that could affect sensitive environments.
Viscosity of the oil will also impact its dispersability. Generally, an oil must have a viscosity of less than 5,000-10,000 centistokes to be effectively dispersed.

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

- API Gravity is more than 17.
- Pour point is less than 10 F (5.5 C) below ambient temperature
- Viscosity is less than 10,000 centistokes
- The following Tables may also prove helpful in determining an oil's dispersability: Tables 1 and 2.

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

This is perhaps the most difficult question to be answered in the dispersant-use decision-making process. Further information on weighing the environmental advantages versus disadvantages of using oil spill dispersants is available in Appendix V: "Biological Assessment of Dispersant Toxicity".

3. Is The Chosen Dispersant Likely To Be Effective?

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

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

TABLE #1 SPECIFIC FRESH OIL DISPERSABILITY

CRUDE	SEA TEMPERATURE, DEG. F. 45-55	55-65	65-75	> 75
ALASKAN	YES	YES	YES	YES
ALGERIAN BLEND	YES	YES	YES	YES
ALGERIAN CONDENSATE	YES	YES	YES	YES
ARABIAN LIGHT	YES	YES	YES	YES
ARABIAN MEDIUM	YES	YES	YES	YES
ARABIAN HEAVY	YES	YES	YES	YES
ARDJUNA	NO	NO	NO	YES
ARUN CONDENSATE	YES	YES	YES	YES
ATTAKA/BEDAK	YES	YES	YES	YES
BASRAH	YES	YES	YES	YES
BASS STRAIT/OTHER	NO	NO	YES	YES
BCF13	NO	NO	NO	NO
BCF17	NO	NO	YES	YES
BCF22	YES	YES	YES	YES
BEATRICE	NO	YES	YES	YES
BEKAPAI	YES	YES	YES	YES
BERRI	YES	YES	YES	YES
BOMBAY HIGH	NO	NO	NO	NO
BONNY LIGHT	NO	NO	YES	YES
BONNY MEDIUM	YES	YES	YES	YES
BOSCAN	NO	NO	NO	NO
BRASS RIVER	YES	YES	YES	YES
BRENT	YES	YES	YES	YES
CABINDA	NO	NO	YES	YES
CAMAR	NO	NO	NO	NO
CEUTA	YES	YES	YES	YES
COBAN BLEND	NO	YES	YES	YES
DJENO BLEND	YES	YES	YES	YES
DUBAI	YES	YES	YES	YES
EKOFISK	YES	YES	YES	YES
ERAWAN CONDENSATE	YES	YES	YES	YES
ESCRAVOS	YES	YES	YES	YES
ESPOIR	YES	YES	YES	YES
FLOTTA	YES	YES	YES	YES
FORCADOS	YES	YES	YES	YES
FORTIES	YES	YES	YES	YES
GALEOTA MIX	YES	YES	YES	YES
GAMBA	NO	NO	NO	YES

CRUDE	SEA TEMPERATURE, DEG. F. 45-55	55-65	65-75	> 75
GULF OF SUEZ	YES	YES	YES	YES
HANDIL	NO	NO	NO	NO
IRANIAN LIGHT	YES	YES	YES	YES
IRANIAN HEAVY	YES	YES	YES	YES
ISTHMUS	YES	YES	YES	YES
ISTHMUS/MAYA BLEND	YES	YES	YES	YES
JOBO	NO	NO	NO	NO
KHAFJI	YES	YES	YES	YES
KIRKUK	YES	YES	YES	YES
KOLE	YES	YES	YES	YES
KUWAIT	YES	YES	YES	YES
LAGUNA	NO	NO	NO	NO
LAGUNILLAS	NO	NO	NO	YES
LALANG	YES	YES	YES	YES
LORETO	YES	YES	YES	YES
LSWR	NO	NO	NO	NO
LUCINA	NO	YES	YES	YES
MANDJI	YES	YES	YES	YES
MARGHAM	YES	YES	YES	YES
MAYA	YES	YES	YES	YES
MENEMOTA	YES	YES	YES	YES
MEREY	NO	NO	YES	YES
MINAS	NO	NO	NO	NO
MORICHAL	NO	NO	NO	YES
MURBAN	YES	YES	YES	YES
NIGERIAN MEDIUM	YES	YES	YES	YES
NINIAN	YES	YES	YES	YES
OMAN	YES	YES	YES	YES
OQUENDJO	YES	YES	YES	YES
ORIENTE	YES	YES	YES	YES
PALANCA	NO	YES	YES	YES
PENNINGTON	NO	YES	YES	YES
PILON	NO	NO	NO	NO
PLATFORM B, TRINIDAD	NO	YES	YES	YES
QUA IBO	NO	YES	YES	YES
SAHARAN BLEND	YES	YES	YES	YES
SANTA CRUZ	NO	NO	NO	NO
SANTA ROSA CONDENSATE	YES	YES	YES	YES

CRUDE	SEA TEMPERATURE, DEG. F. 45-55	55-65	65-75	> 75
SEPINGGAN	YES	YES	YES	YES
SERIA LIGHT	YES	YES	YES	YES
SHARJAH	YES	YES	YES	YES
SHARJAH CONDENSATE	YES	YES	YES	YES
SHENGLI	NO	NO	NO	YES
SOYO BLEND	NO	NO	YES	YES
STATFJORD, NORWAY	YES	YES	YES	YES
STATFJORD, U.K.	YES	YES	YES	YES
SUEZ MIX	YES	YES	YES	YES
TACHING	NO	NO	NO	NO

CRUDE	SEA TEMPERATURE, DEG. F. 45-55	55-65	65-75	> 75
TAKULA	YES	YES	YES	YES
TAPIS	YES	YES	YES	YES
TIA JUANA MEDIUM	YES	YES	YES	YES
TRINIDAD	NO	YES	YES	YES
UMM SHAIF	YES	YES	YES	YES
VENEZUELA MIX	YES	YES	YES	YES
ZAIRE	NO	NO	NO	NO
ZAKUM	YES	YES	YES	YES
ZARZAITINE	YES	YES	YES	YES

GULF OF MEXICO CRUDE	45-55	55-65	65-75	> 75
BAY MARCHAND	YES	YES	YES	YES
EAST CAMERON	YES	YES	YES	YES
EASE COTE BLANCHE BAY	NO	NO	YES	YES
EAST EMPIRE	NO	YES	YES	YES
EUGENE ISLAND	YES	YES	YES	YES
HACKBERRY	YES	YES	YES	YES
LOCKHART TUSCALOOSA	YES	YES	YES	YES
LOCKHART WILCOX	YES	YES	YES	YES
MAIN PASS	YES	YES	YES	YES
MISSISSIPPI CANYON	YES	YES	YES	YES
PORT HUDSON	YES	YES	YES	YES
REDFISH POINT	YES	YES	YES	YES
SHIP SHOAL	YES	YES	YES	YES

GULF OF MEXICO CRUDE	45-55	55-65	65-75	> 75
SOUTH MARSH ISLAND	NO	YES	YES	YES
SOUTH MARCH ISL. BLK 107	YES	YES	YES	YES
SOUTH PECAN LAKE	YES	YES	YES	YES
SOUTH PASS	YES	YES	YES	YES
SOUTH TIMBALIER	YES	YES	YES	YES
SOUTHWEST PASS	YES	YES	YES	YES
TURTLE BAYOU	YES	YES	YES	YES
VERMILLION	YES	YES	YES	YES
VERMILLION BLK 56/57	NO	YES	YES	YES
WEST CAMERON BLK 118	NO	YES	YES	YES
WEST CAMERON BLK 265	NO	NO	YES	YES
WEST DELTA	YES	YES	YES	YES
WEST EMPIRE	NO	YES	YES	YES

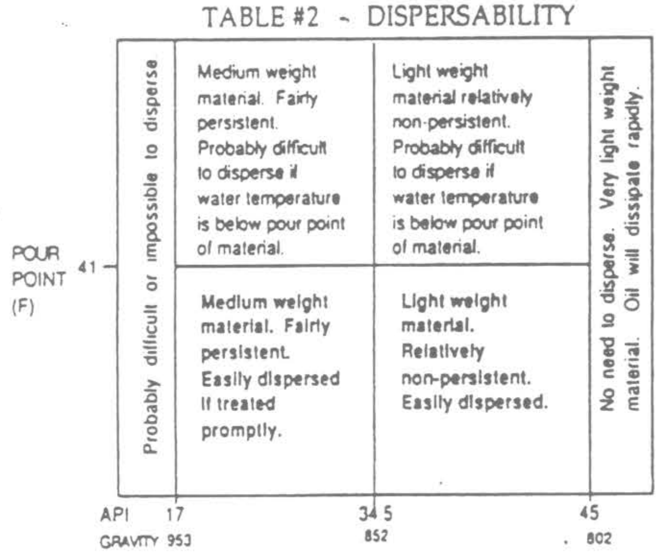
REFINED PRODUCTS	45-55	55-65	65-75	> 75
ASPHALT	NO	NO	NO	NO
DIESEL	YES	YES	YES	YES
DISTILLATE	YES	YES	YES	YES
GASOLINE	YES	YES	YES	YES
JET FUEL	YES	YES	YES	YES
LUBE OIL	NO	NO	NO	NO

REFINED PRODUCTS	45-55	55-65	65-75	> 75
NAPHTHA	YES	YES	YES	YES
NO. 2 FUEL OIL	YES	YES	YES	YES
PARAFFINS/WAXES	NO	NO	NO	NO
RESIDUAL FUELS/BUNKERS	NO	NO	NO	NO
SOLVENT	YES	YES	YES	YES
UNFINISHED OIL	NO	NO	YES	YES

TABLE #1 is from the Region VI, Regional Contingency Plan, Subpart H, "Authorization for the Use of Dispersants in Non-life Threatening Situations", approved February 10, 1988 by RRT 6

GENERAL DISPERSABILITY RELATIVE TO API AND POUR POINT

TABLE #2 - DISPERSABILITY



Derived from information published by the International Tanker Owners Pollution Federation, Ltd., London (API 1986)

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

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

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

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

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

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

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

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

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

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

- **Wind Speed**: Winds should be less than or equal to 25 knots.

- **Visibility**: Visibility should be greater than or equal to 3 miles.

- **Ceiling**: There should be a ceiling greater than or equal to 1000 feet.

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

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

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

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

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

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

Appendix I contains maps indicating the areas of pre-approval for dispersant use. These areas include waters that are:

- Outside of state jurisdiction; and
- at least three miles from any shoreline; and
- at least 10 meters in depth.

Additionally, dispersant use is not pre-approved if:

- The waters fall under State, or special federal management jurisdiction. This includes any waters designated as marine reserves, National Marine Sanctuaries, National or State Wildlife Refuges, units of the National Park Service, or proposed or designated Critical Habitats, and/or;

- The waters are in mangrove or coastal wetland ecosystems, or directly over coral reefs, which are in less than 10 m of water. Coastal wetlands include submerged algal beds and submerged seagrass beds.

Dispersant use in non pre-approved areas must be requested by the OSC and approved by EPA, and the affected state(s) after consultation with DOC and DOI.

Further information on the description of pre-approved areas can be found in the RRT IV Dispersant Use Policy and LOAs promulgated for use of dispersants within State waters.

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

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

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

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

DISPERSANT / APPLICATION FORM FOR DISPERSANT USE

Name of the Spill Incident: ______________________________

Responsible Party (if known): ______________________________

Date and Time of the Spill Incident: ______________________________

I. OIL TYPE:

1. **Spilled oil/substance name (if known):** ______________________________
2. **Viscosity:** ______________________________
3. **API Gravity:** ______________________________
4. **Pour Point:** ______________________________
5. **Percent Evaporation in: 24 Hours -** ______________________________
   48 Hours - ______________________________
6. **Did oil emulsify within the operational period?** ______________________________

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

II. ENVIRONMENTAL CONDITIONS:

1. **Wind Speed:** ______________________________
2. **Wind Direction:** ______________________________
3. **Visibility:** ______________________________
4. **Ceiling:** ______________________________
5.

III. DESCRIPTION OF SPILL INCIDENT AND SPILL SITE:

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

____

IV. DESCRIPTION OF AREA OVER WHICH DISPERSANTS WERE APPLIED:

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

V. AVAILABILITY OF PERSONNEL AND EQUIPMENT:

1. **Availability of Application and Spotter Aircraft/Vessel:** ______________________________

   Source: ______________________________

   Point of Contact: ______________________________

   Type: ______________________________

   Travel Time to Spill: ______________________________

2. **Type of Aircraft/Vessel Used:** ______________________________
3. **Aircraft/Vessel's Dispersant Load Capability:** ______________________________
4. **Availability of Qualified Personnel:** ______________________________

   Source: ______________________________

   Point of Contact: ______________________________

   Travel Time to Spill: ______________________________

5. **Time Required for Delivery to the Aircraft Staging Area:** ______________________________

VI INFORMATION ON DISPERSANT PRODUCT:

1. **Name of Dispersant:** ______________________________
2. **Manufacturer:** ______________________________
3. **Amount Available:** ______________________________

4. Source: ____

**** A Material Safety Data Sheet of the Product Should Be Attached Here.**

VII. IMPLEMENTATION OF RECOMMENDED MONITORING PROTOCOLS:

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

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

APPENDIX VIII

Dispersant Use Operational Planning and Implementation Guidance

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

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

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

Appendix Format.

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

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

Implementation.

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

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

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

Procedure. On Scene Coordinators (OSCs) are encouraged to use this guidance to standardize the planning and implementation of dispersant use.

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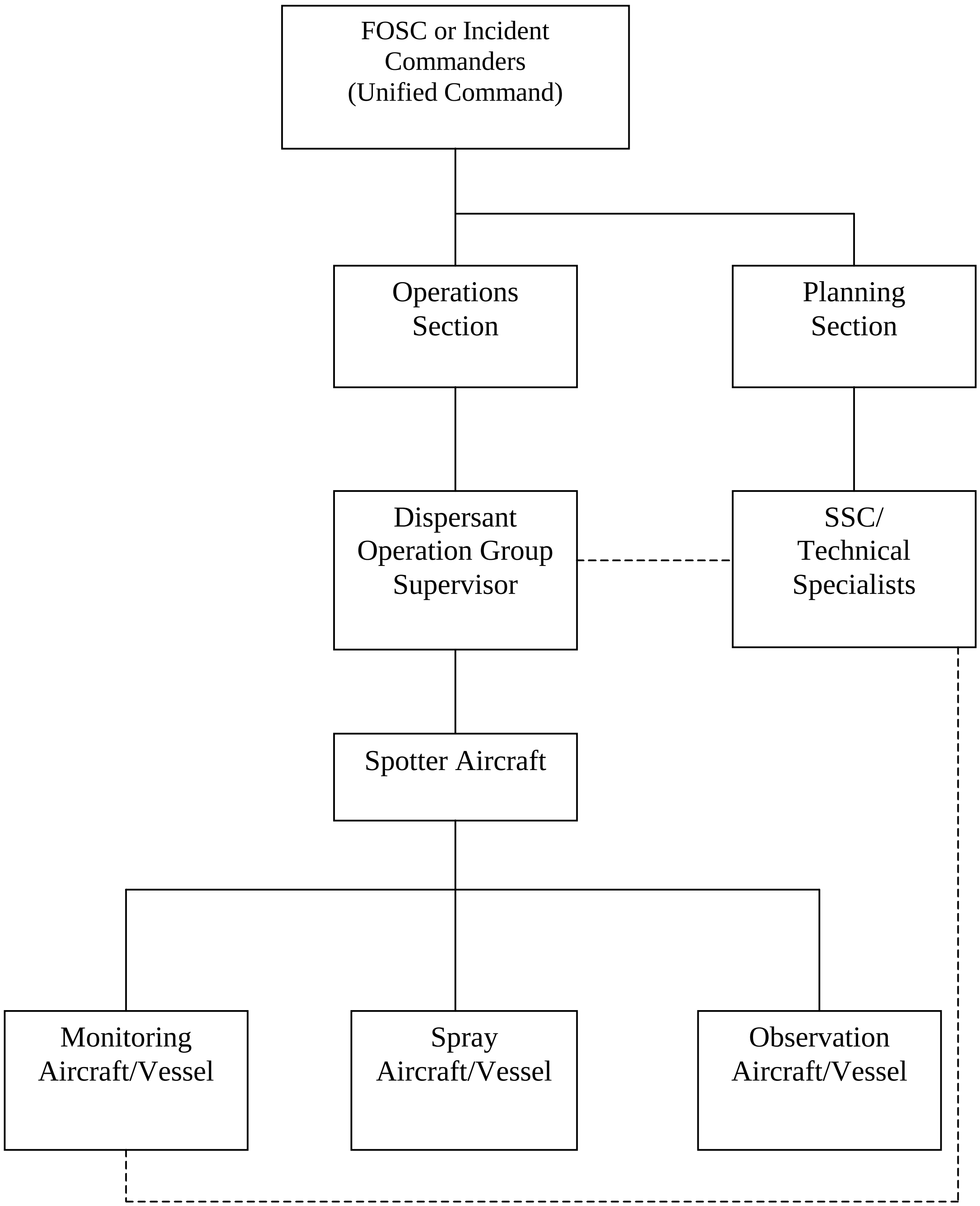
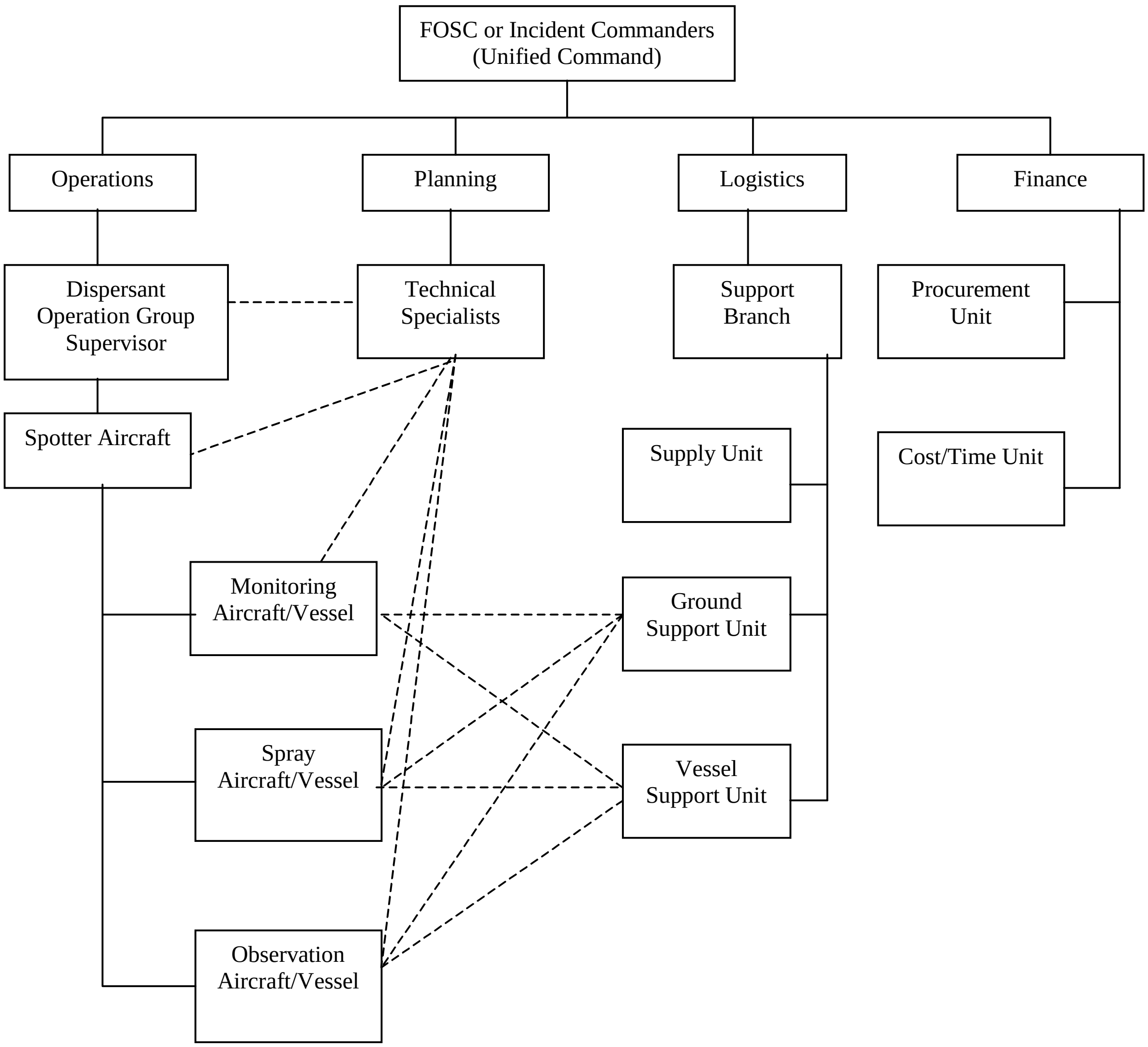
ICS ORGANIZATION CHART FOR DISPERSANT USE



ICS DISPERSANT USE ORGANIZATIONAL RELATIONSHIPS



NOTES:

1. **The dotted lines above depict the cross-functional relationships between Operations, Planning, and Logistics to successfully implement dispersant activities.**

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

DISPERSANT USE DECISION / IMPLEMENTATION

ELEMENT CHECKLIST

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

YES	NO	DECISION ELEMENT
		1. Is the spill/oil dispersible?

Oil is generally dispersible if:
- API Gravity is more than 17
- Pour Point is less than 10 F (5.5 C) below ambient temperature
- Viscosity is less than 10,000 centistokes

Note: Some modern dispersants may be formulated to be effective on a wider range of oil properties. The choices of dispersants listed on the NCP's National Product Schedule are limited. To answer this question you should look at which dispersant would the most effective given the type of oil.

YES	NO	
		2. Have environmental tradeoffs of dispersant use indicated that use should be considered ?

Note: This is one of the more difficult questions. Dispersant toxicity assessment information found in Appendix V of the RRT pre-approval agreement may assist in this decision.

YES	NO	
		3. Is the chosen dispersant likely to be effective?

Consider:

* effectivenss of dispersant application to the oil;
* dispersant-to-oil application ratio;
* oil slick thickness;
* distribution of oil slick on the water;
* droplet size distribution in aerial spray;
* oil viscosity;
* energy input;
* suspended particles in water (sedimentation);
* weathering of oil;
* emulsification of oil;
* oil composition;
* dispersant composition;
* water salinity; and
* temperature.
* dispersant type compatible with application means

Note: A preliminary effectiveness test such as the standard flask swirling method is highly recommended.

DISPERSANT USE DECISION / IMPLEMENTATION

ELEMENT CHECKLIST (cont.)

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

YES	NO	DECISION ELEMENT
		4. Can dispersant application be conducted safely and effectively given the physical environment?

Environmental parameters:

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

YES	NO	
		5. Are sufficient equipment and personnel available to conduct aerial dispersant application operations within the window of opportunity?

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

YES	NO	
		6. Has a Site Safety Plan for dispersant operations been completed?

YES	NO	
		7. Is the spill/oil to be dispersed within a Pre-Approved Zone?

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

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

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

Dispersant use in non-approved areas must be requested by the OSC and approved by EPA and the affected state(s) after consultation with DOC and DOI.

DISPERSANT USE DECISION / IMPLEMENTATION

ELEMENT CHECKLIST (cont.)

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

YES	NO	DECISION ELEMENT
		8. Are the necessary equipment and trained personnel available to conduct the recommended monitoring operations?

The recommended monitoring protocol in the RRT Region IV is the Special Monitoring for Advanced Response Technologies or SMART. The Gulf Strike Team or Atlantic Strike Team is available to support and provide monitoring assistance.

It may not be appropriate to base Go/No Go or continue/discontinue decisions solely on results from the SMART monitoring team since dispersant effectiveness is often delayed or not totally and easily conclusive.

Monitoring is recommended but not strictly required…should not be a showstopper for operation.

YES	NO	
		9. Has the overflight to assure that endangered species are not in the application area been conducted?

The provisions of the Section 7 consultation in regard to the RRT Pre-Approval Agreement requires an overflight of the application area to ensure endangered species are not threatened or endangered by the operation.

YES	NO	
		10. Has a Dispersant Operations Plan been completed?

Attached within this plan is a Dispersant Operations Plan template. The completion of this template should provide the OSC and Unified Command with a suitable and complete plan to support and implement the dispersant effort.

DISPERSANT APPLICATION PLATFORM CAPABILITY DECISION MATRIX****

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

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

DISPERSANT APPLICATION PLATFORM CAPABILITY DECISION

MATRIX NOTES

NOTES:

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

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

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

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

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

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

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

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

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

(10) May be good for surgical treatment of the slick’s leading edge and thickest portions of the slick. Calibration and delivery rate may be difficult to control.

DISPERSANT APPLICATION OPERATIONAL FEASIBILITY FORM

1. Key Operational Factors

a. *Weather*

Wind	**OK**	**Not OK**
Visibility	**OK**	**Not OK**
Clearance	**OK**	**Not OK**

b. *Window of Opportunity*		hrs
c. *Daylight Hours Remaining*		hrs
d. *Enter Smallest Window*		hrs

e. *Platform Data*

Type:

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

f. *Spotter Data*

Type Platform:			
Transit Speed:			Knots

2. Spill Stats

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

3. Resource Locations and Distances

	Location	Distance to Staging Area	Transportation Unit
Staging Area			
Dispersant			
In Product Schedule?	**Yes** / **No**		
Amount	**Gals**		
Platform Location			
Dispersant Location			
Application System Location			
Spotter Location			

4. Time To Get Systems Ready (hrs)

	Stockpile	Platform	Application	Spotter
Personnel Recall				
Loading/Transport to Staging Area				
Totals				
Loading of Stockpile				
Loading of Application System				
Enter Total Time for Ready System				
Enter Slowest Transport Speed (kn)				
Time to Arrive at Treatment Area				
Time for Positioning				
Total Time to Application				
Amount of Window Time Left				
Time Remaining After Stockpile Use				
Return, Reload, Back O/S Time				
Amount of Window Time Left				

DISPERSANT OPERATION PLAN CHECKLIST

(Completed by Dispersant Operations Group Supervisor)

GENERAL

- ☐ **Incident Name:** ______________________________
- ☐ **Vessel or Facility Name:** ______________________________
- ☐ **Date/Time Spill Occurred:** ______________________________
- ☐ **Location of the Spill:** ______________ **LAT** __________ **LONG** __________
- ☐ **Amount/Type of Oil Spilled:** ______________ / ______________
- ☐ **Dispersant Type:** ______________________________

WEATHER ON SCENE

- ☐ **Wind Speed and Direction:** ______________________________
- ☐ **Visibility & Precipitation:** ______________________________
- ☐ **Sea State:** ______________________________
- ☐ **Ceiling:** ______________________________

DISPERSANT USE PRE-BRIEF - PLATFORM ASSIGNMENTS:

	TITLE	PLATFORM/PERSONNEL NAMES	TACTICAL CALL SIGN	ETD TO SITE	ETA TO SITE
☐	Spotter(s)	______	______	______	______
☐	Sprayer(s)	______	______	______	______
☐	Observer(s)	______	______	______	______
☐	Monitor(s)	______	______	______	______

PLATFORM ASSIGNMENTS / IDENTIFICATION OF OPERATIONAL AREA BOUNDARIES :

	TITLE	AIRCRAFT DESIGNATOR	LAT	LONG	ALTITUDE
☐	ENTRY:	______	______	______	______
☐	EXIT:	______	______	______	______
☐	SPILL SITE:	______	______	______	______

- ☐ **LOCATION OF OPERATIONAL AREA:** ______________________________
  (Attach Map, GPS Coordinates, etc.)

DISPERSANT OPERATION PLAN CHECKLIST

(Completed by Dispersant Operations Group Supervisor)

AIRCRAFT SEPARATION ALTITUDES:

	AIRCRAFT/CALL SIGN	SPRAY ALTITUDE	OPERATIONS ALTITUDE
☐ Spotter	____________	______N/A_______	____________
☐ Sprayer	____________	____________	____________
☐ Observer	____________	______N/A_______	____________
☐ Sprayer	____________	____________	____________

DISPERSANT INFORMATION:

- ☐ Dispersant Name: ______________________________
- ☐ Source of Dispersant: ______________________________
- ☐ Application Rate per Sortie: _______gal/acre Number of Sorties Planned: ___________
- ☐ Total Amount of Dispersant to be Used per Sortie: ______________________________
- ☐ Sprayer Platform: _______________ _______________ _______________
- ☐ Swath Width: ___________(ft) _____________(ft) ______________(ft)

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

☐ Air to Air:	VHF____________	UHF____________	Other____________
☐ Air to Vessel:	VHF____________	UHF____________	Other____________
☐ Air to Ground:	VHF____________	UHF____________	Other____________
☐ Ground to Vessel:	VHF____________	UHF____________	Other____________
☐ Vessel to Vessel:	VHF____________	UHF____________	Other____________

POST DISPERSANT USE INFORMATION (Fill Out For Each Sortie)

	SORTIE 1	2	3
☐ Total Amount of Dispersant Used:	__________	__________	__________
☐ Time Dispersant Application Began:	__________	__________	__________
☐ Time Dispersant Application Ended:	__________	__________	__________
☐ Number of Passes Per Sortie:	__________	__________	__________

DISPERSANT OPERATION PLAN CHECKLIST

(Completed or used by all personnel within Dispersant Group if applicable)

OBSERVATIONS:

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

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

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

Did the dispersant operation follow the approved Dispersant Operations Plan?

What problems were encountered?

What recommendations would you make?

OTHER:

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

DISPERSANT EFFECTIVENESS MONITORING AERIAL CHECKLIST

(Completed by Dispersant Op Monitoring Team)

GENERAL:

- ☐ **Incident Name:** ____________________
- ☐ **Vessel or Facility Name:** ____________________
- ☐ **Date/Time Spill Occurred:** ____________________
- ☐ **Location of the Spill:** ______________**LAT**__________**LONG**__________
- ☐ **Amount/Type of Oil Spilled:** ______________/______________
- ☐ **Dispersant Type:** ____________________

OBSERVATIONS:

- ☐ **What immediately happened when the dispersant contacted the spill?** ____________________

After 2 Hours: ____________________
After 6 Hours: ____________________
After 24 Hours (if applicable): ____________________

- ☐ **Submerged cloud observed? Yes/No**
- ☐ **Number of Passes/Sortie: (1)________ (2)________ (3)________ Total________**
- ☐ **Did any oil resurface? Yes/No**
- ☐ **Effects On Floating Oil, Biota, Sea Color, Wave Pattern, or Other Physical Features:** ____________________
- ☐ **Extent of Application/Acres of Oil Sprayed:** ____________________
- ☐ **Approximate Percent of Overspray:** ____________%

PHOTOGRAPHY:

- ☐ **Color photos taken? Yes/No** **Written notes made for photos? Yes/No**
- ☐ **If videotape of the operation is taken, obtain a copy.**
- ☐ **If AIREYE and/or HIRR/IR is used, obtain a copy of the film, tape, or digital imagery.**
- ☐ **Monitoring Team Leader reports data to the Scientific Support Coordinator after each sortie.**

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

DISPERSANT EFFECTIVENESS MONITORING WATERBORNE CHECKLIST

(Completed by Dispersant Op Monitoring Team)

GENERAL:

- ☐ **Incident Name:** ______________________________
- ☐ **Vessel or Facility Name:** ______________________________
- ☐ **Date/Time Spill Occurred:** ______________________________
- ☐ **Location of the Spill:** ______________ **LAT** __________ **LONG** __________
- ☐ **Amount/Type of Oil Spilled:** ______________ / ______________
- ☐ **Dispersant Type:** ______________________________

FLOUROMETRY / SAMPLING :

- ☐ **Monitoring Platform Identified? Name:** ______________ **Location:** ______________
  ETD: __________ **ETA:** __________ **(To Spill Site)**

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

- ☐ **Take Background Flourescence Readings**
- ☐ **Record Transect Readings After the Dispersants are Applied**
- ☐ **Was an oil/dispersant /water sample collected? Yes** _____ **No** _______
- ☐ **If Yes, Label and Record the Following:**

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

- ☐ **Report Information to Monitoring Team Leader**

DEBRIEF:

Did the dispersant operation follow the approved plan? ______________________________

____

What problems were encountered? ______________________________

____

What recommendations would you make? ______________________________

____

DISPERSANT GROUP PERSONNEL SHOULD PROVIDE FEEDBACK TO DISPERSANT OPERATION GROUP SUPERVISOR

DISPERSANT APPLICATION LOGISTICS AND SUPPORT CHECKLIST

(Completed by Dispersant Operations Group Supervisor)

Personnel: (Note: A person can hold more than one functional position especially within the Unified Command Post and depending on the platform resources deployed)

- ◯ Incident Commander
- ◯ Operations Section Chief
- ◯ Dispersant Operations Group Supervisor
- ◯ Spotter
- ◯ Sprayer
- ◯ Effectiveness Monitor
- ◯ Operations Observer
- ◯ Planning Section Chief
- ◯ Technical Specialists (SSC)
- ◯ Logistics Section Chief
- ◯ Support Branch Chief
- ◯ Supply Unit Leader
- ◯ Ground Support Unit Leader
- ◯ Vessel/Air Support Unit Leader
- ◯ Finance Section Chief
- ◯ Procurement Unit Leader
- ◯ Cost/Time Unit Leader

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

- ◯ Spotter Aircraft
- ◯ Spray Aircraft or Vessel (various)

Spray Aircraft Types:

- Helicopter (various)
- C-130 Hercules
- DC-4
- DC-6B

- DC-3, Fokker F-27, or Canadair CL-215
- Agriculture Spray Planes: Piper Pawnee, Cessna Agtruck, Ayres Thrush, Turbo Thrush
- Air Tractor 801

◯ Camera (film and digital)

◯ Video Camera

◯ Infrared Camera

◯ Binoculars

◯ GPS Equipment

Materials:

◯ Proper Quantity of Desired Dispersant (for initial and subsequent applications)

◯ Functional Position Job Aids and Checklists

- Dispersant Operation Group Supervisor
- Spotter
- Sprayer
- Monitor
- Observer
- Common ICS Responsibilities

◯ Checklists, Log, and Reporting Forms (Sprayer, Observer, etc.)

◯ Dispersant Operation Plan

- Dispersant Operation Plan Checklist
- Dispersant Effectiveness Monitoring Aerial Checklist
- Dispersant Effectiveness Monitoring Waterborne Checklist
- RRT Documentation/Application Form for Dispersant Use (if considering non-approved area)

◯ Basemaps / Charts of the Area

◯ Site Safety Plan Items:

- Monitoring Equipment (e.g. O2/Combustible Gas Meter, WBGT/Heat Stress, H2S Monitor, etc.)
- Personal Flotation Device
- Emergency Locator Beacon
- Survival Equipment
- NOMEX Coveralls (if available)
- Cold Water Flotation Suit (if applicable)
- Level D and Level C PPE Equipment (where applicable)
- Communications Equipment

◯ Administrative Supplies (e.g. pencils/pens, note pads, etc.)

DISPERSANT / APPLICATION FORM FROM REGION IV RRT DISPERSANT PRE-APPROVAL POLICY (Submit to RRT)

(Use to document information in pre-approved zones and request use in non-pre-approved zones)

Name of the Spill Incident: ______________________________

Responsible Party (if known): ______________________________

FOSC / POC (name & Phone #): ______________________________

Date and Time of the Spill Incident: ______________________________

I. OIL TYPE:

1. **Spilled oil/substance name (if known):** ______________________________
2. **Viscosity:** ______________________________
3. **API Gravity:** ______________________________
4. **Pour Point:** ______________________________
5. **Percent Evaporation in: 24 Hours -** ______________________________
   48 Hours - ______________________________
6. **Did oil emulsify within the operational period?** ______________________________

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

II. ENVIRONMENTAL CONDITIONS:

1. **Wind Speed:** ______________________________
2. **Wind Direction:** ______________________________
3. **Visibility:** ______________________________
4. **Ceiling:** ______________________________

III. DESCRIPTION OF SPILL INCIDENT AND SPILL SITE:

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

____

____

____

____

____

DISPERSANT / APPLICATION FORM FROM REGION IV RRT DISPERSANT PRE-APPROVAL POLICY (Submit to RRT)

IV. DESCRIPTION OF AREA OVER WHICH DISPERSANTS WERE APPLIED:

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

V. AVAILABILITY OF PERSONNEL AND EQUIPMENT:

1. **Availability of Application and Spotter Aircraft/Vessel:** ______________________________

   Source: ______________________________

   Point of Contact: ______________________________

   Type: ______________________________

   Travel Time to Spill: ______________________________

2. **Type of Aircraft/Vessel Used:** ______________________________
3. **Aircraft/Vessel's Dispersant Load Capability:** ______________________________
4. **Availability of Qualified Personnel:** ______________________________

   Source: ______________________________

   Point of Contact: ______________________________

   Travel Time to Spill: ______________________________

5. **Time Required for Delivery to the Aircraft Staging Area:** ______________________________

VI INFORMATION ON DISPERSANT PRODUCT:

1. **Name of Dispersant:** ______________________________
2. **Manufacturer:** ______________________________
3. **Amount Available:** ______________________________
4. **Source:** ______________________________

**** A Material Safety Data Sheet of the Product Should Be Attached Here.**

DISPERSANT / APPLICATION FORM FROM REGION IV RRT DISPERSANT PRE-APPROVAL POLICY (Submit to RRT)

VII. IMPLEMENTATION OF RECOMMENDED MONITORING PROTOCOLS:

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

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

INCIDENT COMMAND FUNCTIONAL CHECKLISTS

FOR DISPERSANT USE

DISPERSANT OPERATION GROUP SUPERVISOR

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

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

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

- Comply with the dispersant use planning protocols for the RRT region including completing of any checklist, consultations, and dissemination of required information to the RRT or others.
- Continue other countermeasures and operations as appropriate while waiting for dispersants or in conjunction with dispersant use.
- Treat thickest part of the slick as the priority.
- Consider using a tiered response plan (e.g. most available response means fist while waiting for more desirable response equipment). For example, start dispersant treatment with vessels and fire monitors or helicopters with a spray bucket until larger platforms, such as a C-130, arrive.
- Determine the relationship between the RP and the government's implementation of the Dispersant Operations Group Supervisor responsibility.
- Develop Safety Plan for Dispersant Operation.
- Establish applicable Safety Zones and Restricted Airspace to ensure safety of vessels, aircraft, and personnel during the operation.
- Use the NOAA dispersant mission planning software to develop a range of scenarios and a comparison table for planning purposes.
- Initiate recording and download capability for GPS or written documentation.
- GPS capability and maps should show application and no-application zones for open ocean.

SPOTTER AIRCRAFT OR "SPOTTER"

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

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

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

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

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

- Coordinates and is lead for any necessary emergency or rescue evolution
- Determine how the control of the "spray on" and "spray off" will be managed and coordinated for the operation.
- Spotter and Observation Aircrews should be knowledgeable with oil observation, dispersant observations, operations, directing spray aircraft, and monitoring protocols. Need to pre-identify training and knowledgeable personnel.
- Spotter Aircraft needs time in the air to observe prior to dispersant deployment.
- Speed of Spotter Aircraft must be compatible with Spray Aircraft.

SPRAY AIRCRAFT, SPRAY VESSEL, OR "SPRAYER"

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

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

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

SPRAYER LOG SHEET

(Completed by Sprayer)

GENERAL

Incident Name: ____

Application Platform Name: ____

Date/Time OF Sortie: ____

Location of the Spill: ____________________LAT__________ LONG____________

Amount/Type of Oil Spilled: ________________/________________________

Dispersant Type: ____

DISPERSANT USE INFORMATION

SORTIE NUMBER: ________________

Application Rate: ____gal/acre

Total Amount of Dispersant to be Used: ____

Sprayer Platform: ____

Swath Width: ____(ft)

Total Amount of Dispersant Used: ____

Time Dispersant Application Began: ____

Time Dispersant Application Ended: ____

Number of Passes: ____________________

MONITORING AIRCRAFT / MONITORING VESSEL / "MONITOR"

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

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

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

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

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

OBSERVATION AIRCRAFT / VESSEL / "OBSERVERS"

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

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

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

DISPERSANT OBSERVER JOB AID

Reporting Observations:

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

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

Oil On The Water:

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

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

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

Dispersant Applications:

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

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

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

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

Effective/Ineffective Applications:

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

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

- Sometimes other things such as suspended solids may appear like dispersed oil.

- The visibility of the dispersed plume will vary according to water clarity. In some case, remaining surface oil and sheen may mask oil dispersing under the slick and thus interfere with observations of the dispersed oil plume.

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

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

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

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

- Boat wakes through oil may appear as a successful dispersion of oil, however, this may be just the vessel wake breaking a path through the oil (physically parting the oil) not dispersing it.

DISPERSANT OBSERVATION EQUIPMENT AND PREFLIGHT SAFETY BRIEF CHECKLIST

Observation Aids: (Responsibility of Observer Team)

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

Safety Equipment: (Responsibility of pilot or aircrew)

- ◯ Personal Floation Device
- ◯ Emergency Locator Beacon
- ◯ Survival Equipment
- ◯ NOMEX Coveralls (if available)
- ◯ Cold Water Flotation Suit * (if water temperature requires)
- ◯ Intercom

Safety Brief - Preflight Safety Brief with Pilot: (Responsibility of pilot or aircrew)

- ◯ Safety Features of Aircraft (i.e. fire extinguishers, communications devices, emergency locator beacon, flotation release, raft, first aid kit, etc.)
- ◯ Walk Around Aircraft
- ◯ Emergency Exit Procedures
- ◯ Purpose of Mission
- ◯ Area Orientation / Copy of Previous Overflight
- ◯ Route / Flight Plan

- Duration of Flight
- Preferred Altitude
- Landing Site
- Number of People on Mission
- Estimated Weight of People and Gear
- Gear Deployment (if needed, i.e. dye marker, current drogue, etc.)
- Frequency to Communicate Back to the Command Post

Spill Information: (Provided by Dispersant Operations Group Supervisor)

- Incident Name: ____________________
- Source Name: ____________________
- Date / Time Spill Occurred: ____________________
- Location of Spill: ____________________
- Latitude: ____________ Longitude: ____________
- Type of Oil Spilled: ____________________
- Amount of Oil Spilled: ____________________

Weather On Scene: (Provided by Scientific Support Coordinator)

- Wind Speed and Direction: ____________________
- Visibility: ____________________
- Ceiling: ____________________
- Precipitation: ____________________
- Sea State: ____________________

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

Title	Aircraft/Personnel	Tactical Call Sign	ETD	ETA
Spotter (s)	________	________	____	____
	________	________	____	____
Sprayer (s)	________	________	____	____
	________	________	____	____
Observer (s)	________	________	____	____
	________	________	____	____

Title	Aircraft/Personnel	Tactical Call Sign	ETD	ETA
◯ Monitor (s)	______________	______________	____	____
	______________	______________	____	____
◯ Supervisor (s)	______________	______________	____	____
	______________	______________	____	____

SAFETY CHECK: (Responsibility of pilot or aircrew)

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

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

	Airport	Tactical Call Sign
◯ Entry:	____________________	___________________________________
◯ Exit:	____________________	___________________________________

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

(Responsibility of Dispersant Operations Group Supervisor)

◯ Observer to Spotter: VHF ____________ UHF ____________ Other ________________
(air to air)

◯ Observer to Monitor: VHF ____________ UHF ____________ Other ________________
(air to vessel)

◯ Observer to Supervisor: VHF ____________ UHF ____________ Other ________________
(air to ground)

◯ Supervisor to Monitor: VHF ____________ UHF ____________ Other ________________
(ground to vessel)

◯ Monitor to Monitor: VHF ____________ UHF ____________ Other ________________
(vessel to vessel)

DISPERSANT OBSERVATION FINAL REPORTING FORM

(Completed by Dispersant Operations Group Supervisor)

- Names of Observers (Agency): ____________________
- Platform: ____________________
- Date of Application: ____________________
- Location (Long./Lat.) / Distance from Shore: ____________________
  ____
- Time of Commencement of Application: ____________________
- Time of Completion of Application: ____________________
- Weather Conditions (air temperature, wind speed, direction): ____________________
  ____
- Water Temperature, Depth, and Sea State: ____________________
- Visibility: ____________________
- Altitude (observation and application platforms): ____________________
- Type of Application Method (aerial / vessel): ____________________
- Type of Oil: ____________________
- Oil Properties (specific gravity, viscosity, pour point, etc.): ____________________
- Name of Dispersant: ____________________
- Surface Area of Slick: ____________________
- Operational Constraints Imposed by Agencies: ____________________
- Percent Slick Treated: ____________________
- Estimated Efficiency: ____________________
- Visual Appearance of Application: ____________________
- Submerged Cloud Observed? ____________________
- Recoalescence (reappearance of oil): ____________________
- Effectiveness of Application in Achieving Goal (reduce shoreline impact, etc.): ____________________
  ____
- Presence of Wildlife (any impacts, i.e. fishkill, etc.): ____________________
- Photographic Documentation: ____________________
- Lessons Learned: ____________________

COMMON ICS RESPONSIBILITIES FOR EACH POSITION

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

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

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

SITE SAFETY PLAN TEMPLATE FOR DISPERSANT OPERATIONS

A. SITE DESCRIPTION

Location

General area____
Lat.______________ Long. ____________

Hazards

Oil: ____
Dispersants: ____
General safety hazards: ____

Weather related hazards (mark appropriate)

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

B. RESPONSE ORGANIZATION

Function and Name	**Phone Number**
OSC:	
Site Safety and Health Officer:	
Scientific Support Coordinator:	
Contractor Supervisor:	
Responsible Party:	
State Representative	
Other Fed/State/Local reps:	

C. RESPONSE OBJECTIVES.

__ Dispersant application __ Dispersant observation ___ Dispersant monitoring __ Other
____

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

D. SITE CONTROL.

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

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

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

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

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

E. HAZARD EVALUATION

Crude oils

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

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

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

Exposure limits of interest:

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

Dispersants Application

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

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

Health Hazards

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

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

Protection

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

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

Monitoring

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

E. GENERAL SITE SAFETY AND HEALTH PROCEDURES.

The following controls shall be observed (check appropriate)

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

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

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

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

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

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

__ **Helicopter Operations**: See attachment 2

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

H. DECONTAMINATION PROCEDURES

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

J. EMERGENCY PROCEDURES

1. Emergency Medical Procedures:

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

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

- The closest hospital for regular emergencies is:
  ____ Phone: ________________

- Closest hospital for chemical exposure emergencies:
  ____ Phone: _________________

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

2. Emergency Fire Procedures:

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

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

- Radio in for help, use distress signals.

K. COMMUNICATION

1. Hand Signals:

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

2. Radio Communication:

Working:
freq:_________, chnl:________ (__VHF __UHF __CB ______OTHER)

Emergency:
freq:_________, chnl:________ (__VHF __UHF __CB ______OTHER)

freq:_________, chnl:________ (__VHF __UHF __CB ______OTHER)

3. Phone Communication:

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

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

Agency for Toxic Substance and Disease Registry (ATSDR)
(404)639-0615 (24 hr) (voice) 0655 (fax)
Case officer: ____

ATSDR can provide emergency medical and toxicological information, assist in determining procedures for potential chemical overexposures, and can provide on scene assistance for certain chemical emergencies.

Police:
(_____)_________________(_voice _fax _cellular _pager _home)

Fire:
(_____)_________________(_voice _fax _cellular _pager _home)

Ambulance/EMT/Hospital:
(_____)_________________(_voice _fax _cellular _pager _home)

(_____)_________________(_voice _fax _cellular _pager _home)

OTHER NUMBERS:
(_____)_________________(_voice _fax _cellular _pager _home)

(_____)_________________(_voice _fax _cellular _pager _home)

(_____)_________________(_voice _fax _cellular _pager _home)

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Sign Up Sheet

Team Member (Print Name)	Contact Number (Phone, Pager)	Signature	Date

References:

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

(b) 40 CFR 311 Worker Protection

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

(d) Site Safety Program for Oil Spill Response

GENERIC SITE SAFETY PLAN FOR DISPERSANT OPERATIONS

ATTACHMENT #1

ENVIRONMENTAL MONITORING FOR CHEMICAL HAZARDS:

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

INSTRUMENT	FREQUENCY
__ Combustible gas	___continuous, ___hourly, ___ daily, Other:
__ Oxygen	___continuous, ___hourly, ___ daily, Other:
__ HNU	___continuous, ___hourly, ___ daily, Other:
__ OVA	___continuous, ___hourly, ___ daily, Other:
__ WBGT/heat stress	___continuous, ___hourly, ___ daily, Other:
__ Noise	___continuous, ___hourly, ___ daily, Other:
__ H_2S Monitor	___continuous, ___hourly, ___ daily, Other:
__ other chemical specific monitors (colorimetric/electronic):	
1.	___continuous, ___hourly, ___ daily, Other:
2.	___continuous, ___hourly, ___ daily, Other:

GENERIC SITE SAFETY PLAN FOR DISPERSANT OPERATIONS

ATTACHMENT #2

AIRCRAFT SAFETY

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

CHOICE OF PLATFORMS

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

HELICOPTER SAFETY

<u>BEFORE YOU BOARD...</u>

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

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

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

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

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

<u>BOARDING</u>

It is best to board the helicopter when the rotor is stationary. Often it is not possible. If there is a crew member to assist you, follow his/her instructions. If not, board as follows:

- From a safe distance (at least 100 feet) wait for the helicopter to land safely. Be patient. Sometimes the pilot will reposition the helicopter after the first landing.

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

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

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

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

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

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

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

WHILE IN FLIGHT (Some safety tips):

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

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

- Absolutely no smoking!

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

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

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

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

- Stop talking if your aircraft was called.

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

EMERGENCY PROCEDURES

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

<u>In case of emergency landing:</u>

- Remove your glasses (they may shatter and injure your eyes) and objects from your mouth

- Disconnect the microphone cord.

- Assume the ditching position

- After landing, release the seat belt, open exit, wait for the rotor to stop spinning, and only then exit the aircraft.

<u>Water ditching:</u>

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

- Find a reference point and hold on to it.

- Hold your breath upon contact with water.

- Wait 5-8 seconds after the helicopter has submerged (or until rotor movement stops), then release your seat belt.

- Using the reference point, move to the exit, open it if needed, and exit.

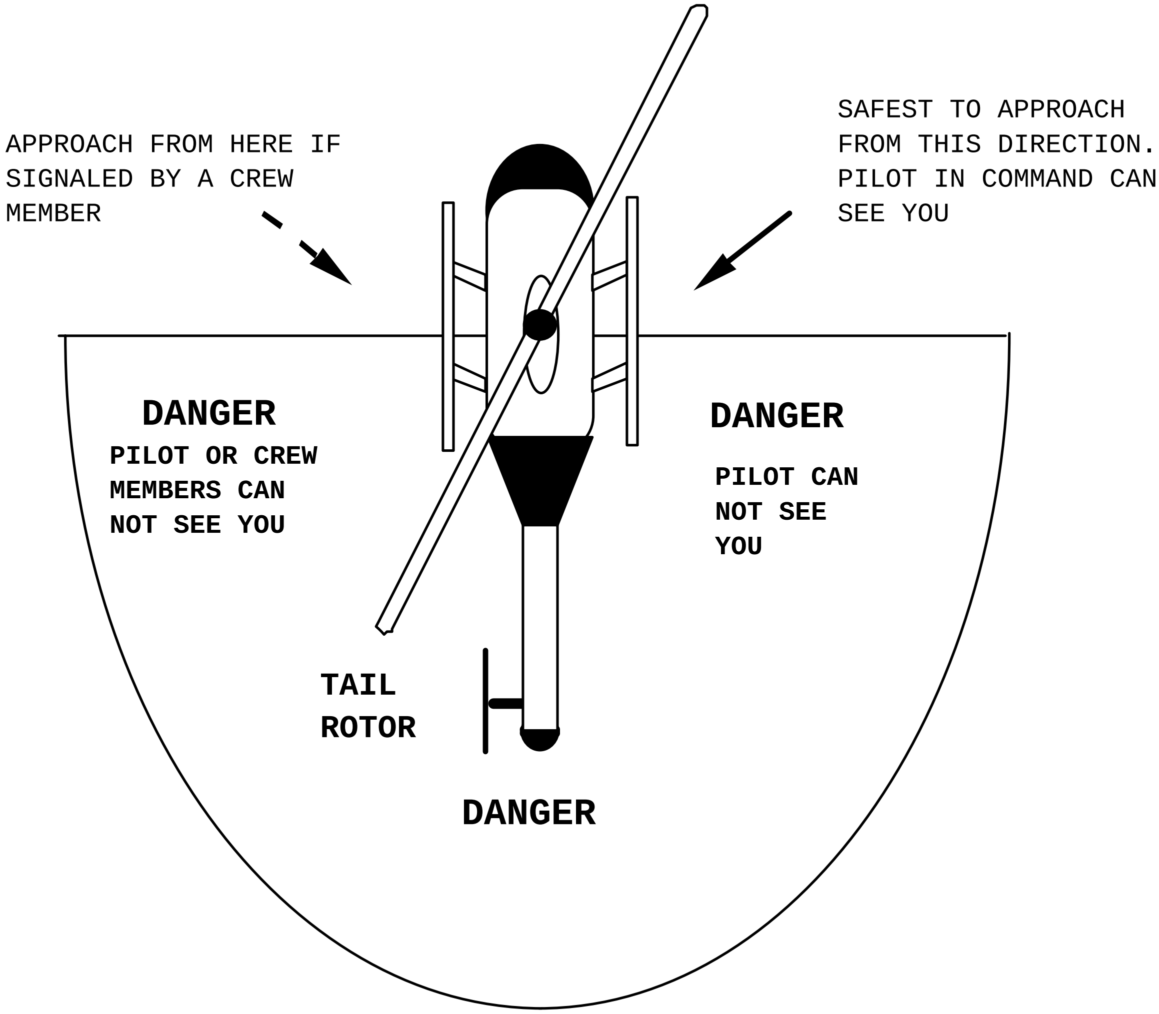
- Inflate the flotation vest only after you are outside the helicopter. Inflating it inside will inhibit your movement.

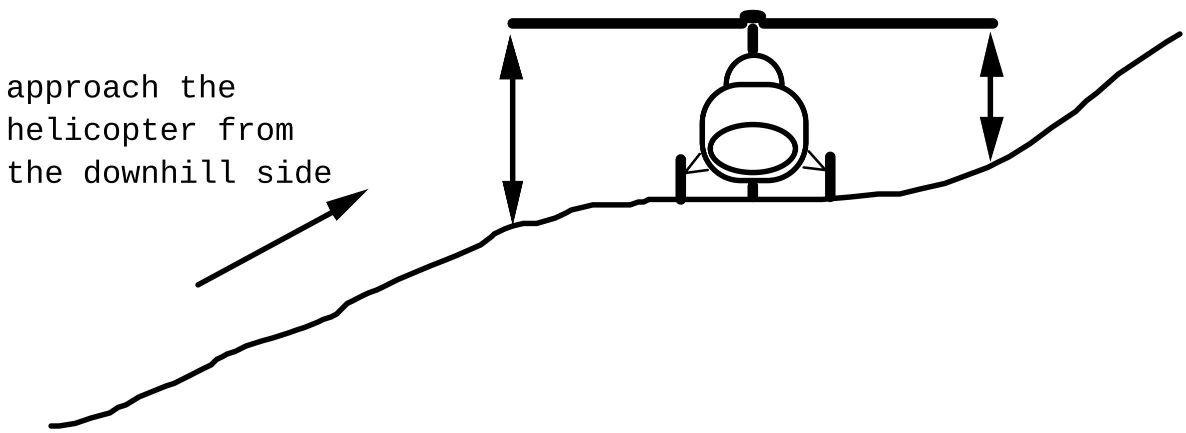
- Stay near the aircraft.

• Do not use distress flares if oil or fuel are present.

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

SAFE APPROACH TO A HELICOPTER





GENERIC SITE SAFETY PLAN FOR DISPERSANT OPERATIONS

ATTACHMENT #3

TECHNICAL PRODUCT BULLETIN #D-6
EMERGENCY RESPONSE DIVISION
DATE LISTED: March 10, 1978

"COREXIT 9527"

I. <u>NAME, BRAND, OR TRADEMARK</u>

COREXIT 9527

1. <u>Type of Product</u>: Dispersant (Concentrate)

II. <u>NAME, ADDRESS AND TELEPHONE NUMBER OF MANUFACTURER</u>

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

III. <u>NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS</u>

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

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

IV. <u>SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION</u>

1. <u>Flammability</u>:

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

2. <u>Ventilation</u>:

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

3. <u>Skin and eye contact; protective clothing; treatment in case of contact</u>:

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

4. <u>Storage temperature</u>:

a. Maximum storage temperature: l70 F

b. Minimum storage temperature: -30 F
c. Optimum storage temperature range: 40 F to l00 F
d. Temperatures of phase separations and chemical changes:

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

V. SHELF LIFE

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

VI. RECOMMENDED APPLICATION PROCEDURE

l. Application Method:

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

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

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

2. Concentration/Application Rate:

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

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

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

3. Conditions for Use:

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

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

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

VII. TOXICITY AND EFFECTIVENESS

1. TOXICITY:

MATERIAL TESTE	SPECIES	LC50 (ppm)
COREXIT 9527	Fundulus heteroclitus	100 96-hr
	Artemia salina	50 48-hr
No. 2 Fuel Oil	Fundulus heteroclitus	4,280 96-hr
	Artemia salina	44,000 48-hr
COREXIT 9527 &	Fundulus heteroclitus	36 96-hr
No. 2 Fuel Oil (1:10)	Artemia salina	44 48-hr

2. EFFECTIVENESS

STANDARD EFFECTIVENESS TEST WITH NO. 6 FUEL OIL

VOLUME DISPERSANT	INITIAL (10 min) MEAN % DISPERSION	FINAL (2 hrs) MEAN % DISPERSION
10	71	63
25	69	60

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

VIII. MICROBIOLOGICAL ANALYSIS (Not Applicable)

IX. PHYSICAL PROPERTIES

1. Flash Point: 162 F

2. Pour Point: Less than -45 F

3. Viscosity: 60 cst at 60 F, 22 cst at 100 F, 9 cst at 150 F

4. Specific Gravity: 0.995 at 60 F, 0.975 at 100 F

5. pH: 8.2 (10% in deionized water)

6. Surface Active Agents: CONFIDENTIAL

7. Solvents: Water, Ethylene glycol monobutyl ether

8. Additives: Borate ester

9. Solubility: Not Applicable

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	<0.005
Cadmium	<0.01
Chromium	1.0
Copper	<0.2
Lead	<0.1
Mercury	<0.003
Nickel	<0.1
Zinc	0.1
Cyanide	<0.01
Chlorinated Hydrocarbons	<0.01

GENERIC SITE SAFETY PLAN FOR DISPERSANT OPERATIONS

ATTACHMENT #3 (Cont.)

TECHNICAL PRODUCT BULLETIN #D-69
EMERGENCY RESPONSE DIVISION
DATE LISTED: December 18, 1995

"COREXIT 9500"

I. NAME, BRAND, OR TRADEMARK

COREXIT 9500

1. Type of Product: Dispersant (Concentrate)

II. NAME, ADDRESS AND TELEPHONE NUMBER OF MANUFACTURER

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

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

Nalco/Exxon Energy Chemicals. LP
P.O. Box 87
Sugar Land, TX 77487-0087
Phone: (800) 333-3714

Nalco/Exxon Energy Chemicals L.P.
P.O. Box 220
Long Beach, CA 90801
Phone: (310) 639-1533

Nalco/Exxon Energy Chemicals. LP
15555 Poydras Street
New Orleans, LA 70112
Phone: (504) 561-4656

Nalco/Exxon Energy Chemicals L.P.
701 E. Tudor Street, # 290
Anchorage, AK 99503
Phone: (907) 563-9866

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

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

1. Flammability:

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

2. Ventilation:

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

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

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

4. Storage temperature:

a. Maximum storage temperature: l70 F
b. Minimum storage temperature: -30 F
c. Optimum storage temperature range: 40 F to l00 F
d. Temperatures of phase separations and chemical changes: N/A

V. SHELF LIFE

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

VI. RECOMMENDED APPLICATION PROCEDURE

l. Application Method:

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

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

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

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

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

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

2. Concentration/Application Rate:

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

3. Conditions for Use:

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

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

VII. TOXICITY AND EFFECTIVENESS

1. TOXICITY:

MATERIAL TESTED	SPECIES	LC50 (ppm)
COREXIT 9500	Menidia beryllina	25.20 96-hr
	Mysidopsis bahia	32.23 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT 9500 &	Menidia beryllina	2.61 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	3.4 48-hr
Reference Toxicant	Menidia beryllina	7.07 96-hr
(SDS)	Mysidopsis bahia	9.82 48-hr

2. EFFECTIVENESS

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

Oil	Effectiveness %
Prudhoe Bay Crude	45.3%
South Louisiana Crude	54.7%
Average of Prudhoe Bay & South Louisiana Crudes	50.0%

VIII. PHYSICAL PROPERTIES

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

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

3. Viscosity: 55 cst at 68 F

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

5. pH: 6.4

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

7. Surface Active Agents: CONFIDENTIAL

8. Solvents: CONFIDENTIAL

9. Additives: None

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

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

COMPOUND	CONCENTRATION (ppm)
Arsenic	0.16
Cadmium	N/D
Chromium	0.03
Copper	0.10
Lead	N/D
Mercury	N/D
Nickel	N/D
Zinc	N/D
Cyanide	N/D
Chlorinated Hydrocarbons	N/D

N/D = Not Detected

GENERIC SITE SAFETY PLAN FOR DISPERSANT OPERATIONS

ATTACHMENT #4

PERSONAL PROTECTIVE EQUIPMENT

LEVEL C

OPERATION FOR WHICH THIS LEVEL C ENSEMBLE APPLIES:

Dispersant application, observation and monitoring

SPLASH SUIT

___ Tyvek
___ Saranex

INNER GLOVES

___ Nitrile

OUTER GLOVES

___ Silvershield
___ Solvex
___ Ansol
___ Fireball

OUTER SAFETY BOOTS

___ Neoprene
___ Outer booties

OTHER

___ Full Face Air Purifying Respirator Cartridges: ___________________________

___ Hard Hat

___ EEBA

LEVEL D

OPERATION FOR WHICH THIS LEVEL D ENSEMBLE APPLIES: _______________
____

___ Cloth coveralls

OPTION: long sleeved coveralls (poison plant areas)
OPTION: short sleeved coveralls (heat stress alert)
OPTION: street clothing may be worn by personnel not exposed to splashing liquids or oily equipment.

___ rubber steel toe/shank safety boots with textured bottoms

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

___ rubber gloves (as needed)

OPTION: leather gloves (if no contact with oil)

___ PFD (all personnel on or near water)

___ quart bottle to carry fluids (during heat stress alerts)

___ hearing protection (in noisy areas)

___ insect repellent (in designated mosquito/tick areas)

___ hard hat (all personnel in designated areas)

___ safety glasses (as required by Site Safety Officer)

OPTION: with tinted lenses (as required for sunlight)

___ sunscreen (as needed for sunlight)

___ whistle (in designated areas)

NOTES:

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

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

FLORIDA

Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

May 5, 2011

Captain Drew Pearson, U.S. Coast Guard RRT IV Co-Chair
Seventh United States Coast Guard District
Marine Safety Division
909 SE 1st Avenue
Miami, Florida 33131-3050

Mr. Shane Hitchcock, U.S. Environmental Protection Agency RRT IV Co-Chair
U.S. Environmental Protection Agency, Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303

Dear Captain Pearson and Mr. Hitchcock:

The Region IV Dispersant Use Policy was a cutting edge document when first approved in 1996. Since that time, while communication and response technologies have changed enormously, the concept that dispersing oil in offshore waters can prevent or minimize nearshore impacts remains as valid today as yesterday. The State of Florida believes that the Region IV Dispersant Use Policy document needs to be updated to reflect these changes and technological advances, including lessons learned during the response to the Deepwater Horizon spill.

Given the age of the document and current sensitivities related to dispersant use in state waters, pursuant to section 5 of the Letter of Promulgation dated October 8, 1996, the State of Florida withdraws all state waters from the Green Zone for dispersant pre-approval as outlined in the Region IV Dispersant Use Policy in Ocean and Coastal Waters. This includes all state waters three nautical miles off the Atlantic coastline and nine nautical miles off the Gulf of Mexico coastline.

The state of Florida remains committed to the mission of the RRT and believes in its value as a resource to the federal On-Scene Coordinator. As a demonstration of this commitment, I will be happy to assist the RRT Response and Technology Committee with updating the Dispersant Use Plan and other plans (such as the in-situ burning plan) and guidance documents developed by the RRT.

This change to our pre-authorization boundaries is effective upon receipt.

Sincerely;

Douglas C. White

Douglas C. White
State of Florida
RRT Region IV Member

cc: Commander, Coast Guard Sector Jacksonville
Commander, Coast Guard Sector Miami
Commander, Coast Guard Sector Key West
Commander, Coast Guard Sector St. Petersburg
Commander, Coast Guard Sector Mobile
Outposted EPA Federal On-Scene Coordinator
Bureau of Emergency Response Field Managers

REGIONAL RESPONSE TEAM IV

United States Coast Guard
Environmental Protection Agency
Department of Agriculture
Department of Commerce
Department of Defense
Department of Energy
Department of Health and Human Services
Department of the Interior
Department of Justice
Department of Labor
Department of State
Department of Transportation
Department of the Treasury
Federal Emergency Management Agency
General Services Administration
Nuclear Regulatory Commission
Tennessee Valley Authority
State of Alabama
State of Florida
State of Georgia
Commonwealth of Kentucky
State of Mississippi
State of North Carolina
State of South Carolina
State of Tennessee

June 15, 2009

Mr. David Bernhart
Assistant Regional Administrator
Protected Resources Division
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701

Dear Mr. Bernhart:

Reference is made to the Region IV Regional Response Team (RRT IV) policy for dispersant use in ocean and coastal waters in response to offshore oil spills. The policy preauthorizes use of dispersants by the pre-designated US Coast Guard On-Scene Coordinator on oil discharges impacting federal waters within Federal Region IV jurisdiction. In general, preauthorization is granted three miles seaward of land providing waters are at least ten meters deep. The policy implements Subpart J of the National Contingency Plan and is signed by the US Coast Guard, the Environmental Protection Agency, and the Department of the Interior, the Department of Commerce, and the coastal states of RRT IV (Mississippi, Alabama, Florida, Georgia, South Carolina, and North Carolina).

In your letter dated March 13, 1996, you concurred that the dispersant policy is unlikely to adversely affect endangered or threatened species under National Marine Fisheries Service purview or their critical habitat. In that letter you made special stipulations related to designated critical habitat and to listed species of sea turtles and whales. Those stipulations were incorporated into the policy.

The Section 7 consultation with National Marine Fisheries Service did not include *Pristis pectinata, Acropora palmate, Acropora cervicornis,* and *Halophila johnsonii.* We believe that these species should be included in the Section 7 consultation for the policy for use of dispersants in coastal and ocean waters.

Revisions have been proposed to the RRT IV policy for dispersant use in ocean and coastal waters in response to offshore oil spills. In general preauthorization is 3 miles seaward of any land providing that the water is at least 10 meters deep. Some special management areas are however, excluded from preauthorization. Three zones have been established to delineate locations and conditions under which dispersant application operations may take place in waters of federal Region IV. The Green Zone (preauthorization), Yellow Zone (case-by-case approval), and the Red or Exclusion Zone (areas excluded from use of dispersants; no areas are presently designated).

Chief, Incident Management Branch
U.S. Coast Guard Seventh District
Brickell Plaza Federal Building
909 SE 1st Avenue Miami, FL 33131-3050
(305)415-6841/ Fax (305)415-6791

Chief, Emergency Response and Removal Branch
U.S. Environmental Protection Agency IV
61 Forsyth St. SW, Suite 11T15
Atlanta, GA 30303-8960
(404)562-8718/ Fax (404)562-8699

REGIONAL RESPONSE TEAM IV

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

a) The waters fall under State, or special federal management jurisdiction. This includes any waters designated as National Marine Sanctuaries, National or State Wildlife Refuges, units of the National Park Service, proposed or designated Critical Habitats, Habitat Areas of Particular Concern, or Marine Protection Areas (MPA).

b) The waters are within three miles of a shoreline, and/or falling under state jurisdiction.

c) The waters are less than 10 meters in depth.

d) The waters are in mangrove or coastal wetland ecosystems, or directly over living coral communities, which are in less than 10 meters of water. Coastal wetlands include submerged algal beds and submerged seagrass beds.

If the USCG OSC believes dispersants should be applied within the Yellow zone, a request for authorization must be made to the RRT IV representatives of the EPA, DOI, DOC, and the affected State(s). The OSC is only granted authority to conduct dispersant operations in the Yellow zone when concurrence has been given by EPA and the affected State(s), and after consultation with DOC and DOI.

Application of dispersants within the Yellow zone, if approval is granted, will be conducted in accordance with the appropriate and relevant protocols outlined in the Protocols Section. Additionally, the USCG OSC will make every reasonable effort to continuously evaluate the application of dispersants within the Yellow zone, and will allow RRT IV agencies and the affected State(s) the opportunity to comment.

The Protocols Section require adherence to those stipulations specified in your concurrence letter dated March 13, 1996. Also specified is compliance with the Section 7 emergency consultation procedures as outlined in the *Interagency MOA Regarding Oil Spill Planning and Response Activities under the NCP and the Endangered Species Act.* And the Protocols Section requires consultation for emergency actions that may adversely affect essential fish habitat.

To support our evaluation and to avoid having to initiate a new Section 7 consultation for the policy on use of dispersants, we request NMFS to include *Pristis pectinata, Acropora palmate, Acropora cervicornis,* and *Halophila johnsonii* in our Section 7 consultation for this project.

We believe the conditions as outlined above and to be implemented during the operation of dispersant use as a requirement of the preauthorization policy will effectively prevent and minimize any potential effects to the above listed species.

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REGIONAL RESPONSE TEAM IV

United States Coast Guard
Environmental Protection Agency
Department of Agriculture
Department of Commerce
Department of Defense
Department of Energy
Department of Health and Human Services
Department of the Interior
Department of Justice
Department of Labor
Department of State
Department of Transportation
Department of the Treasury
Federal Emergency Management Agency
General Services Administration
Nuclear Regulatory Commission
Tennessee Valley Authority
State of Alabama
State of Florida
State of Georgia
Commonwealth of Kentucky
State of Mississippi
State of North Carolina
State of South Carolina
State of Tennessee

Based on the above, we have determined that the proposed project may affect, but is not likely to adversely affect the above referenced federally listed threatened species. We request concurrence from the National Marine Fisheries Service - Protected Resources Division with the above determination, as part of the previous Section 7 consultation for the policy for dispersant use in ocean and coastal waters in response to offshore oil spills.

Captain Drew Pearson
Co-Chair
U.S. Coast Guard
Regional Response Team IV

Shane Hitchcock
Co-Chair
U.S. Environmental Protection Agency
Regional Response Team IV

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Use of In-Situ Burning in RRT Region IV

Prepared for

Region IV Regional Response Team
Response and Technology Committee
In-Situ Burn Workgroup

Region IV Regional Response Team

From: Region IV Regional Response Team

To: Distribution

Subject: LETTER OF PROMULGATION

1. The Region IV Regional Response Team (RRT IV) has approved the attached policy for in-situ burning (ISB) of oil in ocean and coastal waters throughout the RRT IV area of responsibility effective as of this date. This policy hereby replaces any other policies, guidelines or plans now in force throughout the RRT IV area. This policy will be used in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

2. This policy may become part of the local Area Contingency Plans (ACP) maintained by the U.S. Coast Guard Marine Safety Offices throughout RRT IV.

3. This policy shall be followed as closely as possible, but has not provided for every possible contingency that might occur. Deviations from this policy are authorized when necessary in the best interest of safety or protection of resources. The RRT IV must be made aware of any deviation as soon as possible.

4. This policy cannot be changed or altered without notice and opportunity for comment provided to each signatory official or designated representative to the RRT IV.

5. Any signatory official or designated representative to the RRT IV can petition the RRT IV to amend or revise the policy and/or withdraw approval at any time.

6. All comments and requests for revision shall be directed to the RRT IV Response and Technology Committee for consideration by the RRT IV.

7. The RRT IV Response and Technology Committee will remain abreast of developments and changes for in-situ burning which may provide cause for recommending revision to this policy. Additionally, the Response and Technology Committee may be tasked at any time by members of the RRT IV to provide additional information or guidelines pertaining to the utilization of in-situ burning if available.

8. This Letter of Promulgation remains in effect until canceled by a competent authority.

DATE of EFFECT: 20 Apr 95

U.S. Environmental Protection Agency RRT IV Co-Chair: //s//
Mr. Myron D. Lair

U.S. Coast Guard RRT IV Co-Chair: //s//
Captain Gerald Abrams

Encl: (1) RRT IV In-situ Burn Policy

Region IV Regional Response Team
Ocean, Coastal, and Inland Waters In-situ Burn Policy

RECORD OF CHANGES

Change Number	Effective Date	Date Entered	Entered By:	Page Check

DISTRIBUTION LIST

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

COAST GUARD
Commandant (G-MOR)
LANTAREA COMCEN
National Strike Force Coordination Center
Atlantic Strike Team
Gulf Strike Team
CGD Seven (m)
CGD Seven (cc)
CGD Eight (m)
CGD Five (Am)
MSO Wilmington
MSO Charleston
MSO Savannah
MSO Jacksonville
MSO Tampa
MSO Miami
MSO Mobile

FEDERAL AGENCIES
U.S. EPA Region IV
U.S. Department of the Interior Region IV
U.S. Department of Commerce Region IV
U.S. Fish and Wildlife Service Region IV
National Marine Fisheries Service Region IV
NOAA National Marine Sanctuaries, Florida Keys National Marine Sanctuary
NOAA National Marine Sanctuaries, Grays Reef National Marine Sanctuary
NOAA HAZMAT Reference Library Seattle, Washington
NOAA Biological Assessment Team, Seattle, Washington
NOAA HAZMAT USCG Commandant (G-MEP)
NOAA Scientific Support Coordinator, CGD Seven

STATE AND LOCAL AGENCIES
State of North Carolina, RRT IV representative
State of South Carolina, RRT IV representative
State of Georgia, RRT IV representative
State of Florida, RRT IV representative
State of Alabama, RRT IV representative
State of Mississippi, RRT IV representative

NON-GOVERNMENT AGENCIES
Marine Spill Response Corporation, SE region
Clean Caribbean Corporation
Chevron Oil
Shell Oil

If you would like to be added to this distribution list please contact the Region IV Regional Response Team Response and Technology Chairperson or your agency representative to the regional response team.

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Ocean, Coastal, and Inland Waters
In-Situ Burn Policy

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REGION IV
REGIONAL RESPONSE TEAM
POLICY FOR
USE OF IN-SITU BURNING
IN OCEAN, COASTAL, AND INLAND WATERS

INTRODUCTION

This is the Region IV Regional Response Team (RRT IV) in-situ burn policy for ocean and coastal waters. It is structured as five sections. Section I defines the purpose, authority and scope of the policy. Section II describes the established ocean and coastal water zones for pre-authorized and conditional in-situ burning. Section III contains protocols for conducting in-situ burning, applicable to all open water burns throughout the RRT IV region. Section IV is a signature page where the RRT IV members representing the United States Coast Guard (USCG), the United States Environmental Protection Agency (EPA), the United States Department of the Interior (DOI), the United States Department of Commerce (DOC), and the coastal states within the RRT IV region have by signature agreed to accept this policy for their respective agency or state. Section V contains appendices and includes:

- A regional map showing pre-authorized burn zones.
- Separate Letters of Agreement for the coastal states within region IV for which this policy covers, which establish specific conditions for conducting any in-situ burning inside state waters and for special federally managed areas if applicable.
- Biological assessments and letters pertaining to section 7 consultations with the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFW) for protection of endangered species during in-situ burning operations.
- The intent of RRT IV to adopt the current monitoring program for in-situ burn operations in the RRT IV region which is supported by the U.S. Coast Guard National Strike Force.
- In-situ burn equipment lists.
- Decision tree and application/checklist form.
- Guidance covering the conditional use of in-situ burning in response to oil discharges occurring on inland waters and lands within the jurisdiction of RRT 4. This guidance includes protocols under which the federal On-Scene Commander (OSC) in the Inland Zone may be granted authorization for using ISB.

SECTION I

Purpose

The purpose of this Agreement is to provide concurrence of the USCG, EPA, DOC, DOI, and State representatives to the Region IV Regional Response Team for the pre-authorized use of in-situ burning in response to oil discharges occurring in ocean and coastal waters within the jurisdiction of the RRT IV.

RRT IV recognizes that in some instances the physical collection and removal of oil is infeasible or inadequate, and the effective use of in-situ burning as an oil spill response technique must be considered. Pre-authorization within the set guidelines of this agreement allows the On-Scene Coordinator (OSC) to employ in-situ burning to: (1) prevent or substantially reduce a hazard to human life, (2) minimize the environmental impact of the spilled oil or, (3) reduce or eliminate economic or aesthetic losses which would otherwise presumably occur without the use of this technique.

Authority

Subpart J of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) provides that the OSC; with the concurrence of the EPA representative to the RRT IV, and with the concurrence of the State(s) with jurisdiction over affected waters, and in consultation with the DOC and DOI trustee representatives to the RRT IV; may authorize the use of in-situ burning on oil spills. Pre-authorization of in-situ burning may be adopted with concurrence from all of the above mentioned RRT IV representatives.

Commandant, U.S. Coast Guard, has pre-designated the USCG Captains of the Port as On-Scene Coordinators for coastal oil spills; and has delegated authority and responsibility for compliance with Section 1321 of the Clean Water Act, as amended, to them. The EPA has delegated its authority for authorization of in-situ burning to the EPA representative to the Regional Response Team. RRT IV representatives from the DOC, DOI, and the states of North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi have been delegated authority by their respective agencies or state governments to represent natural resource trustee concerns and to serve as consultants to the OSC on these matters.

Scope

The USCG, EPA, DOI, DOC, and the coastal states of RRT IV have adopted in-situ burning as an approved tool to remove spilled or discharged oil from ocean and coastal waters within the jurisdiction of RRT IV. This agreement covers protocols under which in-situ burning is pre-authorized for use by the USCG OSC on state and federal coastal and ocean waters. This document also contains decision-making guidance and RRT IV authorization procedures for the potential use of in-situ burning on inland waters and land areas under the jurisdiction of the RRT IV.

SECTION II

Pre-authorization of In-situ Burning

The term "in-situ burning" applies to operations conducted for removal of oil by burning. These operations may apply during daylight or nighttime hours. In-situ burning operations will be conducted within the jurisdiction of the RRT IV region in accordance with this agreement and, in addition, where applicable, in accordance with protocols established in Letters of Agreement (LOA) between the USCG, EPA, DOI, DOC, and the affected state(s). The authority to authorize the use of in-situ burning provided under this Agreement to the USCG OSC may not be delegated. The following three zones have been established to specify pre-authorized locations and conditions under which burning may occur:

1) "A" ZONES -- PRE-AUTHORIZATION FOR OPEN-WATER BURNING

The "A" zone is defined as any area in Region IV, falling exclusively under federal jurisdiction; and not classified as a "B", or "R" zone; which is at least 3 miles seaward from any state coastline; and seaward of any state waters, or as designated by separate LOAs with each individual state, the USCG, EPA, DOI, and DOC. In the event that state jurisdiction extends beyond 3 miles from a state shoreline, pre-approval for the "A" zone applies only to those areas outside state jurisdiction unless a LOA is inplace and specifically pre-authorizes in-situ burning within those state waters.

Within "A" zones, the USCG, EPA, DOC, DOI, and the state(s) agree that the decision to use in-situ burning rests solely with the pre-designated USCG OSC, and that no further approval, concurrence or consultation on the part of the USCG or the USCG OSC with EPA, DOC, DOI, or the state(s) is required.

The USCG agrees with EPA, DOC, DOI, and the state(s) that the USCG will immediately notify said agencies and affected state(s) of a decision to conduct burning within the "A" zone, via RRT IV representatives.

2) "B" ZONES -- WATERS REQUIRING CASE-BY-CASE APPROVAL

A "B" zone is defined as any area in the RRT IV region falling under state or special management jurisdiction which is not classified as an "A", or "R" zone.

"B" zones are all areas falling: 1) anywhere within state waters, 2) waters less than 30 feet in depth that contain living reefs, 3) waters designated as a marine reserve, National Marine Sanctuary, National or State Wildlife Refuge, unit of the National Park Service, proposed or designated Critical Habitats, and 4) mangrove areas, or coastal wetlands. Coastal wetlands include submerged algal beds and submerged seagrass beds.

Where a LOA is in effect between the USCG, EPA, DOI, DOC, and the affected state(s); the policy for pre-authorization established under the provisions of said LOA shall preempt the policy herein established for zones otherwise designated as falling in the "B" zone. Established LOAs are provided in Appendix II of this document. In the event that a Letter of Agreement is not in effect for areas falling within the "B" zone, the following protocols shall apply:

a) If the OSC feels that in-situ burning should be used in areas falling in a "B" zone, a request for authorization must be submitted to the RRT and the affected state(s), along with the required information listed in the in-situ burning Application\Checklist form, found in Appendix VI.

b) The OSC's decision to use in-situ burning shall be made after consulting with RRT IV representatives of state and federal trustee agencies to ensure that the best available information pertaining to the presence or absence of natural resources at the burn site is obtained.

c) The OSC is only granted authority to conduct in-situ burning in the "B" zone when consent has been given by EPA and the affected state(s) and after consultation with, DOI and DOC.

d) The RRT IV will respond to the OSC's request for authorization to burn in zone "B" within four hours from time of notification. If the RRT IV has not responded to a request for authorization to burn in zone "B"within four hours, then the OSC may proceed with in-situ burn operations.

The USCG agrees with EPA, DOC, DOI, and the state(s) that the USCG will immediately notify said agencies and affected state(s) of a decision to initiate an approved burn within a "B" zone via RRT IV representatives.

Note - Special Case for West Coast of Florida:

Florida state waters extend seaward into the Gulf of Mexico to a distance of nine miles whereas all other state coastal waters in RRT IV, including Florida's east coast, extend seaward to a distance of three miles. Since Florida state law prohibits pre-authorization of in-situ burning within state waters, an emergency order has been drafted by the state which will allow for rapid case by case approval of in-situ burning in state waters when necessary and judged to be appropriate by a designated state official (App. II). No case by case approval will be required or considered necessary from EPA, DOI, or DOC for waters extending seaward in excess of three miles on Florida's west coast unless otherwise designated as meeting the criteria for a case by case zone.

3) "R" ZONES -- EXCLUSION ZONES

An "R" zone is defined as any area in the RRT IV region falling under state or special management jurisdiction which is not classified as an "A" or "B" zone.

The "R" zone is that area designated by the RRT IV as an exclusion zone. No in-situ burning operations will be conducted in the "R" zone unless 1) in-situ burning is necessary to prevent or mitigate a risk to human health and safety; and/or 2) an emergency modification of this agreement is made on an incident-specific basis.

RRT IV currently has not designated any areas as "R" zones, but retains the right to include areas for exclusion at a future point in time if it feels this is warranted.

SECTION III

Protocols

The following requirements apply to the use of all burning operations under the provisions of this policy:

1. **Health and Safety Concerns -- Operators**: Assuring workers' health and safety is the responsibility of employers and the USCG OSC who must comply with all Occupational Health and Safety Administration (OSHA) regulations. Prior to any in-situ burn operations, a site safety plan must be submitted and approved by the OSC. Public: The burning should be stopped if it is determined that it becomes an unacceptable health hazard due to operational or smoke exposure concerns to responders or the general public. If at any time, exposure limits are expected to exceed national federal air quality standards in nearby populated areas, as a result of in-situ burning operations, then in-situ burning operations will immediately cease. The Level of Concern (LOC) for particulates for the general public in the RRT IV region is 150 ug/m3 (PM-10) averaged over 1 hour.

2. Monitors representing the USCG, EPA, federal trustee agencies, the affected state(s), OSHA, and the responsible party will have the opportunity to observe in-situ burning operations. Monitoring to establish "Continue/Discontinue" data for input to the OSC will be conducted in accordance with protocols established by the Region IV Regional Response Team and as outlined in the monitoring program contained in appendix VI. Unless smoke plumes are predicted to cross over populated or environmentally sensitive areas, an inability to conduct monitoring operations will not be automatic grounds for discontinuing or prohibiting in-situ burn operations. All burns must incorporate visual monitoring at the burn site to record the disposition of burn residues and to monitor the burn site for potential impact to any natural resource in the area. Samples of the residue will be collected if feasible.

3. Prior to any in-situ burning operations, the OSC will apply the decision tree contained in Appendix VI.

4. The Application\Checklist form in Appendix VI shall be completed for all burns and provided to RRT IV members in a timely manner for documentation and informational purposes.

5. The USCG will make every reasonable effort to continuously evaluate the decision to burn, and allow RRT agencies and affected state(s) the opportunity to comment. Formal requests to discontinue a burn should be presented, in writing, to the OSC for consideration.

6. Burning will be conducted in a way that allows for effective control of the burn, to the maximum extent feasible, including the ability to rapidly stop the burn if necessary. Contained and controlled burning is recognized as the preferred method of burning using fire-resistant boom. All practical efforts will be made to control and contain the burn and prevent accidental ignition of the source. Generally it is not recommended that the source or adjacent uncontained slicks be allowed to ignite during in-situ burning operations. Certain circumstances, however, may warrant consideration of carefully planned source ignition.

7. Mechanical recovery equipment shall be mobilized on-scene, when feasible, for backup and complimentary response capability. Provisions must be made for collection of burn residue following the burn(s).

8. In-situ burning will be conducted in accordance with any consultations approved by the USFWS and the NMFS, under Section 7 of the Endangered Species Act. Prior to beginning an in-situ burn, an on-site survey will be conducted to determine if any threatened or endangered species are present in the burn area or otherwise at risk from any burn operations, fire, or smoke. Appropriate natural resource specialists, knowledgeable with any special resource concern in the area and representing the resource trustee, will be consulted prior to conducting any in-situ burn. Measures will be taken to prevent risk of injury to any wildlife, especially endangered or threatened species. Examples of potential protection measures may include: moving the location of the burn to an area where listed species are not present; temporary employment of hazing techniques, if effective; and physical removal of individuals of listed species only under the authority of the trustee agency.

9. In-situ burning is advised only when the meteorological and sea conditions are operationally favorable for a successful burn. The OSC will give due consideration to the direction of the wind, and the possibility of the wind blowing precipitate over population centers or sensitive resources onshore. A safety margin of 45 degrees of arc on either side of predicted wind vectors should be considered for shifts in wind direction.

10. Any use of in-situ burning requires that a post-incident report be provided by the OSC, or a designated member of the OSC's staff, within 45 days of in-situ burning operations. Recommendations for changes or modification to this policy should be presented in the report, if appropriate. This report will be presented at a Region IV RRT meeting, if requested by the RRT.

SECTION IV

Signature Page

We hereby attest and declare that by our signature we do approve this policy for in-situ burning as presented herein for the agency or government we represent on the Region IV Regional Response Team (RRT IV).

//s//	4/20/95
Captain Gerald Abrams United States Coast Guard RRT IV Co-chair	DATE
//s//	4/20/95
Mr. Myron D. Lair United States Environmental Protection Agency RRT IV Co-chair	DATE
//s//	4/20/95
Mr. James H. Lee U.S. Department of the Interior RRT IV Member	DATE
//s//	4/20/95
Mr. John Lindsay U.S. Department of Commerce RRT IV Member	DATE
//s//	4/20/95
Mr. Douglas C. White State of Florida RRT IV Member	DATE
//s//	6/19/95
Mr. R. Lewis Shaw Deputy Commissioner Environmental Quality Control Department of Health and Environmental Control State of South Carolina	DATE

//s// — 6/23/95

Mr. Robert J. Rogers, Chief — DATE
State of Mississippi
RRT IV Member

//s// — 4/20/95

Mr. E. John Williford — DATE
State of Alabama
RRT IV Member

//s// — 4/20/95

Ms. Linda Forehand — DATE
State of North Carolina
RRT IV Member

7/10/95

Dr. Albert K. Langley — DATE
State of Georgia
Environmental Protection Division
Department of Natural Resources
Region IV RRT Member

SECTION V

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III Section 7 Consultations for Endangered Species

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VI Decision Tree, Application/Checklist

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- **Georgia**
- **Florida**
- **Alabama**
- **Mississippi**
- **Kentucky**
- **Tennessee**
- **Federal Trustees**
    - **Gray's Reef National Marine Sanctuary**

North Carolina

NORTH CAROLINA

OFFICE: North Carolina Department of Environment, Health and Natural Resources
Division of Environmental Management
P.O. Box 29535
Raleigh, NC 27626-9535

REQUESTS FROM THE FEDERAL ON-SCENE COORDINATOR TO USE IN-SITU BURNING SHALL BE DIRECTED TO:

(919) 733-5291	(7:30AM – 5:00PM)
(919) 899-4500	(After hours pager)

PROCEDURES:

DEM personnel will obtain the necessary input from the Air and Water Quality Sections, Emergency Management, Marine Fisheries, U.S. Coast Guard. Etc. and then notify the Federal OSC of the State's decision.

INFORMATION TO BE PROVIDED BY THE FEDERAL OSC/RESPONSIBLE PARTY:

Completion of the checklist contained in Section IV of this plan will be accepted as meeting the State's information requirement.

TIME NEEDED TO REACH A DECISION: Minimum of four hours.

A DECISION WILL BE MADE OM A CASE-BY-CASE BASIS.

South Carolina

LETTER OF AGREEMENT
ON LIMITED USE OF IN-SITU BURNING
DURING OIL DISCHARGES OCCURRING IN COASTAL WATERS
AMONG U.S. COAST GUARD -- SEVENTH DISTRICT,
U.S. ENVIRONMENTAL PROTECTION AGENCY -- REGION IV,
U.S. DEPARTMENT OF THE INTERIOR,
U.S. DEPARTMENT OF COMMERCE,
AND THE STATE OF SOUTH CAROLINA

I. PURPOSE

The U. S. Environmental Protection Agency (EPA), U. S. Department of Commerce (DOC), U. S. Department of the Interior (DOI), the U. S. Coast Guard (USCG), and the State of South Carolina recognize that, while mechanical removal is the preferred method of dealing with oil discharges into the waters of the State of South Carolina, in certain instances the physical containment, collection, and removal of the oil may not be possible, and the effective use of in-situ burning must be considered to prevent a substantial threat to public health or welfare, or to minimize serious environmental and/or economic damages. Accordingly, above said agencies hereby grant the USCG On-Scene Coordinator (OSC) approval to authorize in-situ burning of oil spills on the waters of the State of South Carolina, within the following parameters.

II. AUTHORITY

Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) provides that the USCG OSC, with the concurrence of the EPA, the affected State(s), DOI, and DOC may pre-authorize the use of in-situ burning agents on oil discharges.

Commandant, U. S. Coast Guard has designated the USCG Captain of the Port as the OSC for oil discharges in the coastal zone. The USCG OSC has pre-approval to use in-situ burning on oil discharges as defined in the NCP, when it is necessary to prevent substantial threat to public health or welfare. The authority to use in-situ burning on oil discharges in accordance with this agreement is vested solely in the individual who is the pre-designated USCG OSC and may not be delegated.

As stated in the NCP, EPA notes that the state representative to the RRT, the body which has the responsibility for pre-approval for specific countermeasures, represents all the interests of the State and is the conduit for State concurrence. Also as stated in the NCP, under section 300.115, local governments are represented directly on the RRT by the State, and local input is coordinated through the State's representative.

III. PROVISIONS

1) The minimum requirements for conducting burns in federal waters in Region IV, as delineated in the Region IV in-situ burning policy and specifically, the protocols listed in section III of that policy, must be applied, in addition to any provisions set forth below.

2) If a decision has been made to conduct in-situ burning within South Carolina waters, under the provisions of this agreement, the USCG OSC will immediately notify the RRTIV representative to the State of South Carolina and EPA, DOI, and DOC through their representatives to the RRTIV. This notification will include at a minimum:

a. Date, Time and Location of the incident;
b. Type and amount of oil discharged;
c. Area affected;

d. The projected area of impact of the oil if not burned;
e. Reasons why mechanical or physical removal of the oil is not feasible, or will not provide the optimal response method.
f. Burning method to be used.
g. On-scene weather, wind, and forecasted weather.

3) Any official request by a Trustee representative, of any of the above agencies to discontinue in-situ burning operations, submitted to the OSC in writing, will be grounds for immediate cessation of in-situ burning operations.

4) Monitoring of in-situ burning operations shall be performed in accordance with stated RRTIV policy.

IV. AREA OF DESIGNATED PRE-APPROVAL IN SOUTH CAROLINA STATE WATERS

The predesignated USCG OSC is granted authorization to allow in-situ burning in the waters of the State of South Carolina according to the following guidelines. No further approval from the State, the EPA, DOI, DOC, or other agencies is required to conduct burning operations within these pre-approved areas subject to the following conditions:

Burning shall not be conducted in, on, or over waters containing reefs; waters designated as marine reserves; in a National marine Sanctuary, National or State Wildlife Refuge, in proposed or designated Critical Habitat; units of the National Park Service; in mangrove areas; or in waters in coastal wetlands; except with the prior and express concurrence of the State of South Carolina, EPA, DOI, and DOC. Coastal wetlands include: submerged algal beds and submerged seagrass beds.

Burning shall not be conducted in harbors, bays, rivers, lakes and other inland waters except with the prior and express concurrence of the State of South Carolina, the EPA, DOI, and DOC.

Burning shall not be conducted in State waters from the coastline out 3 miles unless prevailing wind direction is decidedly seaward and is expected to remain in the seaward direction throughout the duration of the in-situ burning operations. Without favorable winds, the prior and express concurrence of the State of South Carolina, the EPA, DOI, and DOC must be obtained.

V. AMENDMENTS

This Letter of Agreement (LOA) may be amended in whole or in part as is mutually agreeable to all parties thereto by petition in writing.

VI. CANCELLATION

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

//s//	7/8/95
Captain Gerald Abrams Seventh Coast Guard District Region IV RRT co-chair	DATE

//s//	8/10/95
Mr. Myron D. Lair U. S. Environmental Protection Agency Region IV RRT co-chair	DATE

//s// | 8/10/95

Mr. James Lee
U. S. Department of the Interior
Region IV RRT member

DATE

//s// | 8/10/95

Mr. John Lindsay
U. S. Department of Commerce
Region IV RRT member

DATE

//s// | 8/1/95

Mr. R. Lewis Shaw
Deputy Commissioner
Environmental Quality Control
Department of Health and Environmental Control
State of South Carolina

DATE

Georgia

LETTER OF AGREEMENT
ON LIMITED USE OF IN-SITU BURNING
DURING OIL DISCHARGES OCCURRING IN COASTAL WATERS
AMONG U.S. COAST GUARD -- SEVENTH DISTRICT,
U.S. ENVIRONMENTAL PROTECTION AGENCY -- REGION IV,
U.S. DEPARTMENT OF THE INTERIOR,
U.S. DEPARTMENT OF COMMERCE,
AND THE STATE OF GEORGIA

I. The U. S. Environmental Protection Agency (EPA), U. S. Department of Commerce (DOC), U. S. Department of the Interior (DOI), the U. S. Coast Guard (USCG), and the State of South Carolina recognize that, while mechanical removal is the preferred method of dealing with oil discharges into the waters of the State of South Carolina, in certain instances the physical containment, collection, and removal of the oil may not be possible, and the effective use of in-situ burning must be considered to prevent a substantial threat to public health or welfare, or to minimize serious environmental and/or economic damages. Accordingly, above said agencies hereby grant the USCG On-Scene Coordinator (OSC) approval to authorize in-situ burning of oil spills on the waters of the State of Georgia, within the following parameters.

II. Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) provides that the USCG OSC, with the concurrence of the EPA, the affected State(s), DOI, and DOC may pre-authorize the use of in-situ burning agents on oil discharges.

Commandant, U. S. Coast Guard has designated the USCG Captain of the Port as the OSC for oil discharges in the coastal zone. The USCG OSC has pre-approval to use in-situ burning on oil discharges as defined in the NCP, when it is necessary to prevent substantial threat to public health or welfare. The authority to use in-situ burning on oil discharges in accordance with this agreement is vested solely in the individual who is the pre-designated USCG OSC and may not be delegated.

As stated in the NCP, EPA notes that the state representative to the RRT, the body which has the responsibility for pre-approval for specific countermeasures, represents all the interests of the State and is the conduit for State concurrence. Also as stated in the NCP, under section 300.115, local governments are represented directly on the RRT by the State, and local input is coordinated through the State's representative.

III. PROVISIONS

1) The minimum requirements for conducting burns in federal waters in Region IV, as delineated in the Region IV in-situ burning policy and specifically, the protocols listed in section III of that policy, must be applied, in addition to any provisions set forth below.

2) If a decision has been made to conduct in-situ burning within Georgia waters, under the provisions of this agreement, the USCG OSC will immediately notify the RRTIV representative to the State of Georgia and EPA, DOI, and DOC through their representatives to the RRT IV. This notification will include at a minimum:

a. Date, Time and Location of the incident;
b. Type and amount of oil discharged;
c. Area affected and trajectory of oil (preliminary);
d. On-Scene weather and weather forecasted over the next 48 hours;
e. Reasons why mechanical or physical removal of the oil is not feasible, or will not provide the optimal response method.

f. Reasons why dispersant application is not feasible, or will not provide the optimal response method.

3) Any official request by any of the above mentioned RRT IV agencies to discontinue in-situ burning operations, submitted to the OSC in writing, will be grounds for immediate cessation of in-situ burning operations.

4) Monitoring of in-situ burning operations shall be performed in accordance with stated RRTIV policy.

IV. AREA OF DESIGNATED PRE-APPROVAL IN GEORGIA STATE WATERS

The pre-designated USCG OSC is granted authorization to allow in-situ burning in the waters of the State of Georgia according to the following guidelines. No further approval from the State, the EPA, DOI, DOC, or other agencies is required to conduct burning operations within these pre-approved areas subject to the following conditions:

Burning shall not be conducted in, on, or over waters containing reefs; waters designated as marine reserves; in a National marine Sanctuary, National or State Wildlife Refuge, in proposed or designated Critical Habitat; units of the National Park Service; in mangrove areas; or in waters in coastal wetlands; except with the prior and express concurrence of the State of South Carolina, EPA, DOI, and DOC. Coastal wetlands include: submerged algal beds and submerged seagrass beds.

Burning shall not be conducted in harbors, bays, rivers, lakes and other inland waters.

Burning shall not be conducted in State waters from the coastline out 3 (three) miles unless prevailing wind direction is decidedly seaward from the surface to 500 mb and is expected to remain in the seaward direction throughout the duration of the in-situ burning operations.

Burning shall not be conducted within 1/2mile of the coastline under any circumstances.

Burning shall not be conducted within 1 hour of sunrise or sunset.

V. AMENDMENTS

This Letter of Agreement (LOA) may be amended in whole or in part as is mutually agreeable to all parties thereto by petition in writing.

VI. CANCELLATION

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

//s//	8/15/95
Captain Gerald Abrams Seventh Coast Guard District Region IV RRT co-chair	DATE
//s//	8/10/95
Mr. Myron D. Lair U. S. Environmental Protection Agency Region IV RRT co-chair	DATE

//s//
Mr. James Lee
U. S. Department of the Interior
Region IV RRT member

8/10/95
DATE

//s//
Mr. John Lindsay
U. S. Department of Commerce
Region IV RRT member

8/10/95
DATE

//s//
Dr. Albert K. Langley
State of Georgia
Environmental Protection Division
Department of Natural Resources
Region IV RRT Member

8/2/95
DATE

Florida

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

EMERGENCY ORDER
TO ALLOW IN SITU BURNING OF DISCHARGED OIL

Pursuant to the authority of Chapter 403.061(8) and (28), Florida Statutes, the Secretary is authorized to issue orders as are necessary to control pollution and perform any other act necessary to control pollution.

FINDINGS OF FACT

1. Oil discharged from vessels, on the salt waters of the state is detrimental to marine resources and could endanger the health, safety, and welfare of the people of the State of Florida.

2. In situ burning of discharged oil reduces the detrimental environmental impact of discharged oil on marine resources and on the health, safety, and welfare of the people of the State of Florida.

3. Oil discharged onto the salt waters of the state poses a threat to air quality through evaporation alone. Additionally, the mechanical cleanup of discharged oil generates large amounts of waste which must be disposed of in landfills and by incineration.

4. Oil has been discharged onto slat waters of the state at he coordinates of:
   ____
   ____
   ____

5. The discharged oil will be burned in situ on salt waters of the state at the coordinates of:
   ____
   ____
   ____

6. The discharged oil is at least 1 to 2 mm thick on the water and will support in situ burning.

7. Wind speed is 20 knots or less at the site of the in situ burn.

8. Wave height is three feet or less at the site of the in situ burn

9. The oil is gathered by and contained in a fire-resistant boom prior to igniting.

10. The location of the in situ burn is a minimum of (miles/yards) from shore.

11. Mechanical recovery equipment shall be mobilized on scene, \when feasible, as a backup capability should in situ burning prove ineffective and to collect burn residue.

12. A Department representative is on-site to observe the application techniques and results.

13. The in situ burning is conducted by trained professionals using recognized techniques and technology.

14. Burning is not permitted if the prevailing winds will carry significant smoke plumes over inhabited areas. Burning shall be conducted in a way that allows for controlling the burn in the event of wind shifts.

15. The National Oceanographic and Atmospheric Administration (NOAA) will be consulted to assure that meteorological conditions during the in situ burn of discharged oil are such that the effects to the public health and safety and the environment from the burning are minimized.

CONCLUSIONS OF LAW

1. The Secretary has the authority to issue emergency orders pursuant to Chapter 403.061(8), F.S. and Chapter 120.59(3), F.S.

2. Oil discharged from vessels on the salt waters of the state is environmentally detrimental to marine resources and could endanger the health, safety, and welfare of the people of the State of Florida.

3. In Situ burning of oil discharged onto salt waters of the state is authorized notwithstanding the prohibitions in Rule Chapter 62-256, F.A.C.

ORDER

In Situ burning of oil discharged onto salt waters of the State is authorized at (coordinates) ________________ beginning on (date) ___________ at (time) _____________ and to be concluded by (date) _____________ at (time) ____________ subject to the restrictions and findings of fact in this ORDER.

In situ burning of oil discharged onto salt waters of the State will be conducted only under conditions, including meteorological, which minimize any detrimental environmental effects of the discharged oil and its burning on marine resources and upon the health, safety, and welfare of the people of the State of Florida.

ORDERED this _____day of __________________, __________

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

____
DIRECTOR
DIVISION OF LAW ENFORCEMENT

(address)

Alabama

No LOA or special agreement is in place for Alabama at this time.

Mississippi

No LOA or special agreement is in place for Mississippi at this time.

Kentucky

No LOA or special agreement is in place for Kentucky at this time.

Tennessee

No LOA or special agreement is in place for Tennessee at this time.

Federal Trustees

Appendix III

Memoranda of Understanding for Protection of Endangered Species

- **National Marine Fisheries Service**
- **United States Fish and Wildlife Service**

National Marine Fisheries Service

Commander
Seventh Coast Guard District

Brickell Plaza
Federal Building
909 SE First Avenue
Miami, Florida 33131-3050
Staff Symbol: (m)
Phone: (305) 536-5651

16465
3 Feb 95

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

Dear Mr. Oravetz:

I am writing to request your review of and concurrence on a biological assessment conducted pursuant to Section 7 of the Endangered Species Act. Lieutenant Commander Bradford Benggio, the National Oceanographic and Atmospheric Administration (NOAA) Scientific Support Coordinator for the United States Coast Guard Seventh District, has discussed this matter with Mr. Jeff Brown of your staff. Additionally, he has consulted with Mr. Waynon Johnson, the designated NOAA trustee representative to the Regional Response Teams in Federal Region IV and the Caribbean.

The U. S. Coast Guard, along with the Environmental Protection Agency, the Department of the Interior, the Department of Commerce, and the States of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and the Commonwealth of Puerto Rico, and Territories of the U.S. Virgin Islands plan to execute policy that will provide the Federal On-Scene Coordinators within Federal Region IV and the Caribbean pre-authorization to use in-situ burning within designated zones as a response countermeasure for oil spills. It is the understanding of the Federal Agencies involved that this may constitute federal action in an area where endangered and threatened species are known to occur. Consequently, consultation may be required under Section 7 of the Endangered Species Act.

This request includes the attached biological assessment in accordance with 50 CFR 402.12. Our biological assessment of this action indicates that the listed species present are not likely to be adversely affected by this action. The use of in-situ burning offers strong potential for net environmental benefit during an oil spill by allowing for increased protection of nearshore, shoreline, and down-current habitat and biological resources. It provides for a more rapid removal of oil from the environment thus subjecting fewer resources to the potential of impact. Therefore, with your concurrence, a formal consultation should not be necessary.

Sincerely,

//s//

Gerald W. Abrams
Captain, U.S. Coast Guard
Chief, Marine Safety Division
Seventh Coast Guard District
By direction of the District Commander

cc: Mr. Jeff Brown

BIOLOGICAL ASSESSMENT

This biological assessment consists of:

- a description of the area affected by the action;
- a description of the proposed action;
- a description of in-situ burning as an oil spill response technique;
- a description of the listed species present;
- a brief review of the literature on the effects of oil on the listed species of concern;
- an assessment of the risks of in-situ burning to listed species; and
- a brief assessment of alternatives to pre-authorization of in-situ burning in these zones.

Description of the Area

The subject area includes two zones (see zone maps) in U.S. Coast Guard Districts 5, 7, and 8 designated in the regional policy as follows:

Zone A: The "A" zone is defined as any area within Region IV Regional Response Team (RRT IV) or the Caribbean Region Regional Response Team (CRRT) jurisdictions falling exclusively under federal jurisdiction; and not classified as a "B" or "R" zone; which is at least 3 miles seaward from any state coastline; and seaward of any state waters, or as designated by separate Letters of Agreement (LOA) with each individual state or Federal Trustee and the Regional Response Team (RRT).

Zone B: The "B" zone is defined as any area in RRT IV or the CRRT falling under state or special management jurisdiction which is not classified as an "A" or "R" zone. "B" zones are areas falling anywhere within state waters or the following special management or specified areas:

- National Marine Sanctuaries, including the Florida Keys National Marine Sanctuary;
- National or State Wildlife Refuges;
- Units of the National Park System;
- Waters designated as Marine Reserves;
- Proposed or designated Critical Habitats;
- Special endangered species use areas designated by Trustee Agency representatives;
- Waters less than 30 feet in depth that contain living coral reefs, submerged algal beds, submerged seagrass beds, and coastal wetlands including mangroves areas, saltwater marshes, salt ponds, and freshwater marshes.

Zone R: Currently no "R" zones have been identified by Region IV or the Caribbean Region. An "R" zone is defined as any area in the RRT IV and CRRT regions falling under state or special management jurisdiction which is not classified as an "A" or "B" zone. The "R" zone is that area designated by the Region IV and Caribbean Region as exclusion zones where no in-situ burn operations will be conducted.

This policy will be implemented regionally for in-situ burning throughout the offshore areas within the boundaries of the Caribbean Regional Response Team and Region IV Regional Response Team jurisdictions.

Description of the Proposed Action

The policy acknowledges that in most cases the primary method for controlling released oil will be physical removal from the environment. Under certain circumstances, however, effective physical removal of oil from the water surface may not be possible or efficient enough to maximize resource protection. In such cases, in-situ burning can significantly reduce impacts to the environment, including listed species. The policy recognizes that the decision to use in-situ burning within the pre-authorization protocols rests solely with the pre-designated Federal On-Scene Coordinator (FOSC) and cannot be further delegated.

The policy provides that the FOSC may conduct in-situ burning without further concurrence within Zone A. Burning can be conducted in Zone A only when the wind is expected to carry smoke away from population centers and other sensitive resources and if PM-10 concentrations, measured according to a monitoring plan which uses real-time particulate counters, do not exceed established human exposure limits. The decision to conduct burning will be guided by a decision tree contained in the policy. This decision tree addresses concerns related to oil type, oil amount, oil condition, environmental conditions, proximity issues, availability of personnel and equipment, and time constraints.

In-Situ burning in Zone B will require case-by-case authorization by the Region IV RRT or Caribbean RRT. In-situ burning will not be pre-authorized in Zone B areas unless designated in separate LOAs developed by the states and agreed upon by the Regional Response Team.

Prior to beginning an in-situ burn, an on-site survey will be conducted, in consultation with natural resource specialists, to determine if any threatened or endangered species are present in the burn area or otherwise at risk from any burn operations, fire, or smoke. Measures will be taken to prevent risk of injury to any wildlife, especially endangered or threatened species. Examples of potential protection measures include: moving the location of the burn to an area where listed species are not present; temporary employment of hazing techniques, if effective; and physical removal of individuals of listed species under the authority of the trustee agency. Burn residues will be collected immediately following an in-situ burn to minimize exposure to wildlife and habitat.

If a decision to use in-situ burning is made, the U.S. Environmental Protection Agency (EPA), the U.S. Department of Commerce (DOC), the U.S. Department of the Interior (DOI), and appropriate state(s) will be notified through RRT representatives as soon as possible. A post-incident briefing will be held within 45 days after an in-situ burn to exchange information on the efficacy and effects of the burn, and to determine whether any changes to the policy are needed.

Description of In-Situ Burning

In-situ burning is an oil spill response technique which, when used under appropriate conditions, quickly and efficiently removes large quantities of oil from the water surface with minimal logistical support. A typical in-situ burn employs boats towing fire resistant boom in a U-shaped configuration, in which oil is collected, towed away from the main slick and ignited. The configuration is slowly towed during the burn in order to maintain the oil toward the back end of the boom at the minimum thickness necessary to sustain the burn. After the boomed oil is burned, the process is repeated. In-situ burning can be used simultaneously with other offshore oil spill response techniques or can be conducted when and where other techniques are insufficient or impossible.

Perhaps the biggest advantage of in-situ burning is that it can achieve a burn efficiency of up to 99 percent of the oil contained in the boom, a substantially higher removal efficiency than is achieved with mechanical removal or dispersants. When conditions are optimal for an effective and safe ignition, burning can eliminate spilled oil at approximately 100 gallons/day/square foot . This elimination rate means that a single 500 foot fire boom positioned in a U-configuration to intercept an ongoing spill could provide enough burn area to sustain an elimination rate of 15,000 barrels per day (Allen and Ferek, 1993, Fingas *et al.*, 1994). A major operational advantage of in-situ burning is the lack of dependence on skimming, transfer, and storage equipment for recovered oil and water.

As with any response technique, effective use of in-situ burning requires a specific set of operational, environmental, and oil slick conditions. Most crude and refined oils will burn on water if the oil layer is at least several millimeters thick (minimum of 2-3 mm), the ignition area sufficiently large, and the temperature high enough to vaporize the oil for continued combustion. Emulsification, evaporation of lighter volatiles, and the thinning of spilled oil layers can significantly reduce the successful use of controlled burning. Consequently, burning at sea is most effective early in a spill response. Due to containment requirements for ignition, relatively calm wind and sea conditions are also necessary.

Typically 97% to 98% of the heat produced during a burn is directed upward and outward so that any heat absorbed by the underlying water is generally negligible. This is particularly true where currents continuously cause an exchange of water below the burning oil. At mesoscale burn tests conducted in the Mobile, Alabama in 1992, researchers found that temperature did not increase in the static water layer at depths greater than four centimeters below the surface (Shigenaka and Barnea, 1993).

In-situ burning rapidly coverts the oil into its primary combustion products, carbon dioxide and water, a small amount of other gases such as CO, NO2, and SO2, a small percentage of smoke particulates and residue byproducts. The smoke particulates and other products of combustion produce a visible smoke plume. The heat generated by the burning oil in the boom causes the smoke to rise several hundred to several thousand feet and to be carried away by the prevailing winds. Laboratory and field experiments indicate concentrations of the gases and fine particulate matter dissipate to background levels within less than two hundred meters downwind of the burn location. The exact distance depends on several factors, including size of the burn, wind velocity, and plume behavior (Walton, *et al*., 1993, 1994. Fingus *et al*., 1994). A small percentage of the original oil volume remains as a taffy-like residue following an in-situ burn. Floating residue can be collected easily with nets and requires relatively small volumes for temporary storage.

Potential aquatic toxicity resulting from in-situ burning has been evaluated in laboratory studies and during the Newfoundland Oil Burn Experiment (NOBE), conducted in 1993. Results of these studies indicate that in-situ burning does not adversely affect the underlying water column beyond those effects already associated with the unburned oil. Lethal and sublethal toxicity and concentrations of petroleum hydrocarbons from the water collected in the vicinity of unburned and burned crude oil slicks in the open sea were extremely low with no significant differences found between water samples collected in both areas (Daykin, *et al*., 1994). It is important to remember that the surface area affected by in-situ burning is small relative to the total surface area and depth of a given body of water and that any adverse ecological impacts are likely to be confined to a small localized area.

Description of Listed Species Present

Sea Turtles

Three endangered species of sea turtles (Kemp's (Atlantic) Ridley, Leatherback, and Hawksbill) and three threatened species (Green, Loggerhead, Olive (Pacific) Ridley) occur in the area. Kemp's Ridley (*Lepidochelys kempii*), the most endangered of these species, occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean and is a shallow water benthic feeder, preying largely on crabs (Owens *et al.*, 1992). Leatherback turtles (*Dermochelys coriacea*) occur throughout the area and have been reported to nest on beaches in Florida and, to a lesser extent, Georgia and North Carolina. Leatherback nesting in the U.S. Caribbean is reported from the Virgin Islands (St. Croix, St. Thomas, St. John) and Puerto Rico, including Islas Culebra, Vieques, and Mona (Boulon *et al.*, 1992). Leatherbacks are considered to be a highly pelagic species and feed primarily on jellyfish. Hawksbill sea turtles (*Eretmochelys imbricata*) occur in the area and are omnivorous, though they seem to prefer invertebrates. Atlantic Green Sea turtles *(Chelonia mydas*) occur throughout the area and nest along the east coast of Florida and in smaller numbers in the U.S. Virgin Islands and Puerto Rico. They feed on both sea grasses and algae (Ehrhart *et al.*, 1991). Loggerhead turtles (*Caretta caretta*) occur throughout the area and nest primarily along North Carolina, South Carolina, Georgia, and Florida beaches. Loggerheads feed on a wide variety of benthic invertebrates (NMFS, 1991). The Olive Ridley (*Lepidochelys olivacea*) occurs and nests in the Caribbean and is predominantly carnivorous.

Cetaceans

Endangered cetaceans that occur in the area include four mysticetes (baleen whales): the finback (*Balaenoptera physalus*), humpback (*Megaptera novaeangliae*), right (*Eubaleana glacialis*), and sei (*Balaenoptera borealis*) whales. Right whales are of greatest concern because they are the most severely depleted large whale species and because they feed, primarily on concentrations of zooplankton, by skimming the surface of the water. Right whales occur in the area primarily in winter and calve in the coastal waters of Georgia and northeast Florida (NMFS, 1990). Humpback whales occur in the area most commonly during their winter breeding season and their breeding range includes part of the Caribbean. Humpback whales feed primarily on krill and small schooling fishes. Fin whales winter in the area, primarily in offshore waters and feed on small fishes, pelagic crustaceans, and squids (NMFS, 1989). Sei whales occur in the northern part of the area and feed on surface plankton, krill, small schooling fishes, and squids. All these baleen whale species are opportunistic feeders and may feed at or near the surface (McKenzie and Nicolas, 1988).

The sperm whale (*Physeter catadon*), an odontocete (toothed whale), is the fifth endangered cetacean species that occurs in the area and is most likely to be found at the edge of the continental shelf or in deep oceanic waters. Sperm whales are deep diving and feed primarily on squids and deep water fishes.

Fish

Only one species of endangered fish, the shortnose sturgeon, occurs in the area. This species is known to occur only in the major river systems and within a few miles of shore, and so is not likely to occur in the area under consideration for action.

Effects of Oil Spills on Sea Turtles and Cetaceans

Sea Turtles can be exposed to spilled oil during feeding, when surfacing to breath, or during nesting in areas contaminated by stranded oil. Turtles are also susceptible to floating tarballs that form from unrecovered, weathered oil. Studies indicate oil exposure can have several adverse effects on turtles, including toxic responses to vapor inhalation or ingestion, skin irritation, interference with osmoregulation and ion balance and reduced hatching success (Van Fleet and Pauly, 1987; Fritts and McGehee, 1982; Lutz and Lutcavage, 1989). Though oil exposure may not directly kill turtles, the effects may make them more vulnerable to predation or disease. Additionally, response activities to clean-up oil stranded on nesting beaches can pose an additional risk of injury during nesting activity.

Whales are subject to several risks when exposed to spilled oil. The most serious risk appears to be inhalation of toxic vapors, which can cause inflammation of mucous membranes of the eyes and airways, lung congestion, or even pneumonia. Effects from contact or ingestion are generally temporary and of less concern (Geraci and St. Aubin, 1990). The volatile fraction of crude oil (approximately one-third by volume) contains many toxic hydrocarbons which evaporate and can create hazardous air concentrations in the vicinity of a spill (Allen and Ferek, 1993).

Analysis of the Effects of Proposed Action

The primary objectives of a spill response are to remove as much oil as possible from the surface of the water as quickly as possible and to prevent oil from moving into nearshore and shoreline areas where removal is more difficult and environmental impacts most severe. In-situ burning, under appropriate conditions, may offer the best response option to help achieve these objectives by rapidly and efficiently removing large volumes of oil from the water surface. The benefits to listed and other species include reduced risk of oil exposure in the aquatic environment and of contamination of critical intertidal areas.

In-situ burning, however, may pose some risks to the listed species. Because both cetaceans and sea turtles must surface to breath, there is conceivably potential risk of injury from surfacing in the area of the burn. In order to maintain control of the burn, though, the area in which it is actually conducted is kept relatively small. Furthermore, an in-situ burn is of relatively short duration, typically only a few hours, due to the efficiency of the technique. The vessel activity in the burn area preceding and during a burn, as well as the unusual appearance of the burn, may deter cetaceans and turtles from remaining in or coming into an area where an in-situ burn is conducted. As described above, thermal effects on the water underlying the burn are negligible, and so pose little risk to the listed species.

Though most burn residues float and are collected, negatively buoyant residues and those that escape collection could pose some risk of exposure to sea turtles and cetaceans through ingestion or fouling of baleen. The effects of ingestion of these residues are not completely known. Even if they do cause some toxic effects, exposure is likely to be low considering the small volume of residues produced. Typically, only a small percentage of the original oil volume remains as residue following an in-situ burn. Any unrecovered residue would certainly pose lower exposure risk than the volume of originally released product.

The overall impacts of combustion products, thermal effects, and floating burn residue are minimal in light of their short-term, localized influences and the ease with which such influences can be controlled. The location and timing of the in-situ burning, for example, can be controlled in order to minimize any exposure to wildlife, particularly listed species. Any impacts resulting from the burn would be expected to be much less severe than those manifested through exposure to a large, uncontained spill.

There is no reason to suspect that this action will add to the cumulative environmental stresses currently acting on the listed species. The effect of in-situ burning is to speed up and increase the efficiency of removal of spilled oil from the environment, and thus, to reduce the net environmental impact, including impacts to listed species.

Analysis of Alternatives

As described in the Memorandums of Understanding, physical removal of oil is normally the preferred spill response option. Mechanical/manual removal of oil will remain the predominant response tool due to the nature and size of most spills, which usually are close to shore and in areas where in-situ burning would not be appropriate due to human health concerns, economics and logistic considerations. In-situ burning will be considered when and where physical removal is impossible or insufficient for protecting valuable resources, including endangered species. As discussed above, the weight of evidence indicates that for the listed species, and the environment more generally, use of in-situ burning under appropriate conditions in the designated zones is more beneficial than not burning .

This action pre-authorizes the designated Federal On-Scene Coordinator to use in-situ burning as a response technique in certain zones as described above. The alternative is to require Regional Response Team approval of the use of in-situ burning in these zones on a case-by-case basis at the time of a spill. The limited "window of opportunity" for the most optimal and effective use of in-situ burning occurs very early - usually within the first few hours - following an oil spill. Without pre-authorization to permit rapid response and mobilization of the necessary equipment, the delay for case-by-case RRT approval would realistically eliminate in-situ burning as a response option.

Conclusion

The parties to the RRT4 and CRRT in-situ burn regional policies conclude that this action is not likely to adversely affect those listed species present in the subject area. We request that you concur with this conclusion.

The In-situ burn subcommittee of the Caribbean and Region 4 RRT will be responsible for providing the RRT with any available and requested reference materials related to in-situ burning. The subcommittee will update the RRT when new information regarding in-situ burning becomes available.

If any information becomes available that indicates the need for further consultation, then such consultation will be duly resumed.

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United States Fish and Wildlife Service

Commander
Seventh Coast Guard District

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16465
3 Feb 95

Ms. Lorna Patrick
U.S. Fish and Wildlife Service
1612 June Avenue
Panama City, FL 32045

Dear Ms. Patrick:

I am writing to request your review of and concurrence on a biological assessment conducted pursuant to Section 7 of the Endangered Species Act. I understand that Lieutenant Commander Bradford Benggio, the National Oceanographic and Atmospheric Administration (NOAA) Scientific Support Coordinator for the United States Coast Guard Seventh District, has discussed this matter with you. Additionally, he has consulted Mr. Gregory Hogue, at the Department of Interior's Regional office in Atlanta, and Mr. James Oland of the U.S. Fish and Wildlife Service in Boqueron, Puerto Rico.

The U. S. Coast Guard, along with the Environmental Protection Agency, the Department of the Interior, the Department of Commerce, and the States of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and the Commonwealth of Puerto Rico, and Territories of the U.S. Virgin Islands plan to execute policy that will provide the Federal On-Scene Coordinators within Federal Region IV and the Caribbean pre-authorization to use in-situ burning within designated zones as a response countermeasure for oil spills. It is the understanding of the Federal Agencies involved that this may constitute federal action in an area where endangered and threatened species are known to occur. Consequently, consultation may be required under Section 7 of the Endangered Species Act.

This request includes the attached biological assessment in accordance with 50 CFR 402.12. Our biological assessment of this action indicates that the listed species present are not likely to be adversely affected by this action. The use of in-situ burning offers strong potential for net environmental benefit during an oil spill by allowing for increased protection of nearshore, shoreline, and down-current habitat and biological resources. It provides for a more rapid removal of oil from the environment thus subjecting fewer resources to the potential of impact. Therefore, with your concurrence, a formal consultation should not be necessary.

Sincerely,

Gerald W. Abrams
Captain, U.S. Coast Guard
Chief, Marine Safety Division
Seventh Coast Guard District
By direction of the District Commander

cc: Mr. James Oland

BIOLOGICAL ASSESSMENT

This biological assessment consists of:

- a description of the area affected by the action;
- a description of the proposed action;
- a description of in-situ burning as an oil spill response technique;
- a description of the listed species present;
- a brief review of the literature on the effects of oil on the listed species of concern;
- an assessment of the risks of in-situ burning to listed species; and
- a brief assessment of alternatives to pre-authorization of in-situ burning in these zones.

Description of the Area

The subject area includes two zones (see zone maps) in U.S. Coast Guard Districts 5, 7, and 8 designated in the regional policy as follows:

Zone A: The “A” zone is defined as any area within Region IV Regional Response Team (RRT IV) or the Caribbean Region Regional Response Team (CRRT) jurisdictions falling exclusively under federal jurisdiction; and not classified as a “B” or “R” zone; which is at least 3 miles seaward from any state coastline; and seaward of any state waters, or as designated by separate Letters of Agreement (LOA) with each individual state or Federal Trustee and the Regional Response Team (RRT).

Zone B: The “B” zone is defined as any area in RRT IV or the CRRT falling under state or special management jurisdiction which is not classified as an “A” or “R” zone. “B” zones are areas falling anywhere within state waters or the following special management or specified areas:

- National Marine Sanctuaries, including the Florida Keys National Marine Sanctuary;
- National or State Wildlife Refuges;
- Units of the National Park System;
- Waters designated as Marine Reserves;
- Proposed or designated Critical Habitats;
- Special endangered species use areas designated by Trustee Agency representatives;
- Waters less than 30 feet in depth that contain living coral reefs, submerged algal beds, submerged seagrass beds, and coastal wetlands including mangroves areas, saltwater marshes, salt ponds, and freshwater marshes.

Zone R: Currently no “R” zones have been identified by Region IV or the Caribbean Region. An “R” zone is defined as any area in the RRT IV and CRRT regions falling under state or special management jurisdiction which is not classified as an “A” or “B” zone. The “R” zone is that area designated by the Region IV and Caribbean Region as exclusion zones where no in-situ burn operations will be conducted.

This policy will be implemented regionally for in-situ burning throughout the offshore areas within the boundaries of the Caribbean Regional Response Team and Region IV Regional Response Team jurisdictions.

Description of the Proposed Action

The policy acknowledges that in most cases the primary method for controlling released oil will be physical removal from the environment. Under certain circumstances, however, effective physical removal of oil from the water surface may not be possible or efficient enough to maximize resource protection. In such cases, in-situ burning can significantly reduce impacts to the environment, including listed species. The policy recognizes that the decision to use in-situ burning within the pre-authorization protocols rests solely with the pre-designated Federal On-Scene Coordinator (FOSC) and cannot be further delegated.

The policy provides that the FOSC may conduct in-situ burning without further concurrence within Zone A. Burning can be conducted in Zone A only when the wind is expected to carry smoke away from population centers and other sensitive resources and if PM-10 concentrations, measured according to a monitoring plan which uses real-time particulate counters, do not exceed established human exposure limits. The decision to conduct burning will be guided by a decision tree contained in the policy. This decision tree addresses concerns related to oil type, oil amount, oil condition, environmental conditions, proximity issues, availability of personnel and equipment, and time constraints.

In-Situ burning in Zone B will require case-by-case authorization by the Region IV RRT or Caribbean RRT. In-situ burning will not be pre-authorized in Zone B areas unless designated in separate LOAs developed by the states and agreed upon by the Regional Response Team.

Prior to beginning an in-situ burn, an on-site survey will be conducted, in consultation with natural resource specialists, to determine if any threatened or endangered species are present in the burn area or otherwise at risk from any burn operations, fire, or smoke. Measures will be taken to prevent risk of injury to any wildlife, especially endangered or threatened species. Examples of potential protection measures include: moving the location of the burn to an area where listed species are not present; temporary employment of hazing techniques, if effective; and physical removal of individuals of listed species under the authority of the trustee agency. Burn residues will be collected immediately following an in-situ burn to minimize exposure to wildlife and habitat.

If a decision to use in-situ burning is made, the U.S. Environmental Protection Agency (EPA), the U.S. Department of Commerce (DOC), the U.S. Department of the Interior (DOI), and appropriate state(s) will be notified through RRT representatives as soon as possible. A post-incident briefing will be held within 45 days after an in-situ burn to exchange information on the efficacy and effects of the burn, and to determine whether any changes to the policy are needed.

Description of In-Situ Burning

In-situ burning is an oil spill response technique which, when used under appropriate conditions, quickly and efficiently removes large quantities of oil from the water surface with minimal logistical support. A typical in-situ burn employs boats towing fire resistant boom in a U-shaped configuration, in which oil is collected, towed away from the main slick and ignited. The configuration is slowly towed during the burn in order to maintain the oil toward the back end of the boom at the minimum thickness necessary to sustain the burn. After the boomed oil is burned, the process is repeated. In-situ burning can be used simultaneously with other offshore oil spill response techniques or can be conducted when and where other techniques are insufficient or impossible.

Perhaps the biggest advantage of in-situ burning is that it can achieve a burn efficiency of up to 99 percent of the oil contained in the boom, a substantially higher removal efficiency than is achieved with mechanical removal or dispersants. When conditions are optimal for an effective and safe ignition, burning can eliminate spilled oil at approximately 100 gallons/day/square foot . This elimination rate means that a single 500 foot fire boom positioned in a U-configuration to intercept an ongoing spill could provide enough burn area to sustain an elimination rate of 15,000 barrels per day (Allen and Ferek, 1993, Fingas *et al.*, 1994). A major operational advantage of in-situ burning is the lack of dependence on skimming, transfer, and storage equipment for recovered oil and water.

As with any response technique, effective use of in-situ burning requires a specific set of operational, environmental, and oil slick conditions. Most crude and refined oils will burn on water if the oil layer is at least several millimeters thick (minimum of 2-3 mm), the ignition area sufficiently large, and the temperature high enough to vaporize the oil for continued combustion. Emulsification, evaporation of lighter volatiles, and the thinning of spilled oil layers can significantly reduce the successful use of controlled burning. Consequently, burning at sea is most effective early in a spill response. Due to containment requirements for ignition, relatively calm wind and sea conditions are also necessary.

Typically 97% to 98% of the heat produced during a burn is directed upward and outward so that any heat absorbed by the underlying water is generally negligible. This is particularly true where currents continuously cause an exchange of water below the burning oil. At mesoscale burn tests conducted in the Mobile, Alabama in 1992, researchers found that temperature did not increase in the static water layer at depths greater than four centimeters below the surface (Shigenaka and Barnea, 1993).

In-situ burning rapidly coverts the oil into its primary combustion products, carbon dioxide and water, a small amount of other gases such as CO, NO2, and SO2, a small percentage of smoke particulates and residue byproducts. The smoke particulates and other products of combustion produce a visible smoke plume. The heat generated by the burning oil in the boom causes the smoke to rise several hundred to several thousand feet and to be carried away by the prevailing winds. Laboratory and field experiments indicate concentrations of the gases and fine particulate matter dissipate to background levels within less than two hundred meters downwind of the burn location. The exact distance depends on several factors, including size of the burn, wind velocity, and plume behavior (Walton, *et al*., 1993, 1994. Fingus *et al*., 1994). A small percentage of the original oil volume remains as a taffy-like residue following an in-situ burn. Floating residue can be collected easily with nets and requires relatively small volumes for temporary storage.

Potential aquatic toxicity resulting from in-situ burning has been evaluated in laboratory studies and during the Newfoundland Oil Burn Experiment (NOBE), conducted in 1993. Results of these studies indicate that in-situ burning does not adversely affect the underlying water column beyond those effects already associated with the unburned oil. Lethal and sublethal toxicity and concentrations of petroleum hydrocarbons from the water collected in the vicinity of unburned and burned crude oil slicks in the open sea were extremely low with no significant differences found between water samples collected in both areas (Daykin, *et al*., 1994). It is important to remember that the surface area affected by in-situ burning is small relative to the total surface area and depth of a given body of water and that any adverse ecological impacts are likely to be confined to a small localized area.

Description of Listed Species Present

Sea Turtles

Six species of sea turtles (Kemp's (Atlantic) ridley, leatherback, hawksbill, green, loggerhead, and olive (Pacific) ridley occur in the proposed area. Kemp's Ridley (*Lepidochelys kempii*), the most endangered of these species, occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. Adults are most frequently sighted off southwestern Florida. Kemp’s ridleys are a shallow water benthic feeder, preying largely on crabs. Young Kemp’s ridleys may use sargassum mats or seagrass mats for refugia and foraging (Owens *et al.*, 1992, Ernst *et al*., 1994).

Endangered leatherback turtles (*Dermochelys coriacea*) occur throughout the area and have been reported to nest on beaches in Florida and, to a lesser extent, Georgia and North Carolina. Leatherback nesting on beaches in the U.S. Caribbean is reported from the Virgin Islands (St. Croix, St. Thomas, St. John) and Puerto Rico, including Islas Culebra, Vieques, and Mona (Boulon *et al.*, 1992). The leatherback turtle is considered to be a highly pelagic species and is the only marine turtle thought to be distributed primarily in offshore waters. Leatherbacks feed primarily on jellyfish.

Endangered hawksbill sea turtles (*Eretmochelys imbricata*) are predominantly tropical but also occur in the proposed area. Hawkbills characteristically inhabit shallow rocky places and coral reefs, but also occur in shallow coastal waters such as mangrove-bordered bays, estuaries, and lagoons with mud bottoms and little or no vegetation. It is occasionally found in deep waters, and juveniles associate with floating patches of sargassum mats. Hawkbills are omnivorous opportunists that seem to prefer invertebrates, particularly sponges (Ernst *et al*., 1994).

Atlantic Green sea turtles *(Chelonia mydas*) occur in U.S. Atlantic waters around the U.S. Virgin Islands, Puerto Rico, and along the continent U.S. from Texas to Massachusetts. They are endangered in Florida and threatened elsewhere. Green turtles nest along the east coast of Florida and in smaller numbers in the U.S. Virgin Islands, Puerto Rico, and along the Florida panhandle. Important nesting areas in Florida include Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties. Green turtles frequent shallow water grass flats, feeding on both seagrasses and algae. Areas that are known as important feeding areas for green turtles in Florida include Indian River Lagoon, Florida Keys, Florida Bay, Homosassa, Crystal River, and Cedar Key (Ehrhart *et al*., 1991).

Loggerhead turtles (*Caretta caretta*) are threatened and occur throughout the proposed area. In the western Atlantic the great bulk of loggerhead nesting occurs along the southeastern coast of the U.S., with approximately 80 percent occurring in Brevard, Indian River, St. Lucie. Martin, Palm Beach, and Broward Counties in Florida (NMFS, 1991). Loggerhead turtles also nest on beaches in North Carolina, South Carolina, Georgia, along the Gulf Coast of Florida, Alabama, and Mississippi. Loggerheads wander widely throughout the marine waters of their range. Hatchlings and juveniles are most often found along current fronts, downswells, or eddies associated with drifting mats of sargassum (Ernst *et al*., 1994). Loggerheads are omnivorous and feed on a wide variety of benthic invertebrates.

The Olive Ridley turtle (*Lepidochelys olivacea*), which is threatened, primarily occurs and nests in tropical regions, including the Caribbean. It inhabits relatively shallow marine waters, typically within 15 kilometers of mainland shores, but occasionally occurs in the open sea. It is predominantly carnivorous, feeding primarily on invertebrates or protochordates that can be caught in shallow marine waters or estuarine habitats (Ernst *et al*., 1994)..

West Indian Manatee

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

Like other sirenians, manatees are aquatic herbivores and feed on a wide variety of submerged, emergent, floating, and shoreline vegetation. In saltwater, they feed primarily on several species of seagrass, including turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*) and shoal grass (*Haladule wrightii*). Manatees also may eat some species of algae, mangrove leaves and red mangrove seedlings. They have been known to haul themselves partially out of the water to consume bank vegetation. In freshwater manatees feed on a variety of plants, including *Hydrilla verticillata*, algae and water hyacinth (*Eichhornia crassipes*). Movements and aggregations of manatees, which spend several hours each day feeding, can be correlated with the distribution of seagrasses and vascular freshwater aquatic vegetation (Reynolds and Odell, 1991).

The Florida manatee occurs along the Atlantic and Gulf Coasts of Florida, inhabiting bays, estuaries, rivers and coastal areas where seagrasses and other vegetation are abundant. The primary range along the Atlantic Coast of Florida extends from the St. Johns River in northeastern Florida southward to the Miami area. Few manatees occur in the Florida Keys or in Florida Bay. On the Gulf Coast of Florida, manatees are abundant in the waters of the Everglades National Park and their range extends northward to the Suwannee River in summer and sporadically westward. During warm summer months, manatees have been known to travel as far north as Chesapeake Bay and as far west as Mississippi and Louisiana. Especially during cold weather, manatees tend to congregate near natural warm springs at Crystal River on the Gulf Coast and Blue Spring State Park on the St. Johns River on the Atlantic Coast of Florida. They also are drawn to warm water discharged from power plants including those at Cape Canaveral, Fort Lauderdale, Port Everglades, Riviera, Fort Myers, and Tampa Bay. Manatees also congregate near freshwater sources such as river mouths. The Indian River Lagoon is an important feeding area. Though manatees rarely venture into deeper, ocean waters, they have been reported in locations as far offshore Florida as the Dry Tortugas Islands. At an estimated population of around 1000 in Florida waters, the Florida manatee is at very serious risk of extinction (USFWS, 1989).

The Antillean manatee occurs in Puerto Rico and very rarely in the Virgin Islands. Manatees routinely cross between the islands of Puerto Rico in the proposed area (Zone A). As in other areas in the Caribbean basin, the distribution of Antillean manatees in Puerto Rico is not uniform and is most likely related to the distribution of freshwater resources, seagrass beds, and sheltered areas. In some areas, seasonal shifts in local abundance appear to correlate with the rainy season in that manatees tend to move downstream when water levels drop in the dry season. Surveys indicate most manatees are seen along the eastern and south-central coasts of Puerto Rico and tend to congregate in the vicinity of the Roosevelt Roads Naval Station on the eastern end of the island (Rathbun and Possardt, 1986).

Brown Pelican

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

Significant U.S. breeding populations of the Eastern Brown Pelican (*Pelecanus occidentalis carolinensis*) occur primarily in Florida and South Carolina. Eastern Brown Pelicans usually nest in early spring and summer and many spend the winter close to their nesting areas (USFWS, 1980). No nesting of brown pelicans has been documented in Mississippi, though large numbers of birds are known to occur there. They occur most commonly nearshore (Zone B area) but also frequent areas farther from shore (Zone A) in large numbers during the summer when food is plentiful, such as around fishing vessels (Goldman, 1995).

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

Roseate Tern

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

Roseate Terns usually feed over open water, often in tidal channels, tide rips, or over sandbanks where currents bring fish into relatively shallow water. This species is a specialist feeder on small schooling marine fish, which it catches by plunging vertically into the water and seizing them in its bill. After feeding offshore, Roseate Terns return to shore to rest and roost, rarely resting on the water.

Piping Plover

The Piping Plover (*Charadrius melodus*) is a shorebird that breeds only in North America in three geographic regions. The Atlantic Coast and Great Plains populations are threatened; the Great Lakes population is endangered. The Atlantic population breeds along the Atlantic coast of North America, from Newfoundland south to South

Carolina. Piping plovers winter more frequently along the Gulf Coast than the Atlantic Coast (Nicholls, 1989). In 1987 to 1989 survey conducted from Virginia to Louisiana, 87 percent of piping plovers observed were on the Gulf Coast of Florida to Texas. It was estimated that this represented 35 percent of the total breeding population and 56 percent of the great Lakes/Great Plains population (Nicholls, 1989). The threatened Atlantic population also winters from North Carolina to Key West, Florida and has been reported to occur in the Caribbean Islands. Major Atlantic Coast wintering areas include the southern North Carolina coast, particularly near Morehead City, the southern coast of Georgia, and the Lower Florida Keys. In the Florida Keys the stretch from 7-mile Bridge to Bahia Honda seems to be particularly favored (USFWS, 1988).

Piping Plovers along the Atlantic Coast nest on sandy beaches above the high tide line, sand flats at the ends of sandspits and barrier islands, gently sloping foredunes, blowout areas behind primary dunes, and washover cut into or between dunes. Nest sites are relatively flat and occur most commonly at sites with little vegetation, but may be found in moderately dense stands of beachgrass (*Ammophila breviligulata*). Piping Plovers feed on the intertidal ocean beach, washover areas along the shorelines of isolated dune ponds, tidal flats on the lagoon side of barrier beaches, and tidal mudflats in the saltmarshes. Plovers usually feed during low or falling tides on marine worms, fly larvae, beetles, crustaceans, molluscs, and other invertebrates, sometimes obtained from intertidal wrack debris or beachgrasses (USFWS, 1988).

Eskimo Curlew

The Eskimo Curlew (*Numenius borealis*) is an almost extinct shorebird. It nests on the Arctic tundra and winters in South America. Eskimo Curlews may occur in the area, primarily in prairie grasslands, during migration in spring and fall. Its diet includes insects, crustaceans, mollusks, worms.

Wood Stork

The Wood Stork (*Mycteria americana*) is an endangered wading bird that occurs along the southern Atlantic and Gulf Coasts from South Carolina in coastal shallows including Cypress swamps (nesting colonies), marshes, ponds, and lagoons. The wood stork's diet includes small fish, crustaceans, frogs, lizards and rodents. The stork will travel greater than 1000 kilometers to feeding areas.

Bald Eagle

The Bald Eagle (*Haliaeetus leucocephalus*) occurs and is endangered in all of the Region IV states. A raptor, the Bald Eagle uses a large area for hunting its prey and is sensitive to chemical contaminants in the food chain. In the Southeast, fish comprise the bulk of the bald eagle's diet, though they are opportunistic feeders and supplement this with a variety of other vertebrate species, including waterfowl, sea birds and carrion.

Bald Eagle nests are usually located near open water. In the Southeast, nests are most often built high up in pine and cypress trees with a clear view of open water, though in some areas eagles nest in low mangroves. In the Southeast the nesting period usually runs from October 1 to May 15. Eagles are most vulnerable to disturbance early in the nesting period (approximately first 12 weeks). Disturbance during this period may lead to nest abandonment, decreased hatching success, or decreased survival of unfledged young. Due to the relatively low reproductive rate of Bald Eagles, this can result in significant population impacts (USFWS, 1989b).

Peregrine Falcon

Both the endangered American Peregrine Falcon (*Falco peregrinus anatum*) and the recently delisted (as of October 5, 1994) Arctic Peregrine Falcon (*Falco peregrinus tundrius)* can occur in the area proposed for action. Though no longer considered biologically threatened, the Arctic peregrine falcon remains classified as “endangered due to similarity of appearance” to protect the nearly identical endangered American peregrine falcon. In the eastern part of its range, the peregrine falcon typically uses closed or semi-enclosed deciduous habitat, usually overlooking aquatic areas. Peregrines prefer cliff ledges for nesting and for night roosting of young after they have fledged, though cut banks, hollows in trees and building ledges are also used occasionally. They breed and nest in the spring.

The peregrine falcon is a raptor, preying chiefly on birds. In inland areas, prey for the peregrine consists primarily of passerine bird species such as bluejays, flickers, meadowlarks and pigeons. On the seacoast and islands, during migration and at wintering grounds, the smaller shorebirds and waterfowl are also taken. Peregrine Falcons prefer to capture their prey in flight, diving from above at great speed, and then descend to the ground to eat the prey (USFWS, 1980a).

Cape Sable Seaside Sparrow

The Cape Sable Seaside Sparrow (*Ammodramus maritima*) is an endangered passerine species that inhabits coastal prairies near Cape Sable, Florida. They eat seeds, insects and small fruits.

Gulf Sturgeon

Only threatened species of fish, the Gulf sturgeon (*Acipenser oxynrhohus desotoi*), occurs in the proposed area. It is an anadromous species that occurs primarily in the Northeastern Gulf of Mexico, where it ranges from the Mississippi Delta east to the Suwannee River in Florida and formerly to Tampa Bay. The Gulf sturgeon is greatly depleted throughout most of its range and now is relatively common only in a few areas (Lee *et al*., 1980).

The anadromous Gulf sturgeon spawns in freshwater riverine habitats from April to June. Eggs adhere to vegetation and stones. Young descend to sea at about 2 to 3 years of age for winter migrations (Barkuloo, 1988). Information is lacking on whether sturgeon aggregate during their migrations. Data shows, however, that adults tend to enter and leave the freshwater system within very narrow time periods (Barkuloo, 1988). The marine habitats for the Gulf sturgeon are poorly known. Limited analyses of stomach content indicate that sand bottom, hard bottom, and seagrass beds are probably important habitats (Barkuloo, 1988). In the Big Bend area of the southeastern Gulf o Mexico, these habitats occur in 70 feet of water as fas offshore as 20 miles. The Gulf sturgeon is a benthic omnivore, feeding on insects, crustaceans, mollusks, annelids and occasionally small fish (Lee, *et al*. 1980).

Crocodilians

Two listed crocodilian species occur in the area. The threatened American alligator (*Alligator mississippiensis*) occurs in lakes, swamps, marshes, and rivers in the Southeastern United States. Like all alligator species, it is confined to freshwater habitats. The endangered American crocodile (*Crocodylus acutus*) occurs in nearshore marine habitats, primarily in coastal estuaries and swamps and the tidal portions of rivers. Both species are aquatic predators that hunt a wide variety of prey including small fish, invertebrates, birds and mammals. Alligators and a few species of crocodiles build mound-nests of vegetation and soil. Most crocodiles dig their nests in friable soils (Zug, 1993).

St. Croix Ground Lizard

The endangered St. Croix Ground Lizard (*Ameiva polops*) occurs in the Caribbean on Green, Protestant and Ruth Cays. It is a predominantly terrestrial and largely insectivorous (Zug, 1993).

Beach Mice

Five endangered subspecies of beach mice occur in the proposed area along the southern Atlantic and northwest Gulf Coasts: the Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*), the Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*), the Alabama beach mouse (*Peromyscus polionotus ammobates*), the Southeastern beach mouse (*Peromyscus polionotus niveientris*), and the Anastasia beach mouse (*Peromyscus polionotus phasma)*. Southeastern and Anastasia beach mice occur on the Atlantic coast of Florida. Beach mouse habitat is restricted to the primary and secondary sand dunes and scrub dunes along the ocean front. Beach mice dig burrows mainly on the lee side of the primary dunes and in other secondary and interior dunes where the vegetation provides suitable cover. It is thought that beach mice feed primarily on the seeds of beach grasses, *Panicum amarum* and *Panicum repens*, and on sea oats, *Uniola paniculata*; however, recent food habit studies show that insects are also an important component of their diet (Holler 1990, 1991a, 1991b; USFWS,1987, 1989c; Moyers, 1995).

Key Deer

The Key deer (*Odocoileus virginianus clavium*) is an endangered subspecies of the Whitetail deer. It typically inhabits forests, swamps and open brushy areas. Key deer are browsers, eating twigs, shrubs, fungi, grass and other herbaceous plants.

Red Wolf

The endangered red wolf (*Canis rufus*) may occur in the area proposed for action. It is usually found in brushy and forested areas and near river bottoms. The red wolf feeds primarily on small mammals and birds. On the Gulf Coast it also feeds on crabs.

Seabeach Amaranth

The seabeach amaranth (*Amaranthus pumilus*) is a threatened annual plant species that grows on beaches and low active dunes, often covered by tides, from Rhode Island to South Carolina (Gleason and Cronquist, 1963).

Effects of Oil Spills on Listed Species

General Effects

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

Sea Turtles

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

Oiling of sea turtle nesting habitat poses a potential risk to adult nesting turtles, hatchlings, and particularly to eggs. Turtle embryos may be especially vulnerable to effects from oil contamination. Important variables in determining the likelihood of damage are the stage of nesting, the type of oil, degree of oil weathering, amount of oil, and height of disposition on the beach. The effect of oil on the development and survival of marine turtles appears to be variable, depending on these factors. Studies by Fritts and McGhee (1982) indicate that fresh oil washing ashore to the level where nests with incubating eggs are located may result in significant embryo mortality. They also concluded that if eggs were deposited in sand after petroleum contamination has occurred and the oil has weathered significant mortality is not likely, though hatchlings may be smaller than normal. On St, Vincent National Wildlife Refuge (NWR) in 1994 beaches in the Florida panhandle became fouled with tar. Female sea turtles crawled through the tar to nest, transferring the tar to the nests. No tar was found on the eggs in the nest when excavated at the end of the season (Lewis, 1995).

In addition, it has been suggested that olfactory cues are imprinted on sea turtles as hatchlings, which guide them back to their natal beaches for nesting when they reach maturity. Oil on the beach could interfere with these chemical guides (Lutz *et al*., 1985; Ogren, 1990; Possardt, 1990). Both eggs and hatchlings may be at additional risk of injury from clean up activities if oil strands on nesting beaches.

Manatees

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

Birds

Birds are extremely vulnerable to impacts from spilled oil. Marine oriented species highly adapted to life on the open ocean are at particularly high risk of direct exposure. Feathers absorb oil, interfering with critical functions such as insulation, water-repellency, buoyancy and flight. Death can result from combinations of cold, starvation, and drowning. Birds may also ingest oil while preening or from eating contaminated food, resulting in toxic effects. Ingested oil can cause anemia, pneumonia, intestinal irritation, kidney damage, altered blood chemistry, decreased growth, altered osmoregulation, and decreased production and viability of eggs. Oil contamination on egg shells, even in very small quantities, is extremely toxic to avian embryos (Fritts *et al*., 1983).

Bird species differ in their vulnerability to oil spill impacts depending on their behavior, distribution and reproduction. Diving coastal seabirds, including the brown pelican, roseate tern, and black-capped petrel are at high risk of oil exposure because they regularly enter the water for feeding. A significant proportion of the world population of black-capped petrels could be affected by an oil spill in North Carolina. Shorebirds, wading birds, raptors and passerines are less vulnerable to exposure to free-floating oil on the water because they rarely immerse themselves in water and do not flock or roost on the water surface. All of these species are at risk, however, of contamination from oil that washes ashore. Shoreline oiling can have severe impacts on shorebirds and other species that use beach habitat for nesting, especially if they form large nesting aggregations as piping plovers do. Some species can be impacted indirectly if their primary food sources are affected. Raptors, for example, are at risk of exposure from contaminated seabirds and other prey. In-situ burning would serve to reduce these potential impacts by minimizing the amount of oil that would wash ashore or remain afloat at sea with potential to contaminate seabirds.

Gulf Sturgeon

The anadromous Gulf sturgeon would be most vulnerable to oil spills during the winter marine migrations. Since the Gulf sturgeon is a benthic feeder, ingestion of contaminated sediments, organisms, or vegetation could occur if oil settles to the sea floor. The ability of Gulf sturgeon to sense and avoid oil contamination is unknown. Because the Gulf sturgeon does little or no feeding in fresh water, its growth and reproductive potential depend entirely on the resources accumulated by feeding during winter migrations. Ingestion of contaminated food and sediments could lead to general body deterioration, lower reproductive potential, and lower viability of offspring. If Gulf sturgeon do aggregate during their winter migrations, as some data indicates, significant portions of the population could be affected by a major oil release impacting aggregation areas (Barkaloo, 1988).

Other Listed Species

Contamination of shoreline habitat or affects on key prey species populations are the major risks of impact associated with oil spills to listed species that spend most of their time on land, in freshwater, or in highly sheltered areas. This includes the listed terrestrial mammals, crocodilians, St. Croix ground lizard, and the seabeach amaranth.

Along Gulf Coast areas with relatively narrow beaches, an oil spill occurring during an episode of high winds and seas (a relatively common occurrence) could result in contamination of dune habitats and severe mortality of the plant and animal species associated with them. Oil stranded on the beach face also can be remobilized later by strong surf action and winds and redeposited into the primary dunes. Consequently, an oil spill reaching the shoreline could seriously impact species such as beach mice, even though the primary habitat of these subspecies is on the lee side of the dunes and their food sources are located above the high tide line. For example, the National Park Service has described the following occurrence during a small oil spill on Horn Island, Mississippi, in September 1989:

> " Several days after landfall of the Horn Island spill, strong surf action and winds combined to remobilize and distribute significant amounts of oil from the beach face up into the adjacent primary dunes. The spray generated by the wind and surf action was sufficiently oily to completely coat most of the dune vegetation, and resulted in leaf browning which persisted until the next growing season" (Zimmerman, 1990).

In-situ burning would help minimize such shoreline contamination and associated ecological impacts by preventing oil from washing ashore.

Analysis of the Effects of Proposed Action

The primary objectives of a spill response are to remove as much oil as possible from the surface of the water as quickly as possible and to prevent oil from moving into nearshore and shoreline areas where removal is more difficult and environmental impacts most severe. In-situ burning, under appropriate conditions, may offer the best response option to help achieve these objectives by rapidly and efficiently removing large volumes of oil from the water surface. The benefits to listed and other species include reduced risk of oil exposure in the aquatic environment and of contamination of critical intertidal areas.

Nevertheless, in-situ burning itself could pose some risks to the listed species. Because sea turtles and manatees must surface to breath, there is conceivably potential risk of injury from surfacing in the area of the burn. Birds could fly into the burn area and be affected by the flames or the smoke plume. Some of the gaseous combustion by-products and the fine particulate material can be toxic or irritating to the respiratory system.

To maintain control of the burn, however, the area in which burning is actually conducted is kept relatively small. Furthermore, because in-situ burning is a highly efficient technique, it is of relatively short duration, typically only a few hours. The vessel activity in the burn area preceding and during a burn, as well as the unusual appearance of the burn, may deter sea turtles, birds, manatees, and other listed species from remaining in or coming into an area where an in-situ burn is conducted. As described above, thermal effects on the water underlying the burn are negligible, and so pose little risk to the listed species. Toxic gases and fine particulate matter in smoke dissipate along with the plume to background levels within a few miles of the burn location (Shigenaka and Barnea, 1993).

Though most floating burn residues float are collected, negatively buoyant residues and those that escape collection could pose some risk of exposure to sea turtles, seabirds, or manatees through ingestion. If escaped residues wash ashore, shorebirds and other listed species using shoreline habitat are potentially at risk of be exposure. The effects of ingestion of these residues are not completely known. Even if they do cause some toxic effects, exposure is likely to be low considering the small volume of residues produced. Typically, only a small percentage of the original oil volume remains as residue following an in-situ burn. Any unrecovered residue would certainly pose lower exposure risk than the volume of originally released product.

The overall impacts of combustion products, thermal effects, and floating burn residue are minimal in light of their short-term, localized influences and the ease with which such influences can be controlled. The location and timing of the in-situ burning, for example, can be controlled in order to minimize any exposure to wildlife, particularly listed species. Effects on prey of the listed species would, likewise, be minor and temporary. Any impacts resulting from the burn would be expected to be much less severe than those manifested through exposure to a large, uncontained spill.

Furthermore, most of the listed species do not occur in Zone A where in-situ burning would be conducted and so are not likely to be directly affected. Manatees very rarely venture into the deeper offshore waters of Zone A, except in Puerto Rico where they routinely cross between the islands. Brown pelicans and roseate terns are known to feed in concentrated areas in Zone A, but wading birds, shorebirds, raptors, and passerines (including the piping plover, eskimo curlew, wood stork, American bald eagle, peregrine falcon, and Cape Sable seaside sparrow) are not likely to occur in the area under consideration for action. Based on observations of hunting techniques employed in Haiti, it has been suggested by Lee (1995) that the candidate black-capped petrel may be attracted to fires, though this had not been substantiated. The listed terrestrial mammals, crocodilians, lizard, and plant species occur only in Zone B and so would not be subject to direct effects of in-situ burning. These species would benefit from in-situ burning by preventing oiling of shoreline habitat and the disturbance associated with shoreline cleanup activity. Several listed species, including piping plovers, peregrine falcons, and brown pelicans are known to be highly sensitive to human disturbance, especially when nesting. The primary human-related cause of manatee mortality is collision with watercraft. Such potential nearshore impacts from cleanup activities would be minimized by preventing oil from washing ashore.

Some hazing and removal activities can adversely affect listed species. Such activities associated with an in-situ burn would be conducted only with full coordination with the natural resource trustees. If deemed appropriate, these activities would be conducted only by authorized or permitted personnel.

This action is not expected to add to the cumulative environmental stresses currently acting on the listed species. The effect of in-situ burning is to speed up and increase the efficiency of removal of spilled oil from the environment, and thus, to reduce the net environmental impact, including impacts to listed species.

Analysis of Alternatives

Physical removal of oil is normally the preferred spill response option. Mechanical/manual removal of oil will remain the predominant response tool due to the nature and size of most spills, which usually are close to shore and in areas where in-situ burning would not be appropriate due to human health concerns, economics and logistic considerations. In-situ burning will be considered when and where physical removal is impossible or insufficient for protecting valuable resources, including endangered species. As discussed above, the weight of evidence indicates that for the listed species and the environment more generally use of in-situ burning under appropriate conditions in the designated zone is more beneficial than not burning.

This action pre-authorizes the designated Federal On-Scene Coordinator to use in-situ burning as a response technique in certain zones as described above. The alternative is to require Regional Response Team approval of the use of in-situ burning in these zones on a case-by-case basis at the time of a spill. The limited "window of opportunity" for the most optimal and effective use of in-situ burning occurs very early, usually within the first few hours, following an oil spill. Without pre-authorization to permit rapid response and mobilization of the necessary equipment, the delay for case-by-case RRT approval would realistically eliminate in-situ burning as a response option.

Conclusion

The parties to the Memorandums of Understanding conclude that this action is not likely to adversely affect those listed species present in the subject area. We request that you concur with this conclusion.

The In-Situ Burn Subcommittee of the RRT IV and CRRT will be responsible for providing the RRT with any available and requested reference materials related to in-situ burning. The subcommittee will update the RRT when new information regarding in-situ burning becomes available. If any information becomes available that indicates the need for further consultation, then such consultation will be duly resumed.

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Appendix IV

In-Situ Burn Monitoring Program Within Region IV

In-Situ Burn Monitoring Program within Region IV

The Region IV Regional Response Team (RRT IV) has adapted the current U.S. Coast Guard (USCG) National Strike Force monitoring program for in-situ burn operations to allow for timely utilization of this response tool and to insure the availability of the monitoring results to the ON-Scene Coordinator (OSC) and the Federal and State Trustees involved in the response. This program is designed for assets and logistical capabilities that are provided in this region by the USCG Gulf Strike Team (GST) and the Scientific Support Coordinator's (SSC) scientific support team.

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

The GST will perform the actual on-site monitoring to collect the raw data with the guidance of the SSC's scientific support team. The SSC scientific support team will assist in monitoring, analysis of the data, and forwarding of the results to the OSC in a timely manner.

The monitoring program is designed to enhance the decision making process undertaken by the OSC during the use of in-situ burning in fulfillment of his/her responsibility to insure appropriate and timely response to mitigate the effects of oil spills, as established by the Clean Water Act and defined by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This monitoring program is established to attempt to provide the OSC with logical "Continue/Discontinue" input during actual operations involving in-situ burning.

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

Appendix V

Equipment Lists

IN-SITU BURNING EQUIPMENT STOCKPILE
SUMMARY TABLE (March 1995)

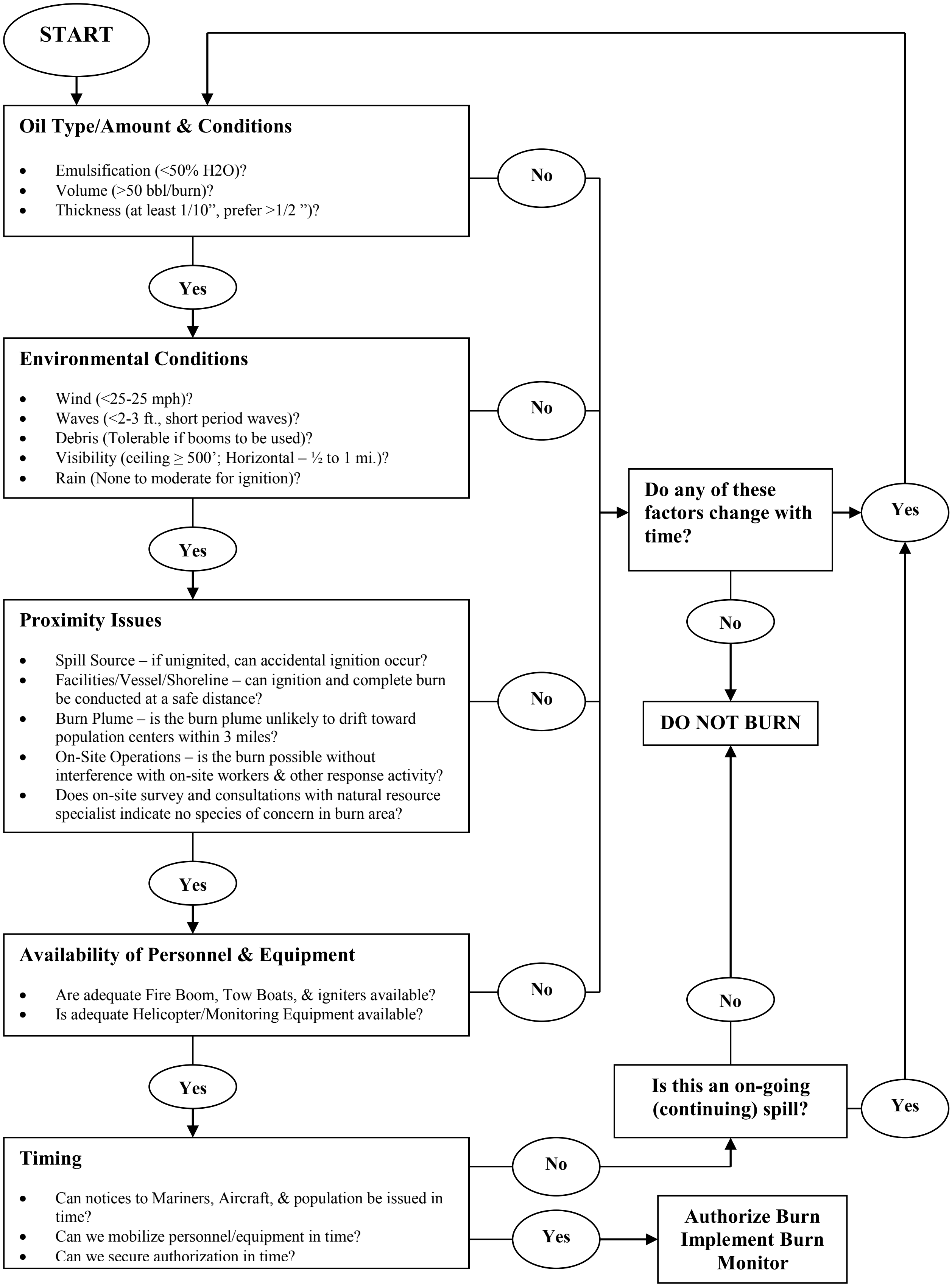
ORGANIZATION	LOCATION	TYPE	SIZE	AMT. (IN FEET)
1. CLEAN CARIBBEAN	FORT LAUDERDALE, FL	3M	18" X 24"	750
PAUL SCHULER (305) 983-9880				
2. TEXAS GENERAL LAND OFFICE	CORPUS CHRISTI, TX CURTAIN FIREGARD	KEPNER SEA	21" X 27"	500
MANNY GONZALES (512) 463-5195				500
3. EXXON	PARADIS, LA	OIL STOP	14" X 22"	500
PAUL FREDRICK (504) 561-3450				
4.ALASKA CLEAN SEAS	NORTH SLOPE ALASKA	3M	8' X 12"	2,508
		3M	8' X 12"	6,000
BRUCE MCKENZIE		3M	12" X 18"	4,600
(907) 345-3142		3M	18" X 24"	4,400
5. ALYESKA	VALDEZ, ALASKA	3M	12" X 18"	2,600
STEVE HOOD (907) 835-6923				
6. ARCO	KUPARUK, ALASKA	3M	12" X 18"	1,000
BRUCE METCALFE / NOVA SPACE (907) 659-7843				
7. COOK INLET SPILL	NIKISKI, ALASKA	3M	12" X 18"	4,000
	PREVENTION AND	3M	12" X 18"	1,000
	RESPONSE, INC.	3M	12" X 18"	500
		3M	18" X 24"	1,000
BILL STILLINGS JIM HICKS (907) 776-5129				
8. SUMMIT HELICOPTERS	VIRGINIA	HELITORCH	6	
(703) 992-5500				

ORGANIZATION	LOCATION	TYPE	SIZE	AMT. (IN FEET)
9. MSRC	MIAMI, FL	OIL STOP FIRE BOOM		500
(305) 347-2200				
10. NAVY SUPSALV		EMERGENCY SHIP SALVAGE MATERIAL IN-SITU BURN SYSTEM		
(703) 695-0231 24 HR NUMBER				

Appendix VI

Decision Tree
and Application\Checklist Forms

Decision Tree



OIL SPILL RESPONSE APPLICATION \ CHECKLIST: IN-SITU BURNING

The following checklist is provided as a summary of important information to be considered by the On-Scene Coordinator (OSC) in reviewing any request to conduct in-situ burning in response to offshore oil spills within the Region 4 Regional Response Team area. This information shall be provided prior to approval of in-situ burning in all zones that are not pre-authorized. The information must be recorded for information and documentation purposes for any offshore in-situ burn.

1. SPILL DATA (To be completed by Responding Party and submitted to OSC)

A. Name of incident:

____

B. Date and time of incident: Month/Day/Year ________ Time _______

C. Incident: Grounding ____ Transfer Operations ____ Collision ____
Blowout ____ Pipeline Rupture ____ Explosion ____ Other ____

D. Did spill source ignite? Yes _____ No _____
Is source still burning? Yes _____ No _____

E. Spill Location: Latitude _____________ Longitude _____________

F. Distance (in miles) and direction to nearest land: ________________

G. Product(s) released:

____

H. Product(s) easily emulsified? Yes _____ No _____
Uncertain _____

I. Product(s) already emulsified upon release? No _____
Light emulsion (0-20%) _____ Moderate emulsion (21-50%) _____
Heavy emulsion (>51%) _____ Unknown _____

J. Estimated volume(s) of product released: _____________ gals / bbls
_____________ gals / bbls

K. Estimated volume(s) of product that could still be released:

_____________________ gals _______bbls _______
_____________________ gals _______bbls _______

L. Release status: Continuous _____ Estimated Rate _____________
Intermittent _____ Estimated Rate _____________

One time only ("batch" spill); flow now stopped _________

M. Estimated area of spill:

Approx. Date/Time _____ Surface Area ______ Sq. Miles (Stat ___ Naut. ___)
Approx. Date/Time _____ Surface Area ______ Sq. Miles (Stat ___ Naut. ___)
Approx. Date/Time _____ Surface Area ______ Sq. Miles (Stat ___ Naut. ___)

2. WEATHER AND WATER CONDITIONS AT TIME & LOCATION OF SPILL (To be completed by responding party and submitted to FOSC)

A. Temperature: Air _____ (deg. F) Water _____ (deg. F)

B. Weather: Clear _____ Partly Cloudy _____ Heavy Overcast _____
Rain _____ (heavy _____ moderate _____ light _____)
Fog ______ (type & amount at spill source ____________)
(type & amount at burn site ______________)

C. Tidal Condition: Slack Tide _____ Flood _____ Ebb _____

D. Dominant Surface Current (net drift):
Speed ________ (knots)
Direction (to) ________ (True compass heading)

E. Wind Speed: ________ knots Wind Direction (from) ________

F. Expected transition time between on-shore & off-shore breeze
____

G. Sea State: Flat Calm _____ Light Wind-Chop _____
Wind-Waves: <1 ft _____ 1-3 ft _____ >3 ft _____
Swell (est. height in ft) ________

H. Water Depth (in feet): _______________________________________

I. Other Consideration:
General Visibility ____
Rip Tides/Eddies ____
Floating Debris ____
Submerged Hazards _______________________________________

Notes: See Section II Part I for weather and water conditions forecast (to be completed by NOAA Scientific Support

Coordinator)

See Section III Part II for predicted oil behavior (to be completed by NOAA SSC)

Responding party has option of also submitting information on predicted oil behavior to OSC.

3. PROPOSED BURNING PLAN (To be completed by party responding to spill)

A. Location of proposed burn with respect to spill source:

____

B. Location of proposed burn with respect to nearest ignitable oil slick(s):

____

C. Location of proposed burn with respect to nearest land:

____

D. Location of proposed burn with respect to commercial fishing activity, vessel traffic lanes, drilling rigs and/or other marine activities/facilities:

____
____
____

E. Risk of accidental (secondary) fires:

____

F. Risk of reducing visibility at nearby airstrip(s) or airport(s):

____

G. Distance to, location and type of nearest population center(s) (e.g., recreational site, town, city, etc.):

____

H. Methods that will be used (prior to ignition) to notify residents in areas where smoke could conceivably drift into or over such areas:

____

I. Type of igniter proposed for use:

____

J. Helicopter(s) needed to deploy igniters? No _____ Yes _____

Name of company and type of helicopter to be used:

____

FAA approval already granted to company for use of igniter:
Yes _____ No _____

Awaiting FAA approval or verification of prior approval _____

K. Burning promoters or wicking agents proposed for use?
Yes _____ No _____
If yes, give type and amount: ___________________________________

L. Describe proposed method of deployment for igniter(s)"

____

Burning Promoter(s):

____

Wicking Agent(s):

____

M. Describe method for oil containment, if any:

____

N. Proposed location of oil containment relative to spill source:

____

O. Proposed burning strategy:

_____ Immediate ignition at or near source
_____ Ignition away form source after containment and movement to safe location
_____ Ignition of uncontained slick(s) at a safe distance
_____ Controlled burning in boom or natural collection site at/near shore
_____ Possible need for multiple ignition attempts

P. Estimated amount of oil to be burned:

____

Q. Estimated duration of each burn: _______________
Total possible burn period: ___________________

R. Estimated smoke plume trajectory:

____

S. Method for collecting burned oil residue:

____

T. Proposed storage & disposal of burned oil residue:

____

____

4. WEATHER AND WATER CONDITION FORECAST FROM TIME OF SPILL (To be completed by NOAA SSC)

A. Wind Speed (knots):
24-hour projection: ____________________________
48-hour projection: ____________________________

B. Wind Direction (from):
24-hour projection: ____
48-hour projection: ____

C. Sea Condition:
24-hour projection:

Flat Calm _____ Light Wind-Chop _____
Wind-Waves: <1 ft _____ 1-3 ft _____ >3 ft _____
Swell (est. height in ft) ________

48-hour projection:

Flat Calm _____ Light Wind-Chop _____
Wind-Waves: <1 ft _____ 1-3 ft _____ >3 ft _____
Swell (est. height in ft) ________

D. Tidal Information:

Date ________ High (time/height) ________/________
Low (time/height) ________/________
Date ________ High (time/height) ________/________
Low (time/height) ________/________
Date ________ High (time/height) ________/________
Low (time/height) ________/________
Date ________ High (time/height) ________/________
Low (time/height) ________/________

E. Predicted Dominant Current (net drift):

Speed (knots): _______________ Direction (to): ______________

5. PREDICTED OIL BEHAVIOR (To be completed by NOAA SSC)

A. Unburned Oil Forecast:

Estimated trajectory (attach sketch if necessary):
____

B. Expected area(s) and time(s) of land fall:

Location ______________________ Date/Time __________________
Location ______________________ Date/Time __________________
Location ______________________ Date/Time __________________
Location ______________________ Date/Time __________________

C. Estimated percent naturally dispersed and evaporated:

Within first 12 hours: ___________
Within first 24 hours: ___________
Within first 48 hours: ___________

6. RESOURCES AT RISK (To be completed by resource agencies)

A. Habitats

Sheltered Tidal Flats ___________________________
Coastal Marshes ___________________________
Etc. ___________________________

B. Biological Resources

Are marine mammals, turtles, or concentrations of birds noted in the burn area?
Yes _____ No _____
Endangered/Threatened Species
Non-Endangered/Threatened Species

C. Historic and Archaeological Resources

D. Commercial Harvest Areas

7. ON-SCENE COORDINATOR'S EVALUATION OF RESPONSE OPTIONS (To be completed by OSC)

A. Is in-situ burning likely to result in the elimination of significant volumes of spilled oil?

Yes _____ No _____

B. Will the use of in-situ burning interfere with (or in any way reduce the effectiveness of) mechanical recovery and/or dispersant application?

Yes _____ No _____

C. Can in-situ burning be used safely, and with an anticipated overall reduction in environmental impact (compared with the decision not to burn)?

8. ON-SCENE COORDINATOR'S DECISION REGARDING IN-SITU BURNING (To be completed by FOSC)

A. _____ Do not conduct in-situ burn

B. _____ In-situ burn may be conducted in limited or selected areas

C. _____ In-situ burn may be conducted as requested

Note: If the OSC approves of in-situ burning, local media and residents in areas within the potential smoke plume trajectory must be notified prior to initiating the burn.

Signature of OSC: ____

Printed Name of OSC: ____

Time and Date of Decision: _____________________________________

Appendix VII

In-Situ Burning In the Inland Zone

In-Situ Burning in the Inland Zone

The USCG, EPA, DOI, DOC, and the states have adopted in-situ burning as a tool to remove spilled oil from inland waters and lands within the jurisdiction of RRT IV.

Description

- This guidance covers the case-by-case use of in-situ burning (ISB) in response to oil discharges occurring on inland waters and lands within the jurisdiction of the RRT IV. This guidance includes protocols under which the FOSC in the inland zone may be granted authorization for using ISB.

Authority Required

- The FOSC, with the concurrence of the EPA and the USCG representatives to the RRT IV, and with the concurrence of the state(s) and tribe(s) with jurisdiction over affected resources, and in consultation with the land manager/owner (private, state, federal), and DOC and DOI trustees' representatives to the RRT IV, may authorize the use of ISB on oil spills.

- The FOSC must complete the Region IV Inland ISB Evaluation and Response Checklist and submit it to RRT IV for approval.

General Application Requirements

- ISB will be allowed only after mechanical recovery is shown to be inadequate, infeasible, or may cause unacceptable additional impact to sensitive resources and habitats; or when ISB may enhance overall cleanup or protection efforts.

- Burn residue may need to be collected and disposed of following a burn. If this is the case, provisions must be made for collection and disposal of burn residue following the burn. Attachment 1 describes factors that may determine whether residue sinks or floats.

- ISB will be allowed only under the direction of a fire ecologist/practitioner. Burning will be conducted utilizing safe fire management techniques. All practical efforts will be made to control and contain the burn and prevent accidental or unplanned ignition of adjacent areas.

- ISB will occur primarily in wetland areas, inland waters, agricultural lands, lands void of vegetation, and grasslands. Burning will not occur in bottom land hardwood swamps or in forested areas unless otherwise recommended by the fire ecologist, the land manager/owner, and approved by the RRT.

- Prior to ISB:

    1) An on-site survey will be conducted to determine if threatened or endangered species are present in the burn area or otherwise at risk from in-situ burn operations. Appropriate specialists knowledgeable of threatened and endangered species and habitats in the area, will be consulted prior to conducting any in-situ burn. Measures will be taken to prevent risk of injury to any wildlife, especially endangered or threatened species.

    2) Compliance with the Programmatic Agreement on the Protection of Historic Properties during Emergency Response Under the NCP will occur.

- Any use of in-situ burning requires that a post-incident report be provided by the FOSC, or a designated member of the FOSC's staff, within 45 days of in-situ burning operations.

Health and Safety Issues

- The FOSC will notify adjacent land managers/owners prior to any in-situ burn operation.

- Operators: Assuring workers' health and safety is the responsibility of employers and the FOSC who must comply with all Occupational Health and Safety Administration (OSHA) regulations. Prior to any in-situ burn operations, a site safety plan must be prepared and approved by the FOSC.

    Public: The burning should be stopped if it is determined that it becomes an unacceptable health hazard due to operational or smoke exposure concerns to responders or the general public. If at any time, exposure limits are expected to exceed national federal air quality standards in nearby populated areas, as a result of in-situ burning operations, then in-situ burning operations will immediately cease. The Level of Concern (LOC) for particulates for the general public is 150ug/m3 (PM-10) averaged over 1 hour. For information purposes, Attachment 2 compares emission rates from the NOBE test burns with other known sources.

- Burning will occur at a minimum of three miles from sensitive human population centers (i.e., hospitals, schools, day care, retirement, nursing homes). The FOSC will give due consideration to the direction of the wind, and the possibility of the wind blowing precipitate over population centers or sensitive resources. A safety margin of 45 degrees of arc on either side of predicted wind vectors should be considered for shifts in wind direction.

When to Use

- Consider *in situ* burning under these conditions:

    - To remove oil to prevent it's spread to sensitive sites or over large areas.

- To reduce the generation of oily wastes, especially where transportation or disposal options are limited.

- Where access to the site is limited by shallow water, soft substrates, thick vegetation, or the remoteness of the location.

- As a removal technique, when other methods begin to lose effectiveness or become too intrusive.

■ Favorable conditions include:

  - Remote or sparsely populated sites (at least 3 miles from populated areas).

  - Fresh crudes or light/inter-mediate refined products which burn more readily and efficiently.

  - Mostly herbaceous vegetation, though some shrubs and trees are fire tolerant.

  - Areas void of vegetation, such as dirt roads, ditches, dry streambeds, idle cropland.

  - In wetlands, with an adequate water layer (at least 1") covering the substrate (prevents thermal damage to soil and roots, and keeps oil from penetrating substrate). However, a water layer is not mandatory, at a minimum, the soils should be water saturated (at least 70%).

Limiting Factors/Environmental Constraints

■ Heavy, weathered, or emulsified oils may not ignite.

■ A crust or residue is often left behind after burning and may need to be broken up or removed to speed restoration.

■ Prolonged flooding of a burned wetland may kill surviving plants if they are completely submerged.

■ Erosion may be a problem in burned areas if plant cover is reduced; short-term erosion control measures may be needed.

■ The site may need protection from overgrazing, especially since herbivores may be attracted to new growth at burned sites.

■ Thickness of the oil to be burned must be 2 to 3 mm.

Monitoring

- Monitoring in-situ burning for effectiveness is the responsibility of the FOSC; monitoring for effects on biota is the responsibility of the trustees.

- All burns must incorporate visual monitoring at the burn site for safety and fire control and to record the disposition of burn residue. The burn site will be monitored for potential impact to natural resources in the area. Samples of the residue will be collected if feasible.

- Monitoring to establish "Continue/Discontinue" data for input to the FOSC will be conducted utilizing a tiered approach as outlined in the SMART plan. An inability to conduct monitoring operations, except for visual monitoring, will not be grounds for discontinuing or prohibiting in-situ burn operations.

- Describe and photograph the burn site before and after the burn, record detailed information on the burn, including duration, residue type and volume, water depth before/after the burn, visible impacts, post-burn activities (e.g., residue removal methods), restoration efforts and results, etc.

Waste Generation and Disposal Issues

- In-situ burning should significantly reduce the amount of oily wastes generated. Burn residue that is collected must be properly disposed of after the burn is completed.

<u>Attachment 1</u>. Residues from In-Situ Burning of Oil

Results from larger-scale laboratory and meso-scale field tests suggest that the most important factors determining whether an in-situ burn residue will float or sink are:

1. **<u>Water Density</u>**

   Burn residues that are denser than the receiving waters are likely to sink. The density of fresh water is 0.997 g/cm3 at 25 degrees Celsius, and the density of seawater is 1.025 g/cm3.

2. **<u>Properties of the Starting Oil</u>**

   Studies predict that burn residues will sink in sea water when the burned oils have a) an initial greater density than about 0.0865 g/cm3 (or API gravity less than about 32) or b) a weight percent distillation residue (at >1000 F) greater than 18.6%. When these correlations are applied to 137 crude oils, 38% are predicted to sink in seawater, 20% may sink, and 42% will float.

3. **<u>Thickness of the Oil Slick</u>**

   Residues from burns of thick crude oil slicks are more likely to sink than residues from burns of thin slicks of the same crude oils, because higher-molecular weight compounds concentrate in the residue as the burn progresses.

4. **<u>Efficiency of the Burn</u>**

   Factors affecting burn efficiency include original slick thickness, degree of emulsification and weathering, areal coverage of the flame, wind speed, and wave choppiness. For efficient burns, removal efficiencies are expected the exceed 90% of the collected and ignited oil. Rules of thumb for predicting residue thickness are:

   - Unemulsified crude oil up to 10-20mm thick, residue will be about 1mm thick.
   - Thicker slicks result in thicker residues (up to 3-6mm thick).
   - Emulsified oils can produce much thicker residues.
   - Light/medium refined products, the residue will be about 1mm thick, regardless of slick thickness.

Burn residues sink only after cooling. Models of cooling rates predict that ambient water temperature will be reached in less than five minutes for 3mm-thick residues, and in 20-30 minutes for 7mm-thick residues.

<u>Attachment 2</u>. Emission Rates from the NOBE Test Burns and Other Known Sources.

Substance	Average Emission Factor for NOBE (g/kg, fuel burned)	Emission Rate (kg/hr)	Comparable Emissions from Other Known Sources
C02	2,800	75,600	approx. 2-acre slash burn
CO	17.5	470	approx. 0.la slash burn or ~1,400 wood stoves
S02	-15	405	7400 kg/hr. (avg. coal-fired power plant)
Total smoke particle	150	4,050	approx. 9-acre slash burn or ~58,000 wood stoves
Sub-3.5 micro-meter smoke particle	3	3,050	approx. 9-acre slash burn
Sub-3.5 micro-meter soot	55	1,480	approx. 38-acre slash burn
PAHs	0.04	1.1	Approx. 7-acre slash burn or ~1,800 wood stoves

Region IV Inland ISB Evaluation and Response Checklist

STEP 1: Evaluating the Need for Burning

Nature, Size, and Type of Product Spilled

A. Name of incident:

B. Date and time of incident:

C. Type of Incident:
___ Grounding
___ Transfer Operations
___ Explosion
___ Vehicle Accident
___ Blowout
___ Pipeline
___ Other

D. Did source burn? Yes ___ No ___
Is source still burning? Yes___ No ___

E. Spill location:

F. Distance and direction to nearest human use areas: ________________________________
(i.e., schools, hospitals, recreation areas, surface water intakes, public wells, etc.)

G. Product(s) released:
___ Heavy Crude
___ Bunker C/#6 fuel oil
___ Medium crude
___ Diesel/#2 fuel oil
___ Jet fuels/gasoline
___ Other

H. Estimated volume of released product: _________ gals _________ bbls

I. Estimated volume of product potentially released: __________ gals
__________ bbls

J. Release status: __________ Continuous ___________ Intermittent
One time only, now stopped? Yes ___No ___

If continuous or intermittent, specify rate of release:
__________________ gals/bbls per hour

K. Estimated surface area covered _______________ acres/sqft

Weather: Current and Forecasted

A. Current Weather:
___ Clear
___ Partly Cloudy
___ Overcast
___ Rain/Snow/Fog
___ Inversion

24-hour projection:

48-hour projection:

B. Wind speed and direction are generally looked at three levels. Surface (measured at the site); 20 foot (these are usually the forecasted winds); and the transport winds. The transport winds determine where and how fast the smoke will go. These winds are generally given by the state forestry agency in the daily prescribed fire or smoke management forecast. Transport wind speed, direction and mixing height are critical components.

	Surface	Forecasted	Transport
Current Wind Speed (mph):	______	_________	___________
Direction (from):	______	_________	___________
24-hour projection (mph):	______	_________	___________
Direction (from):	______	_________	___________
48-hour projection (mph):	______	_________	___________
Direction (from):	______	_________	___________

Evaluation of Response Operations

A. Considering spill size, forecasted weather and trajectories, amount of available equipment, is there time to deploy mechanical recovery equipment? Yes___ No ___

B. Considering spill size, forecasted weather and trajectories, amount of available equipment, is there time to conduct burning operations? Yes ___No ___

C. Why is in-situ burning necessary?(check all that apply)

___ To remove oil to prevent it's spread to sensitive sites or over large areas.
___ To reduce the generation of oily wastes, especially where transportation or disposal options are limited.
___ Access to the site is limited by shallow water, soft substrates, thick vegetation, or the remoteness of the location.
___ Other removal methods have lost effectiveness or have become too intrusive.
___ Other (specify):

STEP 2: Burning Feasibility Checklist

Weather and Oil Conditions

A. Are weather conditions acceptable to conduct burn operations? Yes___ No ___

B. Visibility: Sufficient to see oil, containment systems, and suitable for aerial overflight for burn observation?
Yes___ No ___

C. Oil Condition: 1. Fresh oil,< 2-3 days exposure. Yes___ No___
2. >2-3 mm, (0.1 inch) thickness. Yes___ No ___

Habitats Impacted and Resources at Risk

A. Local public health official/agency notified and consulted? Yes ___ No ___

Name:
Address:
Phone:

B. Land Owner/Manager (federal/tribal/state/private) notified and consulted? Yes ___ No ___

Name:
Address:
Phone:

C. Local Fire Management Officer/Fire Ecologist/State Forestry Commission consulted? Yes ___No ___

Name/Agency:
Address:
Phone:

D. Historic Property Specialist pursuant to the Programmatic Agreement on Protection of Historic Properties During Emergency Response contacted? Yes ___No ___

Name:
Address:
Phone:

E. State Natural Resource Agency notified and consulted? Yes___No ___

Name/Agency:
Address:
Phone:

F. Federal Natural Resource Trustees notified and consulted

___ Department of the Interior
___ Tennessee Valley Authority
___ U.S. Forest Service
___ Department of Energy
___ Department of Defense
___ National Aeronautic and Space Administration
___ National Oceanic and Atmospheric Administration/Dept of Commerce
___ Other:

G. Native American interests present? Yes ___No ___ Unknown ___

Tribal contact:

Name:
Address:
Phone:

Bureau of Indian Affairs contact:

Name:
Address:
Phone:

H. Surface water intakes and wells (public and private): Yes __ No __

I. Habitat Type(s) Impacted:

___ Southern cordgrass prairie
___ Palmetto prairie
___ Cypress savanna
Wetlands
  ___ Estuarine
  ___ Riverine
  ___ Lacustrine
  ___ Palustrine
___ Agricultural lands
___ Other (specify):

J. Seasonal concerns: Yes ___ No ___
Comments:

K. Biological Resources Present:
(Describe significant issues such as large concentrations, breeding activities, rookeries, designated critical habitat, etc.)

1. ____ Threatened and Endangered Species, including plants (list):
2. ____ Mammals
3. ____ Waterfowl
4. ____ Wading Birds
5. ____ Diving Birds
6. ____ Shore Birds
7. ____ Raptors
8. ____ Fish
9. ____ Reptiles
10. ____ Amphibians
11. ____ Other
12. ____ Comments/Attachments (i.e., ESI Maps)

L. Natural Areas (list)

1. ____ National Park:
2. ____ National Wildlife Refuge:
3. ____ National Forest:
4. ____ State Park:
5. ____ State Wildlife Area:
6. ____ Other Natural Areas:
7. ____ Comments

M. Historic, Cultural, and Archeological Resources

___ Unknown
___ Not Present
___ Present

Equipment & Personnel

A. Has the burn area been isolated (e.g., by fire breaks)? Yes ___ No ___
Is there an approved site safety plan in place? Yes ___ No ___
Have local fire and police departments been notified? Yes ___No ___

B. Are the appropriate fire fighting gear and personnel on-scene?
Yes ___ No ___

C. Is aircraft for ignition and aerial observation required? Yes ___ No ___
If yes, are they available? Yes ___No ___(Flight requirements: daylight hours; visibility >1 mile; ceiling >500 feet, FAA certified for helitorch)

D. Ignition System:
1. Available? Yes ___No ___
2. Type/method to be-used? ____
3. Burn Promoters? Yes ___No ___

E. Personnel trained, equipped with safety gear, & covered by site safety plan? Yes ___No ___

F. Communications System to communicate with aircraft and fire fighters available and working? Yes ___No ___

G. Is access to the site restricted to response personnel only? Yes ___ No ___

Proposed Burn Plan

A. Proposed burning strategy (circle appropriate responses)
1. Ignition away from source after containment
2. Immediate ignition at or near source
3. Ignition of uncontained slick(s) at a safe distance

B. Estimated amount of oil to be burned: surface area ____________ sq ft
volume ____________ gal/bbl

C. Estimated duration of burn in minutes: _________________

D. Are simultaneous burns planned? Yes ___No ___If yes how many? ____________

E. Are sequential or repeat burns planned (not simultaneous)? Yes ___No ___

F. Method for terminating the burn: ____

G. Proposed method for ignition: ____

H. Ability to collect burned oil residue: Yes ___ No ___

I. Estimated smoke plume trajectory (miles): ___________________

J. Monitoring protocols contained in SMART will be applied as appropriate.
Is additional monitoring required? Yes ___ No ___ If yes, attach additional monitoring needs and specify responsible agency.

STEP 3: Is Burning Acceptable?

Evaluation of Anticipated Emissions

A. Using an appropriate chart, plot and calculate the following locations and distances:

1. Location of proposed burn in reference to source.

2. If on water, location of proposed burn in reference to nearest ignitable oil slick.

3. Location of proposed burn in reference to nearby human habitation/use areas,(e.g. towns, recreational use areas, airports/strips, roads, daycare centers, schools, hospitals, etc.).

B. Populations of special concern:

1. Schools ___
2. Hospitals ___
3. Retirement communities ___
4. Nursing/convalescence homes ___
5. Day care centers ___
6. Other ___

C. Determine the following:

1. Distance between proposed burn and spill source ____ (miles)

2. Distance between burn and human habitation/use area ____ (miles)

3. Surface area of the proposed burn or burns ____ sqft (approx.)

4. Will impairment of visibility affect airports and/or highways?
Yes ___ No ___

D. Can burning be conducted in a controlled fashion? Yes ___ No ___
Explain measures to reduce and/or control secondary fires.

E. Using a distance of miles with the forecasted wind and transport wind direction, plot the estimated smoke plume with particulate concentration >150 ug/m3.

F. Are additional pollutants of concern present in the smoke plum?
Yes ___No ___ If yes, what are the projected concentrations to human habitation areas? Consultation with local air and health authorities may be necessary.

G. Will the anticipated smoke plume disperse before reaching populated areas? Yes ___No ___

Determination of Acceptability

A. Does the estimated smoke plume potentially impact a populated area with particulate concentrations averaged over one hour exceeding 150 ug/m3? Yes ___No ___

If No, Burning is Acceptable, proceed to Step 4.

If Yes, continue with B.

B. Can the impacted population be temporarily relocated prior to burn?
Yes ___ No ___

If Yes, initiate warning or evacuation and authorize burning AFTER population is protected, proceed to Step 4. If No, do NOT authorize burning!

STEP 4: Controls & Conditions

Operational Controls, Required for All Burns

A. Forecasted weather, winds and atmospheric stability class obtained?
Yes ___No ___

B. A trial burn may be necessary to observe and confirm anticipated smoke plume behavior. Trial burns must have RRT approval.

C. Safe downwind distance validated, or expanded if winds are inconsistent with anticipated forecast?
Yes ___No ___

D. Burn extinguishing measures in place and available? Yes ___No ___

Public Notifications

Public notification (e.g. radio broadcast to public, safety zone broadcast to mariners, road closure, etc.) implemented? Yes ___ No ___

Unified Command Request to the RRT For In-situ Burning

Additional conditions that apply: Yes ___ (Attached) No ____

Signature of Federal On-Scene Coordinator	Printed Name
Signature of State On-Scene Coordinator	Printed Name

Does Land Owner/Manager Concur? Yes ____ No ____

Signature of Land Owner/Manager	Printed Name

RRT Decision Regarding In-situ Burning

A. ____ Do not conduct in-situ burn
B. ____ In-situ burning may be conducted pursuant to attached conditions
C. ____ In-situ burning may be conducted as requested in Step #3

Signature of EPA Co-Chair	Printed Name
Signature of USCG Co-Chair	Printed Name
Signature of DOI Representative	Printed Name
Signature of Affected State(s)	Printed Name
Signature of Other Federal Trustee(s)	Printed Name
Signature of Tribal Representative	Printed Name

July 13, 2000

RE: CHANGE 4 TO REGION IV REGIONAL RESPONSE TEAM POLICY FOR USE OF IN-SITU BURNING IN OCEAN, COASTAL, AND INLAND WATERS

PURPOSE. This notice provides changes to the Region IV Regional Response Team (RRT) Policy for Use of In-Situ Burning in Ocean and Coastal Waters. This change provides an appendix that contains guidance covering the case-by-case use of in-situ burning (ISB) in response to oil discharges occurring on inland waters and lands within the jurisdiction of the RRT IV.

SUMMARY OF CHANGES. The Region IV RRT Response Technology Committee has completed guidelines for In-Situ Burning in the Inland Zone. The guidance covers the conditional use of in-situ burning in response to oil discharges occurring on inland waters and lands within the jurisdiction of RRT 4. This guidance includes protocols under which the federal On-Scene Commander (OSC) in the Inland Zone may be granted authorization for using ISB. This change does not alter the original intent of this plan and has been added only to assist and enhance the current decision-making process. No further approval/acceptance of this appendix is needed.

ACTION. Remove and insert the following pages:

Remove	**Insert**
Table of Contents	Table of Contents CH-4
Introduction Page	Introduction Page CH-4
Section V Appendix Listing after pg IV-2	Page V-i
	Contents of Appendix VII pages V-VII-1 through V-VII-16

If you have any questions, please contact me at (305) 415-6874, by facsimile at (305) 415-6875, or by email at emosher@d7.uscg.mil. This change became effective on July 13, 2000.

Sincerely,

Eric J. Mosher
U.S. Coast Guard Alternate Co-Chair
Region IV Regional Response Team

Encl: (1) Change 4 to Region IV Regional Response Team Policy for Use of In-Situ Burning in Ocean, Coastal, and Inland Waters

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Region IV Regional Response Team
Ocean, Coastal, and Inland Waters
In-Situ Burn Policy

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Authority
Scope

Section II Pre-Authorization of In-Situ Burning

- Zone "A": Pre-Authorization for Open Water Burning
- Zone "B": Areas Requiring Case-by-Case Approval
- Zone "R": Exclusion Areas

Section III Protocols

Section IV Signature Page

Section V Appendices

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Appendix II Letters of Agreement

- North Carolina
- South Carolina
- Georgia
- Florida
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- Mississippi
- Federal Trustees

Appendix III Section 7 Consultations for Endangered Species

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Appendix IV In-Situ Burn Monitoring Protocol

Appendix V Equipment Lists

Appendix VI Decision Tree, Application/Checklist Form

Appendix VII In-Situ Burning in the Inland Zone

REGION IV
REGIONAL RESPONSE TEAM
POLICY FOR
USE OF IN-SITU BURNING
IN OCEAN, COASTAL, AND INLAND WATERS

INTRODUCTION

This is the Region IV Regional Response Team (RRT IV) in-situ burn policy for ocean and coastal waters. It is structured as five sections. Section I defines the purpose, authority and scope of the policy. Section II describes the established ocean and coastal water zones for pre-authorized and conditional in-situ burning. Section III contains protocols for conducting in-situ burning, applicable to all open water burns throughout the RRT IV region. Section IV is a signature page where the RRT IV members representing the United States Coast Guard (USCG), the United States Environmental Protection Agency (EPA), the United States Department of the Interior (DOI), the United States Department of Commerce (DOC), and the coastal states within the RRT IV region have by signature agreed to accept this policy for their respective agency or state. Section V contains appendices and includes:

- A regional map showing pre-authorized burn zones.
- Separate Letters of Agreement for the coastal states within region IV for which this policy covers, which establish specific conditions for conducting any in-situ burning inside state waters and for special federally managed areas if applicable.
- Biological assessments and letters pertaining to section 7 consultations with the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFW) for protection of endangered species during in-situ burning operations.
- The intent of RRT IV to adopt the current monitoring program for in-situ burn operations in the RRT IV region which is supported by the U.S. Coast Guard National Strike Force.
- In-situ burn equipment lists.
- Decision tree and application/checklist form.
- Guidance covering the conditional use of in-situ burning in response to oil discharges occurring on inland waters and lands within the jurisdiction of RRT 4. This guidance includes protocols under which the federal On-Scene Commander (OSC) in the Inland Zone may be granted authorization for using ISB.

SECTION V

Appendices

I	Zone Map
II	Letters of Agreement
III	Section 7 Consultations for Endangered Species
IV	In-Situ Burn Monitoring Plan
V	Equipment Lists
VI	Decision Tree, Application/Checklist
VII	In-Situ Burning in the Inland Zone Protocol

Appendix VII

In-Situ Burning In the Inland Zone

In-Situ Burning in the Inland Zone

The USCG, EPA, DOI, DOC, and the states have adopted in-situ burning as a tool to remove spilled oil from inland waters and lands within the jurisdiction of RRT IV.

Description

- This guidance covers the case-by-case use of in-situ burning (ISB) in response to oil discharges occurring on inland waters and lands within the jurisdiction of the RRT IV. This guidance includes protocols under which the FOSC in the inland zone may be granted authorization for using ISB.

Authority Required

- The FOSC, with the concurrence of the EPA and the USCG representatives to the RRT IV, and with the concurrence of the state(s) and tribe(s) with jurisdiction over affected resources, and in consultation with the land manager/owner (private, state, federal), and DOC and DOI trustees' representatives to the RRT IV, may authorize the use of ISB of oil spills.

- The FOSC must complete the Region IV Inland ISB Evaluation and Response Checklist and submitted it to RRT IV for approval.

General Application Requirements

- ISB will be allowed only after mechanical recovery is shown to be inadequate, infeasible, or may cause unacceptable additional impact to sensitive resources and habitats; or when ISB may enhance overall cleanup or protection efforts.

- Burn residue may need to be collected and disposed of following a burn. If this is the case, provisions must be made for collection and disposal of burn residue following the burn. Attachment 1 describes factors that may determine whether residue sinks or floats.

- ISB will be allowed only under the direction of a fire ecologist/practitioner. Burning will be conducted utilizing safe fire management techniques. All practical efforts will be made to control and contain the burn and prevent accidental or unplanned ignition of adjacent areas.

- ISB will occur primarily in wetland areas, inland waters, agricultural lands, lands void of vegetation, and grasslands. Burning will not occur in bottom land hardwood swamps or in forested areas unless otherwise recommended by the fire ecologist, the land manager/owner, and approved by the RRT.

- Prior to ISB:

  1) An on-site survey will be conducted to determine if threatened or endangered species are present in the burn area or otherwise at risk from in-situ burn operations. Appropriate specialists knowledgeable of T&E species and habitats in the area, will be consulted prior to conducting any in-situ burn. Measures will be taken to prevent risk of injury to any wildlife, especially endangered or threatened species.

  2) Compliance with the Programmatic Agreement on the Protection of Historic Properties during Emergency Response Under the NCP will occur.

- Any use of in-situ burning requires that a post-incident report be provided by the FOSC, or a designated member of the FOSC's staff, within 45 days of in-situ burning operations.

Health and Safety Issues

- The FOSC will notify adjacent land managers/owners prior to any in-situ burn operation.

- Operators: Assuring workers' health and safety is the responsibility of employers and the FOSC who must comply with all Occupational Health and Safety Administration (OSHA) regulations. Prior to any in-situ burn operations, a site safety plan must be prepared and approved by the FOSC.

  Public: The burning should be stopped if it is determined that it becomes an unacceptable health hazard due to operational or smoke exposure concerns to responders or the general public. If at any time, exposure limits are expected to exceed national federal air quality standards in nearby populated areas, as a result of in-situ burning operations, then in-situ burning operations will immediately cease. The Level of Concern (LOC) for particulates for the general public is 150ug/m3 (PM-10) averaged over 1 hour. For information purposes, Attachment 2 compares emission rates from the NOBE test burns with other known sources.

- Burning will occur at a minimum of three miles from sensitive human population centers (i.e., hospitals, schools, day care, retirement, nursing homes). The FOSC will give due consideration to the direction of the wind, and the possibility of the wind blowing precipitate over population centers or sensitive resources. A safety margin of 45 degrees of arc on either side of predicted wind vectors should be considered for shifts in wind direction.

When to Use

- Consider *in situ* burning under these conditions:

  - To remove oil to prevent it's spread to sensitive sites or over large areas.

- To reduce the generation of oily wastes, especially where transportation or disposal options are limited.

- Where access to the site is limited by shallow water, soft substrates, thick vegetation, or the remoteness of the location.

- As a removal technique, when other methods begin to lose effectiveness or become too intrusive.

■ Favorable conditions include:

  - Remote or sparsely populated sites (at least 3 miles from populated areas).

  - Fresh crudes or light/inter-mediate refined products which burn more readily and efficiently.

  - Mostly herbaceous vegetation, though some shrubs and trees are fire tolerant.

  - Areas void of vegetation, such as dirt roads, ditches, dry streambeds, idle cropland.

  - In wetlands, with an adequate water layer (at least 1") covering the substrate (prevents thermal damage to soil and roots, and keeps oil from penetrating substrate). However, a water layer is not mandatory, at a minimum, the soils should be water saturated (at least 70%).

Limiting Factors/Environmental Constraints

■ Heavy, weathered, or emulsified oils may not ignite.

■ A crust or residue is often left behind after burning and may need to be broken up or removed to speed restoration.

■ Prolonged flooding of a burned wetland may kill burned plants if they are completely submerged.

■ Erosion may be a problem in burned areas if plant cover is reduced; short-term erosion control measures may be needed.

■ The site may need protection from overgrazing, especially since herbivores may be attracted to new growth at burned sites.

■ Thickness of the oil to be burned must be 2 to 3 mm.

Monitoring

- Monitoring in-situ burning for effectiveness is the responsibility of the FOSC; monitoring for effects on biota is the responsibility of the trustees.

- All burns must incorporate visual monitoring at the burn site for safety and fire control and to record the disposition of burn residue. The burn site will be monitored for potential impact to natural resources in the area. Samples of the residue will be collected if feasible.

- Monitoring to establish "Continue/Discontinue" data for input to the FOSC will be conducted utilizing a tiered approach as outlined in the SMART plan. An inability to conduct monitoring operations, except for visual monitoring, will not be grounds for discontinuing or prohibiting in-situ burn operations.

- Describe and photograph the burn site before and after the burn, record detailed information on the burn, including duration, residue type and volume, water depth before/after the burn, visible impacts, post-burn activities (e.g., residue removal methods), restoration efforts and results, etc.

Waste Generation and Disposal Issues

- In-situ burning should significantly reduce the amount of oily wastes generated. Burn residue that is collected must be properly disposed of after the burn is completed.

<u>Attachment 1</u>. Residues from In-Situ Burning of Oil

Results from larger-scale laboratory and meso-scale field tests suggest that the most important factors determining whether an in-situ burn residue will float or sink are:

1. **<u>Water Density</u>**

   Burn residues that are denser than the receiving waters are likely to sink. The density of fresh water is 0.997 g/cm3 at 25 degrees Celsius, and the density of seawater is 1.025 g/cm3.

2. **<u>Properties of the Starting Oil</u>**

   Studies predict that burn residues will sink in sea water when the burned oils have a) an initial greater density than about 0.0865 g/cm3 (or API gravity less than about 32) or b) a weight percent distillation residue (at >1000 F) greater than 18.6%. When these correlations are applied to 137 crude oils, 38% are predicted to sink in seawater, 20% may sink, and 42% will float.

3. **<u>Thickness of the Oil Slick</u>**

   Residues from burns of thick crude oil slicks are more likely to sink than residues from burns of thin slicks of the same crude oils, because higher-molecular weight compounds concentrate in the residue as the burn progresses.

4. **<u>Efficiency of the Burn</u>**

   Factors affecting burn efficiency include original slick thickness, degree of emulsification and weathering, areal coverage of the flame, wind speed, and wave choppiness. For efficient burns, removal efficiencies are expected the exceed 90% of the collected and ignited oil. Rules of thumb for predicting residue thickness are:

   - Unemulsified crude oil up to 10-20mm thick, residue will be about 1mm thick.
   - Thicker slicks result in thicker residues (up to 3-6mm thick).
   - Emulsified oils can produce much thicker residues.
   - Light/medium refined products, the residue will be about 1mm thick, regardless of slick thickness.

Burn residues sink only after cooling. Models of cooling rates predict that ambient water temperature will be reached in less than five minutes for 3mm-thick residues, and in 20-30 minutes for 7mm-thick residues.

Attachment 2. **Emission Rates from the NOBE Test Burns and Other Known Sources.**

Substance	Average Emission Factor for NOBE (g/kg, fuel burned)	Emission Rate (kg/hr)	Comparable Emissions from Other Known Sources
C02	2,800	75,600	approx. 2-acre slash burn
CO	17.5	470	approx. 0.la slash burn or ~1,400 wood stoves
S02	-15	405	7400 kg/hr. (avg. coal-fired power plant)
Total smoke particle	150	4,050	approx. 9-acre slash burn or ~58,000 wood stoves
Sub-3.5 micro-meter smoke particle	3	3,050	approx. 9-acre slash burn
Sub-3.5 micro-meter soot	55	1,480	approx. 38-acre slash burn
PAHs	0.04	1.1	Approx. 7-acre slash burn or ~1,800 wood stoves

Region IV Inland ISB Evaluation and Response Checklist

STEP 1: Evaluating the Need for Burning

Nature, Size, and Type of Product Spilled

A. Name of incident:

B. Date and time of incident:

C. Type of Incident:
___ Grounding
___ Transfer Operations
___ Explosion
___ Vehicle Accident
___ Blowout
___ Pipeline
___ Other

D. Did source burn? Yes ___ No ___
Is source still burning? Yes___ No ___

E. Spill location:

F. Distance and direction to nearest human use areas: ________________________________
(i.e., schools, hospitals, recreation areas, surface water intakes, public wells, etc.)

G. Product(s) released:
___ Heavy Crude
___ Bunker C/#6 fuel oil
___ Medium crude
___ Diesel/#2 fuel oil
___ Jet fuels/gasoline
___ Other

H. Estimated volume of released product: _________ gals _________ bbls

I. Estimated volume of product potentially released: __________ gals
__________ bbls

J. Release status: __________ Continuous ___________ Intermittent
One time only, now stopped? Yes ___No ___

If continuous or intermittent, specify rate of release:
__________________ gals/bbls per hour

K. Estimated surface area covered _______________ acres/sqft

Weather: Current and Forecasted

A. Current Weather:
___ Clear
___ Partly Cloudy
___ Overcast
___ Rain/Snow/Fog
___ Inversion

24-hour projection:

48-hour projection:

B. Wind speed and direction are generally looked at three levels. Surface (measured at the site); 20 foot (these are usually the forecasted winds); and the transport winds. The transport winds determine where and how fast the smoke will go. These winds are generally given by the state forestry agency in the daily prescribed fire or smoke management forecast. Transport wind speed, direction and mixing height are critical components.

	Surface	Forecasted	Transport
Current Wind Speed (mph):	______	_________	___________
Direction (from):	______	_________	___________
24-hour projection (mph):	______	_________	___________
Direction (from):	______	_________	___________
48-hour projection (mph):	______	_________	___________
Direction (from):	______	_________	___________

Evaluation of Response Operations

A. Considering spill size, forecasted weather and trajectories, amount of available equipment, is there time to deploy mechanical recovery equipment? Yes___ No ___

B. Considering spill size, forecasted weather and trajectories, amount of available equipment, is there time to conduct burning operations? Yes ___No ___

C. Why is in-situ burning necessary?(check all that apply)

___ To remove oil to prevent it's spread to sensitive sites or over large areas.
___ To reduce the generation of oily wastes, especially where transportation or disposal options are limited.
___ Access to the site is limited by shallow water, soft substrates, thick vegetation, or the remoteness of the location.
___ Other removal methods have lost effectiveness or have become too intrusive.
___ Other (specify):

STEP 2: Burning Feasibility Checklist

Weather and Oil Conditions

A. Are weather conditions acceptable to conduct burn operations? Yes___ No ___

B. Visibility: Sufficient to see oil, containment systems, and suitable for aerial overflight for burn observation?
Yes___ No ___

C. Oil Condition: 1. Fresh oil,< 2-3 days exposure. Yes___ No___
2. >2-3 mm, (0.1 inch) thickness. Yes___ No ___

Habitats Impacted and Resources at Risk

A. Local public health official/agency notified and consulted? Yes ___ No ___

Name:
Address:
Phone:

B. Land Owner/Manager (federal/tribal/state/private) notified and consulted? Yes ___ No ___

Name:
Address:
Phone:

C. Local Fire Management Officer/Fire Ecologist/State Forestry Commission consulted? Yes ___No ___

Name/Agency:
Address:
Phone:

D. Historic Property Specialist pursuant to the Programmatic Agreement on Protection of Historic Properties During Emergency Response contacted? Yes ___No ___

Name:
Address:
Phone:

E. State Natural Resource Agency notified and consulted? Yes___No ___

Name/Agency:
Address:
Phone:

F. Federal Natural Resource Trustees notified and consulted

___ Department of the Interior
___ Tennessee Valley Authority
___ U.S. Forest Service
___ Department of Energy
___ Department of Defense
___ National Aeronautic and Space Administration
___ National Oceanic and Atmospheric Administration/Dept of Commerce
___ Other:

G. Native American interests present? Yes ___No ___ Unknown ___

Tribal contact:

Name:
Address:
Phone:

Bureau of Indian Affairs contact:

Name:
Address:
Phone:

H. Surface water intakes and wells (public and private): Yes __ No __

I. Habitat Type(s) Impacted:

___ Southern cordgrass prairie
___ Palmetto prairie
___ Cypress savanna
Wetlands
    ___ Estuarine
    ___ Riverine
    ___ Lacustrine
    ___ Palustrine
___ Agricultural lands
___ Other (specify):

J. Seasonal concerns: Yes ___ No ___
Comments:

K. Biological Resources Present:
(Describe significant issues such as large concentrations, breeding activities, rookeries, designated critical habitat, etc.)

1. ____ T&E Species, including plants (list):
2. ____ Mammals
3. ____ Waterfowl
4. ____ Wading Birds
5. ____ Diving Birds
6. ____ Shore Birds
7. ____ Raptors
8. ____ Fish
9. ____ Reptiles
10. ____ Amphibians
11. ____ Other
12. ____ Comments/Attachments (i.e., ESI Maps)

L. Natural Areas (list)

1. ____ National Park:
2. ____ National Wildlife Refuge:
3. ____ National Forest:
4. ____ State Park:
5. ____ State Wildlife Area:
6. ____ Other Natural Areas:
7. ____ Comments

M. Historic, Cultural, and Archeological Resources

___ Unknown
___ Not Present
___ Present

Equipment & Personnel

A. Has the burn area been isolated (e.g., by fire breaks)? Yes ___ No ___
Is there an approved site safety plan in place? Yes ___ No ___
Have local fire and police departments been notified? Yes ___No ___

B. Are the appropriate fire fighting gear and personnel on-scene?
Yes ___ No ___

C. Is aircraft for ignition and aerial observation required? Yes ___ No ___
If yes, are they available? Yes ___No ___(Flight requirements: daylight hours; visibility >1 mile; ceiling >500 feet, FAA certified for helitorch)

D. Ignition System:
1. Available? Yes ___No ___
2. Type/method to be-used? ____
3. Burn Promoters? Yes ___No ___

E. Personnel trained, equipped with safety gear, & covered by site safety plan? Yes ___No ___

F. Communications System to communicate with aircraft and fire fighters available and working? Yes ___No ___

G. Is access to the site restricted to response personnel only? Yes ___ No ___

Proposed Burn Plan

A. Proposed burning strategy (circle appropriate responses)
1. Ignition away from source after containment
2. Immediate ignition at or near source
3. Ignition of uncontained slick(s) at a safe distance

B. Estimated amount of oil to be burned: surface area ____________ sq ft
volume ____________ gal/bbl

C. Estimated duration of burn in minutes: _________________

D. Are simultaneous burns planned? Yes ___No ___If yes how many? ____________

E. Are sequential or repeat burns planned (not simultaneous)? Yes ___No ___

F. Method for terminating the burn: ____

G. Proposed method for ignition: ____

H. Ability to collect burned oil residue: Yes ___ No ___

I. Estimated smoke plume trajectory (miles): ___________________

J. Monitoring protocols contained in SMART will be applied as appropriate.
Is additional monitoring required? Yes ___ No ___ If yes, attach additional monitoring needs and specify responsible agency.

STEP 3: Is Burning Acceptable?

Evaluation of Anticipated Emissions

A. Using an appropriate chart, plot and calculate the following locations and distances:

1. Location of proposed burn in reference to source.

2. If on water, location of proposed burn in reference to nearest ignitable oil slick.

3. Location of proposed burn in reference to nearby human habitation/use areas,(e.g. towns, recreational use areas, airports/strips, roads, daycare centers, schools, hospitals, etc.).

B. Populations of special concern:

1. Schools ___
2. Hospitals ___
3. Retirement communities ___
4. Nursing/convalescence homes ___
5. Day care centers ___
6. Other ___

C. Determine the following:

1. Distance between proposed burn and spill source ____ (miles)

2. Distance between burn and human habitation/use area ____ (miles)

3. Surface area of the proposed burn or burns ____ sqft (approx.)

4. Will impairment of visibility affect airports and/or highways?
Yes ___ No ___

D. Can burning be conducted in a controlled fashion? Yes ___ No ___
Explain measures to reduce and/or control secondary fires.

E. Using a distance of miles with the forecasted wind and transport wind direction, plot the estimated smoke plume with particulate concentration >150 ug/m3.

F. Are additional pollutants of concern present in the smoke plum?
Yes ___No ___ If yes, what are the projected concentrations to human habitation areas? Consultation with local air and health authorities may be necessary.

G. Will the anticipated smoke plume disperse before reaching populated areas? Yes ___No ___

Determination of Acceptability

A. Does the estimated smoke plume potentially impact a populated area with particulate concentrations averaged over one hour exceeding 150 ug/m3? Yes ___No ___

If No, Burning is Acceptable, proceed to Step 4.

If Yes, continue with B.

B. Can the impacted population be temporarily relocated prior to burn?
Yes ___ No ___

If Yes, initiate warning or evacuation and authorize burning AFTER population is protected, proceed to Step 4. If No, do NOT authorize burning!

STEP 4: Controls & Conditions

Operational Controls, Required for All Burns

A. Forecasted weather, winds and atmospheric stability class obtained?
Yes ___No ___

B. A trial burn may be necessary to observe and confirm anticipated smoke plume behavior. Trial burns must have RRT approval.

C. Safe downwind distance validated, or expanded if winds are inconsistent with anticipated forecast?
Yes ___No ___

D. Burn extinguishing measures in place and available? Yes ___No ___

Public Notifications

Public notification (e.g. radio broadcast to public, safety zone broadcast to mariners, road closure, etc.) implemented? Yes ___ No ___

Unified Command Request to the RRT For In-situ Burning

Additional conditions that apply: Yes ___ (Attached) No ____

Signature of Federal On-Scene Coordinator	Printed Name
Signature of State On-Scene Coordinator	Printed Name

Does Land Owner/Manager Concur? Yes ____ No ____

Signature of Land Owner/Manager	Printed Name

RRT Decision Regarding In-situ Burning

A. ____ Do not conduct in-situ burn
B. ____ In-situ burning may be conducted pursuant to attached conditions
C. ____ In-situ burning may be conducted as requested in Step #3

Signature of EPA Co-Chair	Printed Name
Signature of USCG Co-Chair	Printed Name
Signature of DOI Representative	Printed Name
Signature of Affected State(s)	Printed Name
Signature of Other Federal Trustee(s)	Printed Name
Signature of Tribal Representative	Printed Name

REGION IV SHORELINE CLEANER
TEST AND EVALUATION PROTOCOL

I. Introduction

Guidelines for authorizing the use of chemicals listed on the NCP product Schedule are found in NCP Subpart J and Section 300.310, Phase III. The OSC may use chemicals and other materials to restrain the spread of oil and protect public health and welfare and the environment. Section 300.910 requires that the RRT shall address the desirability of using appropriate dispersants, surface washing agents, surface collecting agents, bioremediation agents, or miscellaneous oil spill control agents listed on the NCP Product Schedule. Regional Contingency Plans (RCP) shall also include applicable preauthorization plans and address the specific contexts in which such products should and should not be used.

This test protocol identifies specific practices to be followed for evaluating the effectiveness and biological impacts of test applications of chemical shoreline cleaning agents to recover oil discharged to environments within Region IV. The Federal On-Scene Coordinator (FOSC) is preauthorized to test shoreline cleaning agents subject to the constraints and practices identified in this document, including those identified through state permitting. Test preauthorization is contingent on the notification process in Section IV and in accordance with Region IV Area Contingency Plans and their associated Fish and Wildlife and Sensitive Environments Annex. Any post-test decision to operationally use the cleaning agents must receive RRT concurrence from the EPA, USCG, affected State(s), and affected Tribe(s), and in consultation with DOI, DOC/NOAA and other affected Federal trustees.

This protocol addresses the testing and evaluation of shoreline-cleaning agents listed on the NCP Product Schedule.

II. Criteria for Considering the Use of Shoreline Cleaners

The RRT IV response policy recognizes that in certain circumstances, the complete physical containment, collection, and removal of oil discharges may not be possible. While physical control and recovery techniques are the traditional response measures, other countermeasures also need to be considered. The use of shoreline cleaners may be considered to prevent a substantial threat to the public health or welfare, or to minimize serious environmental damage. This protocol sets forth criteria by which shoreline cleaners may be applied to the waters within Region IV.

Initial evaluation of the type of oil and impacted shoreline is required prior to testing chemical agents on a spill. Shoreline-cleaning agents work best with Type IV heavy crude oil (Appendix I describes oil types). However, light and medium crude oil can weather to heavier crude over time as constituents of the oil volatilize. A bucket test should be conducted to determine if the removed oil would likely float so it can be collected when re-mobilized (See Section IV: Test

Preparation Procedures). If the removed oil sinks, it may be more difficult to collect and could adversely impact benthic communities. Shoreline type's best suited for the use of shoreline-cleaning agents include man-made structures, rip-rap, boulders, cobble, bedrock, etc., that can be cleaned without trapping removed oil in inaccessible spaces.

III. Constraints Governing Test Use of Shoreline Cleaners

Physical Conditions play a vital role in the overall effectiveness of shoreline cleaners, as well as the success in recovering refloated oil. As such, the following constraints shall be observed:

1. Water Velocity: Current at the impacted area must be less than 1 knot. This will help ensure refloated oil does not escape containment and contaminate clean environments down current.

   Wave Action: The treated area cannot be exposed to breaking waves. The cleaning agents require a soaking time and continual bombardment will reduce effectiveness of the agent(s).

2. Water Depth: Approximately one foot of water should submerge the hose and strainer assembly of the pump configuration. Depth must be sufficient to facilitate the operation of portable pumps.

3. Accessibility: Area must be accessible to observers, monitors, sample collectors, and contract workers.

4. Precipitation: Application during heavy rain, sleet or snow should be avoided. Heavy precipitation will greatly reduce cleaner effectiveness by impacting the soaking time.

5. Temperature: If ambient air temperature is below 50☜F, special consideration of the shoreline cleaner's viscosity should be reviewed when selecting it for use. Consult the manufacturer's recommended application criteria when practical (appended).

6. Wind: High wind will play a vital role in the effectiveness of certain cleaners. (See appended application procedures for Corexit 9580)

Special consideration areas are notable for environmental sensitivity, treaty protection, government designation, important public value and private ownership. If testing is proposed in the following areas, additional consultation with the appropriate manager or owner shall be undertaken prior to test application:

1. Vital Resources: Shoreline cleaner testing is not recommended near operating water intakes. Oil lifted from the substrate may disperse into the water column or escape floating containment, potentially fouling water supplies.

2. Threatened & Endangered Species (Federal and State listed) and designated critical habitats: OSCs shall comply with the MOA regarding Oil Spill Planning and Response Activities under the NCP and the ESA. OSCs should consult with the governing state agency regarding any recommended measures to avoid or minimize impacts to state-listed species and their habitats.

3. Federal, State or local areas of significance: Preauthorization does not apply within or immediately adjacent to units of the National Park Service, State or local parks, the National Wildlife Refuge System, Federal Wilderness Areas, the Wild and Scenic Rivers System, a National Marine Sanctuary, a National Estuarine Research Reserve, and the National Forest without the prior consent of the land managing agency. Test applications on such lands are subject to all conditions imposed by the managing authorities.

4. Tribal Governments: Preauthorization does not apply for test applications on or immediately adjacent to tribally administered lands and waters, including lands and waters protected by treaty without the prior consent of the Tribal government. Test applications on such lands and waters are subject to all conditions imposed by these authorities.

5. Historic/Archeological Resources: Preauthorization does not apply for test applications on or immediately adjacent to historic properties. OSCs shall comply with the Programmatic Agreement on Protection of Historic Properties During Emergency Response to identify, avoid, and/or mitigate potential impacts.

6. Private landowners: OSCs should notify landowners of their intent to conduct test applications of shoreline cleaning agents on privately-owned property and give special consideration to any concerns expressed by the landowners.

IV. Test Preparation Process

OSCs shall follow this protocol to ensure the physical conditions and special considerations are met and have been adequately addressed prior to continuing consideration of testing shoreline cleaners. The following processes and procedures shall be used to guide further action:

1. Identify, notify and coordinate with stakeholders to include incident specific RRT notification of the intent to initiate test preparation.

2. Select one or more of the NCP listed shoreline-cleaning agents based on environmental conditions.

3. Conduct a bucket test to determine if removed oil will float or sink. If it floats, note the time it takes for the water column to become clear (all particles float to the surface). If

the oil sinks, then the use of shoreline-cleaners is not appropriate.

4. Contact shoreline-cleaning agent supplier

a) Identify cost

b) Determine availability

c) Consider transportation

d) Invite shoreline-cleaning agent representative to participate

V. Test Application Procedures

1. Identify test areas and control area boundaries

a) Select a minimum of two representative test areas that 5 gallons of product will adequately cover (approximately 300 to 500 square feet total) and clearly mark the areas.

b) Set aside a representative control area similar to the test areas for comparison

c) Obtain Global Positioning System (GPS) location points defining each area

d) Include a map of the area identifying the test and control areas

2. Effectiveness criteria and monitoring procedures:

a) Estimates of effectiveness of a Shoreline Cleaning Agent for removing oil are determined by comparing results from tests of oiled substrates with and without application of a candidate Shoreline Cleaning Agent. Therefore, washing the representative control set-aside with on-site water in a manner equivalent to the treated test area with the Shoreline Cleaning Agent should be compared for a measure of effectiveness.

b) 8oz.(125ml) sample jars should be used to collect run-off wash water from all areas where the Shoreline Cleaning Agent was applied for quantifying estimated effectiveness. Note the relative difference of floating oil in the jars from the two areas. Photo-documentation of jars will be needed.

3. Water and sediment sampling in control and test areas for Total Petroleum Hydrocarbon (TPH) analysis

a) Using 1-liter sample jars, collect a background water sample in an adjacent non-impacted area in addition to subsurface water samples from inside and outside of the boom in the test areas and down gradient of boomed areas immediately prior to cleaning agent application. During washing operations, collect 1-liter subsurface water samples from inside and outside of the boom in the test areas and down gradient of boomed areas at 10-minute increments until 30 minutes after final wash process.

b) Label water sample jars with a unique identifier and include media type, date, time, location (GPS), depth, and shoreline cleaner used, and store in a cool to cold container for shipment to EPA-approved lab for quick turn around analysis in accordance with EPA-approved protocol.

c) Using 8 oz. (250 ml) jars, collect sediment samples in test areas immediately prior to cleaning agent application and following washing process.

d) Label sediment sample jars with a unique identifier and include media, date, time, location (GPS), depth, and shoreline cleaner used, and store in a cool to cold container for shipment to EPA-approved lab for quick turn around analysis in accordance with EPA-approved protocol.

e) Document the process and interpret analytical results.

4. Toxicity procedures to evaluate shoreline cleaning agent impacts to aquatic life

a) Choose a laboratory to run the aquatic toxicity tests. See the attached list of laboratories that routinely run these tests in Appendix 5: Contact Information.

b) Collect one-gallon (4-liter) subsurface water samples in brown glass containers at each sampling site.

c) Collect a water sample from an unimpacted area (background/control), from an area near the shoreline inside the boom and from an area downstream outside the boom prior to the application of the shoreline cleaner.

d) Collect a water sample inside and outside the boom and a sample downstream after the shoreline cleaner is washed from the rocks into the surface water.

e) Label sample jars with a unique identifier and include date, time, location (GPS), depth, and shoreline cleaner used, and store in a cool to cold container for shipment to EPA-approved lab for quick turn around analysis in accordance with EPA-approved protocol.

f) Ask the laboratory to conduct 48-hour EC_{50}/LC_{50} acute toxicity tests and 7-day chronic toxicity tests for *Ceriodaphnia dubia* using the American Society for Testing and

Materials (ASTM) guidelines.

g) Compare the results from the 48-hour EC_{50}/LC_{50} and the 7-day tests to assess whether application of the shoreline cleaner has the potential to adversely affect aquatic life.

h) Document the process and interpret analytical results.

5. Booming and recovery procedures:

a) Identify current direction and velocity.

b) Use a float to determine distance of boom placement from the shoreline based on the time it takes for the oil in the bucket test to float to the top and the water becomes clear.

c) Install a double boom around the test and control areas at the appropriate distance.

d) Use appropriate absorbent material inside the boom for oil recovery and if possible utilize more aggressive removal equipment (i.e., vacuum pumps, portable skimmer, etc.) to remove the oil.

6. Site specific product application procedures are to be in accordance with the manufacturers recommended application procedures.

VI. Reporting

1. The following outline is recommended for the after-action report:

a) Cover
- title
- date
- agency
- preparer

b) Introduction
- spill summary
- test date
- test location
- landowner(s) notified
- physical conditions
- type of oil(s) treated
- cleaner(s) tested
- test participants

c) Test Procedures
  - bucket test
  - field test
  - measuring effectiveness
  - sampling for TPH
  - toxicity testing
  - booming and recovery

d) Results
  - effectiveness of bucket test
  - effectiveness of field test and recovery
  - TPH
  - toxicity

e) Test Conclusions
  - oil recovered/not recovered
  - oil dispersed/not dispersed
  - oil-cleaner mix toxic/nontoxic

f) Recommendations
  - proceed no further
  - coordinate/consult for operational use
  - conditions

2. Lessons learned:

a) Following each use of this protocol, the OSC will provide observations, lessons learned and suggested changes to the Region IV Co-Chairs. Changes to this document will be made as appropriate. Lessons learned from each application of this protocol will be submitted for inclusion in the Selection Guide for Oil Spill Applied Technologies.

RRT4/R&TC Position and Guidance on Use of Surface Washing Agents for Oil Spill Response August 2006

The RRT has reviewed the response niche for surface washing agents as presented in the Selection Guide (vol. I). The Response & Technology Committee provided training, case studies, and scenario exercises during 2006 to explore the need for this response countermeasure and the need for any guidance, test protocols, or pre-authorization for use of surface washing agents.

The RRT determined that:

1. There is not a need to develop pre-authorization for use of surface washing agents. The RRT did not feel that the effective use of surface washing agents would be subject to a time-critical window of opportunity as is the case with some countermeasures such as dispersants, in-situ burning, or solidifiers. All use of surface washing agents, will therefore be on a case-by-case basis and reviewed by the incident-specific RRT prior to authorizing any application.

2. Surface washing agents may be of the "lift and float" type whereby oil is lifted from the surface of the oiled substrate or material and then fully floats on the surface of the water. Some surface washing agents "lift and disperse" the oil making effective containment and recovery of the released oil more limited or impossible depending on the degree of dispersing action. Generally, the RRT prefers use of a "lift and float" type surface washing agent in order to enhance recovery. However, some circumstances may warrant consideration of other products that lift and disperse or lift and partially disperse.

3. The selection guide provides good surface washing agent evaluation information and comparisons of products on the current EPA product schedule. This information should be reviewed prior to submitting any request for use to the RRT.

4. The RRT requires that documentation of use be provided following a cleanup. The RRT may specify what to provide in the documentation and may condition use as appropriate for the incident. Generally, the RRT will require photos, estimates of effectiveness, recovery estimates, amount of product used, and amount of oil/area treated. Test applications may be required prior to granting full operational use approval.

5. The use of surface washing agents in or near critically designated habitats and special sensitive areas may require additional safeguards, evaluations, tests, limitations, or protective measures if approved.

Regional Response Team IV
Pre-Authorization Policy for Use of Solidifiers

Prepared by the Regional Response Team IV (RRT4)
Response and Technology Committee
01 May 2006

RECORD OF CHANGES

Change Number	Effective Date	Date Entered	Entered By:	Page Check

Regional Response Team IV (RRT4)

From: Regional Response Team IV

To: Distribution

Subject: LETTER OF PROMULGATION: RRT4 Limited Pre-authorization and Use Policy for Chemical Countermeasures: Solidifiers

1. The Regional Response Team IV (RRT4) has approved the attached policy for the limited use of solidifiers as listed and defined in the National Contingency Plan (NCP) product Schedule under subpart J. This policy covers the pre-approved use of solidifiers for control, containment and enhanced recovery of oil in ocean, coastal waters, and land throughout the RRT4 area of responsibility. This policy hereby replaces any other policies, guidelines, or plans related to the use of solidifiers now in force throughout RRT4. This policy will be used in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), local Area Contingency Plans (ACP), and Regional Contingency Plans (RCP) that are current and in force throughout the region.

2. This policy may be adopted for use by Area Committees by incorporating this document in the local Area Contingency Plan (ACP) maintained by the U.S. Coast Guard as well as Regional Area Contingency Plans maintained by the Environmental Protection Agency (EPA).

3. This policy shall be followed as closely as possible, but has not provided for every possible contingency that might occur. Deviations from this policy are authorized when necessary in the best interest of safety or protection of resources. The RRT4 must be made aware of any deviation, including the reason for the deviation, as soon as possible.

4. This policy cannot be changed or altered without notice and opportunity for comment provided to each signatory official or designated representative to the RRT4.

5. Any signatory official or designated representative to the RRT4 can petition to amend or revise this policy and/or withdraw approval at any time.

6. All comments and requests for revision shall be directed to the RRT4 Response and Technology Committee for consideration by the RRT4.

7. The RRT4 Response and Technology Committee will remain abreast of developments and changes for solidifier products and use which may provide cause for recommending revision to this policy, The Response and Technology

Committee may be tasked at any time by members of the RRT4 to provide additional information or guidelines pertaining to use of solidifiers if available.

8. This Letter of Promulgation remains in effect until canceled by a competent authority.

DATE : __7 February 2007______

U.S. Environmental Protection Agency RRT4 Co-chair:

_Shane Hitchcock______________

U.S. Coast Guard RRT4 Co-chair:

_James J. O'Connor_____________

Encl: (1) RRT4 Limited Pre-approval and Use Policy for Chemical Countermeasures: Solidifiers

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Regional Response Team IV (RRT4)
Limited Pre-authorization and Use Policy for Chemical Countermeasures: Solidifiers

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RRT4 LIMITED PRE-AUTHORIZATION AND USE POLICY FOR CHEMICAL COUNTERMEASURES: SOLIDIFIERS

INTRODUCTION:

The Regional Response Team for Federal Region IV (RRT4) has developed this limited pre-approval and use policy to allow for the use of solidifiers as listed on the U.S. Environmental Protection Agency (USEPA) Product Schedule for mitigation of oil spills. Solidifiers are considered an alternative to sorbents or mechanical recovery to recover small amounts of oil or thin sheens from the water surface. They also have been shown to be useful by creating solid barriers that can limit spreading, thereby enhancing containment, collection, and recovery.

Solidification of oil is an oil spill countermeasure that was evaluated by the RRT4 as a candidate for developing preauthorization for use. Due to the potential for solidifiers to: 1) add to the increased effectiveness of response in certain situations; 2) the fact that currently listed solidifiers are not a significant concern from a toxicological point of view; and 3) they don't sink once reacted with oil, the RRT4 agreed that preauthorization for use of solidifiers under certain conditions was desirable.

Preauthorization is necessary because the product must be on hand at the spill site and applied immediately to be effective for most spills. This pre-authorization agreement is for the use of solidifiers in all applications. However, the use of solidifiers contained in booms, socks, pillows or other similar manner may be considered for use in the same manner as sorbents provided all materials are fully recovered and disposed of properly.

Application ratios of loose powder form of solidifiers range from 1:1 to 1:10 by weight and are best used to treat relatively small volumes of spilled oil. Using solidifiers for small spills have the following benefits:

- The treated oil becomes immobilized and will not spread further, on the surface or into the ground.
- Solidifiers can be added to the perimeter of the oil, forming a solidified barrier to prevent further spreading, rather than treating the entire spill volume.
- The solidified oil can be removed with readily available hand tools, rather than requiring liquid storage and pumping systems.
- Solidifiers are effective on thin sheens whereas standard sorbent materials commonly do not pick up sheens.
- May in some cases be more effective on slow continuous small releases than sorbents.

Under the NCP (Section 300.910), Regional Contingency Plans and Area Contingency Plans may include preauthorization policies that address the specific contexts in which oil spill control products should or should not be used. Factors for consideration in the preauthorization policy include:

- Potential sources and types of oil spilled
- Sensitive resources at risk from spilled oil
- Available equipment and adequately trained operators
- Amount of oil to be treated
- The available means to monitor product application, effectiveness, and recovery

SECTION I

Purpose

This policy implements Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) and provides for the limited use of solidifiers as listed on the EPA product schedule on oil discharges within the Regional Response Team IV area of responsibility. This pre-authorization applies for use on ocean and coastal waters, inland waters, and on land when the use is in accordance with all protocols and conditions of this policy. This authorization does not apply to use in aquifers and other areas where recovery would be limited, difficult or unlikely.

The members of the RRT4 agree that solidifiers may offer enhanced response capability under certain conditions leading to prevention of serious environmental damage, and reduced threat to the public health or welfare. This policy establishes criteria under which solidifiers may be applied in the environment within the RRT4 region.

This RRT4 policy precludes the necessity for each Area Committee to develop separate pre-authorization plans. This policy does not preclude the Area Committees from developing more stringent requirements or limitations as they deem necessary.

Authority

Subpart J of the National Oil and Hazardous Substances Contingency Plan (NCP) provides that the pertinent Regional Response Team (RRT) representatives including the EPA, DOC, DOI, and the affected State(s) may pre-authorize the use of chemical countermeasures for oil spill response. Subchapter J states that the OSC may authorize the use of products pre-authorized without obtaining the specific concurrence of the RRT. The NCP further states that the RRT representatives including the EPA, DOC, DOI and affected State(s) may approve, disapprove, or approve with modification the pre-authorization plans developed by Area Committees. This policy constitutes the RRT4 pre-authorization policy for use by Area Committees. Approved pre-authorization plans shall be included in the appropriate Area Contingency Plans and Regional Contingency Plans.

Scope

The USCG, EPA, DOI, DOC and the states of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, and the Commonwealth of Kentucky have adopted the use of solidifiers as an approved tool to respond to spilled or discharged oil on the waters or lands within the jurisdiction of the RRT4. This policy includes protocols under which solidifier use must be conducted. Use outside the limitations of these protocols shall be on a case by case basis as evaluated and authorized by the incident specific RRT.

Application of solidifiers to remediate oil spills occurring in the RRT4 region will be conducted in accordance with this policy and in accordance with any Letters of Agreement established between the USCG, EPA, DOI, DOC and the affected State(s). The pre-authorization to use solidifiers as provided by this policy is in effect only as dictated by all protocols established in Section III. This pre-authorization applies only to the spill response countermeasure known as solidifiers as listed on the current EPA product schedule. The RRT4 may review any listed solidifier product at any time and may exclude them from pre-authorized use dependant on environmental, health or safety concerns.

SECTION II

Limited Pre-Authorization of Solidifier Use-General Considerations and Protocols

Potential Sources and Types of Oil

Specific solidifier formulations have been shown to be effective on all types of oil. Mixing the product with the oil is more difficult with viscous oils, therefore, solidifiers are generally considered to be more effective with lighter oil types. The best solidifier formulation(s) should be selected for the types of oil to be treated and spill conditions. Pre-testing of solidifier brands with specific oil types may be desired in order to better select the best candidate product.

Examples of the potential sources of spills where solidifier use is considered to have a potentially beneficial and routine niche are listed below:

1. Spills to Water in Marinas, Harbors, Ports, and other Industrial Areas where:

    - Small spills occur frequently
    - Spills are mostly light refined products that quickly spread into thin sheens that are difficult to contain and recover
    - Water currents are slow and there are structures that provide some in-place containment
    - Products could be stored at likely sources of spills (e.g., fueling docks)
    - Facility personnel can be trained in the proper use, recovery, and disposal of the products and treated oil

2. Spills on Land where:

    - Spilled oil could flow off-site into ditches and creeks
    - Oil has the potential to soak in to the ground, contaminating soils and groundwater
    - Facility personnel can be trained in the proper use, recovery, and disposal of the products and treated oil
    - Examples include fueling and oil loading stations, rail yards, and oil storage facilities

Sensitive Resources

Currently listed solidifiers in general have very low if any acute aquatic toxicity, primarily because they are insoluble in water. However, other concerns have been raised, including:

- Toxicity associated with ingestion of unreacted product;

- Ingestion and fouling hazard of treated oil or partially treated oil that is not contained or escapes containment;
- How treated oil would interact with sensitive habitats such as wetlands; and
- Whether treated oil will be more persistent in the environment and tend to weather and sink over long periods of time.

Due to the fact that solidifiers identified for use under this pre-authorization are not toxic, don't sink, are essentially inert to organisms, and render the toxic components of reacted petroleum bio-unavailable to organisms that may ingest them, no special resource restrictions for their use have been identified at this time. As long as the products are applied as directed and fully recovered from the environment, no significant adverse environmental impacts from the use of solidifiers are expected. Their use as allowed under this policy will create no more risk than the use of commonly used sorbent materials which are not regulated. Solidifiers that are manufactured in high quality booms, socks, pillows, or other effective containment devices that do not allow for the possibility of loose material to enter the environment may be considered for use in the same manner as sorbents provided all materials are fully recovered and disposed of properly. Application of solidifiers in loose form will be more restricted as discussed below.

Standard good oil-response practices are required, such as proper application of the solidifier, minimization of foot traffic and trampling of oil into the sediments/soils or damaging vegetation, avoiding application of product directly on to wildlife, and recovery of all product and treated oil.

Any use restrictions identified through Section 7 consultations with the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS), as required under the Endangered Species Act as well as any requirements noted under consultation for Essential Fish Habitat (EFH) with NMFS must be complied with (see Section IV; appendix 2). All stipulations, controls, or limitations identified by the signatory States or Federal Natural Resource Trustees must be complied with as well (see Section IV; appendix 1), Additionally, the State Historic Preservation Officer should also be notified/consulted on the use of solidifiers, as required under the National Historic Preservation Act, if use of a solidifier is in an area where there is an identified potential for impacts to cultural, archeological, or historic resources.

Application Methods and Adequately Trained Staff

Concerns with the application of solidifiers in loose powder form include excess release of product to the environment due to poor application techniques and over application that can lead to increased volumes of waste material. The pre-authorization includes application and recovery requirements with the intent of providing guidelines for the proper use of solidifiers in loose form without being overly restricted. It is important that responders be adequately trained in the proper use of solidifiers.

Preauthorization Conditions

1. Product Information – This preauthorization applies only to those products that have been listed on the NCP Product Schedule (effective 10/05). The purpose of this condition is to make sure that adequate information on product composition and toxicity are available in order to be considered for inclusion in this policy. The Product Schedule must be reviewed to ensure that no new solidifiers have been added that would cause concern if used in the environment and hence would not be authorized for use under this pre-authorization policy.

2. Amount of Oil to be Treated – Solidifiers in loose form may be used on any oil type under 500 gallons (this is the treatment volume, not the total spill volume). No restriction is noted for solidifier used in contained form (booms, pillows, socks) as long as complete recovery is accomplished.

3. Amount of Product Approved for Application – No more than 1,000 pounds of loose solidifier product can be applied in response to a single treatment event under this preauthorization. This limit was based on an application ratio of 1:4 and the treatment volume limit of 500 gallons, as supported by manufacture's application rate guidance. Application of additional amounts requires a request to the RRT4.

4. Application/Recovery Requirements –

    a. On Water (includes rivers, streams, creeks, lakes, ponds, wetlands, open ocean, marine and coastal waters, etc.). In all cases, the application of loose solidifier material must be continuously monitored to ensure material is completely contained and recovered. Recovery must be conducted as soon as the product is no longer effectively removing oil.

        i. Apply loose product only directly onto oil. No loose product will be applied to flowing waterbodies unless the oil is physically contained, such by hard boom or inside a lock or other effective containment structure. The product will be applied in a manner that prevents loss from wind drift, overspray, and spillage.
        If environmental conditions such as wind, currents, weather, prohibit effective containment and recovery of the applied solidifier and treated oil, then pre-authorization does not apply.

        ii. Product contained in booms, pillows, pads, etc. can be deployed in flowing waters as long as they are monitored and replaced prior to failure of containment systems.

        iii. The loose product will be applied only by responders that have been trained in the proper application of the product. The intent is to prevent misuse and over application.

        iv. No loose product will be applied directly onto wildlife (e.g., birds, mammals, reptiles, fish, shellfish) or in sensitive wetland or coastal/marine habitat where resources could be adversely affected if complete recovery is not accomplished or in areas that may affect known cultural, archaeological, or historic properties. Pre-authorization for use of loose solidifier material does not apply for specially managed waters or lands including designated marine sanctuaries, preserves, or national parks without consultation with the proper resource and property manager.

v. All product and treated oil will be recovered.

b. On Land
    i. Only apply loose product directly onto oil or to create a barrier ahead of flowing or potentially mobile oil. No loose product will be applied to drainages in an attempt to wash it towards oil downstream.
    ii. Solidifier booms and pillows can be placed in drainages to intercept oil. However, all materials will be monitored and replaced to prevent failure of containment systems.
    iii. This authorization does not apply to use in aquifers and other areas where recovery would be limited, difficult or unlikely.

c. Waste Disposal
    i. All recovered wastes will be disposed of properly.

5. Monitoring Requirements – During operational use of the loose form solidifier product, monitor the effectiveness and effects of the application, including:
    a. The product:oil ratio needed to solidify the oil. When the amount needed to solidify the oil exceeds the recommended application rate by a factor of 2, determine whether further treatment is warranted.
    b. The properties of the treated oil (firm mass, sticky, non-sticky, etc.).
    c. The efficiency of treated oil recovery.
    d. The degree of damage to substrate and vegetation during application and recovery.
6. <u>Reporting Requirements</u> – As part of the response documentation, the responsible party or responding organization must maintain records of the following information:
    a. Amount of loose solidifier used
    b. Type and amount of oil treated
    c. Weight and/or volume of treated oil recovered
    d. Evaluation of effectiveness of the application

    Any use that results in problems, including: non effectiveness, inability to contain and recover solidifier and treated oil, or any observed impacts to wildlife, aquatic resources, sensitive habitat, or known cultural, archaeological, or historic properties must be reported as soon as feasible to the RRT4 through the National Response Center (800) 424-8802.

SECTION III

Signature Page

For

Pre-Authorization Policy for Use of Solidifiers

//s//________________7 FEB 07___
James J. O'Connor (Date)
CAPT, US Coast Guard
Chief, Incident Management Branch
Seventh Coast Guard District
Co-Chair

//s//________________2/7/07___
Shane Hitchcock (Date)
Chief, Emergency Response and Removal Branch
EPA, Region 4
Co-Chair

//s//_______________10/6/06_____
Brad Benggio (Date)
Scientific Support Coordinator
Department of Commerce

//s//________________10/5/06___
Gregory Hogue (Date)
Regional Environmental Officer
Department of the Interior

//s//________________1/3/07______
Douglas White (Date)
Natural Sciences Manager
Department of Environmental Protection
Division of Law Enforcement
Bureau of Emergency Response
State of Florida

//s//_________________10/11/06__
Carol A. Couch, PhD (Date)
Director
Environmental Protection Division
State of Georgia

Signature Page

For

Pre-Authorization Policy for Use of Solidifiers

______________________________	//s//________________11/7/06_
	Alan W. Klimek, P.E. (Date)
	Director
	Division of Water Quality
State of South Carolina	State of North Carolina
//s//________________10/13/06___	//s//________________10/10/06__
Eric Dear (Date)	Bruce Freeman (Date)
Chief of Emergency Services	State Emergency Response
Depart. of Environmental Quality.	Coordinator
State of Mississippi	State of Alabama
______________________________	//s//________________9/25/06__
	Robert N. Francis (Date)
State of Tennessee	Environmental Response Team
	Supervisor
	Commonwealth of Kentucky

SECTION IV

Appendices

- 1 Letters of Agreement
- 2 Consultation Requirements
  -USFWS Section 7
  -NMFS Section 7
  -NMFS Essential Fish Habitat
- 3 Solidifier Information and Comparison with Sorbents
- 4 List of Solidifier Products Covered by This Policy
- 5 Response Contact List

APPENDIX 1

Letters of Agreement:

North Carolina (see attached document)

Michael F. Easley, Governor

William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E. Director
Division of Water Quality

November 7, 2006

Mr. Patrick Keane
Commander (dxc)
Seventh Coast Guard District
909 SE First Ave
Miami, FL 33131

Subject: Pre-Authorization Policy for Use of Solidifiers for Oil Spill Mitigation

Dear Sir:

Attached please find my signature for pre-authorizing the use of solidifiers for oil spill mitigation in the State of North Carolina and the waters of the State with stipulations.

North Carolina General Statute 143-215.84(a) states in part, "If it is not feasible to collect and remove the discharge, the person responsible shall take all practicable actions to contain, treat and disperse the discharge; but no chemicals or other dispersants or treatment materials which will be detrimental to the environment or natural resources shall be used for such purposes unless they shall have been previously approved by the Commission." The Commission refers to the Environmental Management Commission (EMC). Title 15A North Carolina Administrative Code Chapter 2A .0105 (a) (2) delegates the authority to approve the use of chemicals or other dispersants or treatment materials from the EMC to the Secretary of the Department of Environment and Natural Resources. In accordance with North Carolina General Statute 143B-10, the Secretary has delegated this authority to the Director of the Division of Water Quality.

As follows, my approval of the pre-authorization of the use of solidifiers is based upon three conditions that must be demonstrated to my representative or me before the actual use of solidifiers may be allowed in North Carolina.

1. Use of solidifiers shall be conducted under the direct supervision of a federal OSC.
2. Requests for the use of solidifiers from the EPA federal on-scene coordinator (OSC) shall be directed to the Division of Water Quality's Emergency Response Coordinator at (919) 733-5083 during business hours Monday through Friday from 8:00 AM to 5:00 PM or to the emergency response pager at (919) 899-4500 after business hours and on weekends and holidays.
3. Use of solidifiers shall be conducted by a person or persons adequately trained in the application, recovery and disposal of solidifiers.

Approval for the application of solidifiers shall be made **on a case-by-case basis**.

Sincerely,

Alan Klimek

Alan W. Klimek, P.E.

One North Carolina Naturally

Surface Water Protection Section 1617 Mail Service Center Raleigh, NC 27699-1617 Phone (919) 733-5083 Customer Service
Internet: http://h2o.enr.state.nc.us 512 N. Salisbury St. Raleigh, NC 27604 Fax (919) 733-0059 1-877-623-6748

APPENDIX 2
Consultation Requirements: (see attached documents)

- USFWS Endangered Species Act Section 7
- NMFS Endangered Species Act Section 7
- NMFS Essential Fish Habitat

FILE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Field Office
1601 Balboa Avenue
Panama City, FL 32405-3721

Tel: (850) 769-0552
Fax: (850) 763-2177

IN REPLY REFER TO:

May 24, 2006

Memorandum

To: Assistant Regional Director, USFWS, Ecological Services, Atlanta, GA
Attn: Joe Johnston, Section 7 Coordinator, Endangered Species

From: Project Leader, Panama City FO, Ecological Services, FL

Subject: Concurrence with Findings of "Biological Evaluation of Federally Endangered, Threatened, and Candidate Species for Region 4 and the Caribbean Regional Response Teams on Limited Pre-authorization and Use Policy for Chemical Countermeasures: Solidifiers

As requested by Region 4 and Caribbean Spill Response Teams, biologists in each field office of the Southeast Region have reviewed the document "Biological Evaluation of Federally Endangered, Threatened, and Candidate Species for Region 4 and the Caribbean Regional Response Teams on Limited Pre-authorization and Use Policy for Chemical Countermeasures: Solidifiers." We collectively concur with the determination that endangered, threatened, and candidate species are not likely to be adversely affected by this action. Please complete the consultation by signing where indicated and returning to the Regional Response Team. We would also appreciate a signed copy for our records and distribution to the other field offices.

If you have any questions or would like to discuss the consultation, please contact Dr. Jon Hemming at extension 238.

Gail Carmody

Attachments:
Region 4 and Caribbean Response Teams Review Request
Biological Evaluation
Limited Pre-authorization and Use Policy for Chemical Countermeasures

JMH\kh\Server\public\Jon\letters\solidifier approval cover memo.doc

SPECIES/ CRITICAL HABITAT	ACTIONS TO MINIMIZE IMPACTS
	minimization measures.
	If listed species or critical habitat occur in the area, make all possible effort to avoid contact and/or harassment of species and initiate post-application/recovery emergency consultation procedures on action with the appropriate Service field office in the response area for minimization measures.

VIII. Effect Determination and Response Requested:

SPECIES/ CRITICAL HABITAT	DETERMINATION[1]			RESPONSE[1] REQUESTED
	NE	NA	AA	
All in V and VI above.		X		Yes

[1]DETERMINATION/ RESPONSE REQUESTED:

NE = no effect. This determination is appropriate when the proposed action will not directly, indirectly, or cumulatively impact, either positively or negatively, any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested is optional but a AConcurrence@ is recommended for a complete Administrative Record.

NA = not likely to adversely affect. This determination is appropriate when the proposed action is not likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat or there may be beneficial effects to these resources. Response Requested is a@Concurrence@.

AA = likely to adversely affect. This determination is appropriate when the proposed action is likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested for listed species is AFormal Consultation@. Response requested for proposed and candidate species is AConference@.

Jay McKimmey　　　10 May 2006

Signature (originating station)　　**date**

Ecologist

Title

26 April 2006

IX. Reviewing Ecological Services Office Evaluation:

A. **Concurrence _X_ Nonconcnrrence _______**

B. **Formal consultation required _______**

C. **Conference required _______**

D. **Informal conference required ________**

E. **Remarks (attach additional pages as needed):**

[signature] 7/3/06
Signature **date**

Acting Assistant Regional Director of Ecological Services **Southeastern Region**
Title **Office**

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
(727) 824-5312; FAX 824-5309
http://sero.nmfs.noaa.gov

AUG 23 2006

F/SER31:DK

Mr. Patrick T. Keane
Region 4 and Caribbean Regional Response Teams
Seventh Coast Guard District
909 SE First Avenue, Suite 808
Miami, FL 33131-3050

Dear Mr. Keane:

This is in reply to your April 26, 2006, letter, biological evaluation (BE), and copy of the *Limited Pre-authorization and Use Policy for Chemical Countermeasures* received by the National Marine Fisheries Service (NMFS). The U.S. Coast Guard (USCG), Caribbean Regional Response Team, submitted these documents pursuant to section 7 of the Endangered Species Act (ESA). The USCG proposes to pre-authorize the use of chemical countermeasures in Region IV and the Caribbean to be used in the event of an oil spill, and requests our review and concurrence with their determination that the action would be not likely to adversely affect any endangered, threatened, or candidate species under NMFS purview. Areas of Region IV and the Caribbean that fall under NMFS purview include waters off North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Puerto Rico, and the U.S. Virgin Islands.

The Regional Response Team for Federal Region IV and the Caribbean propose to pre-authorize the use of solidifiers to mitigate oil spills. These solidifiers form a physical bond with the oil and are expected to be beneficial to the environment and protected species as they increase oil spill recovery and containment. The solidifiers themselves have low-to-no toxicity and do not sink when they react with oil. The use of these products is considered an appropriate response for spills in marinas, harbors, on land, inside facilities, and in small water bodies as any loose product can readily be contained and recovered. Use in open water habitats such as oceans or coastal waters would occur only if the oil is physically contained by a boom or other such structure.

Because of the broad geographic range covered by the pre-authorization, including inshore waters, as well as coastal and oceanic waters (if spill is contained in a boom), all ESA-listed species under the purview of NMFS' Southeast Regional Office (SERO) are included in this consultation. The complete species list is included as an enclosure with this letter.

NMFS has analyzed the proposed actions and believes the projects' potential effects on listed species and their critical habitat under NMFS' purview will be discountable and insignificant. The pre-authorization plan includes specific Preauthorization Conditions (enclosed) which will help ensure that the use of the solidifiers is not likely to affect listed species. These conditions include a requirement to contain and recover all loose product and treated oil; therefore, the likelihood of solidifier, or solidifier/oil product remaining in the environment in more than very small quantities is very low. As a result, the probability of ingestion of floating product by any listed species is discountable. The amount of oil to be treated is limited to less than 500 gallons if solidifiers are used in loose form, and no restriction if contained. Likewise, a limit of 1000 pounds of solidifier can be applied in response to any single treatment event. Additionally, the solidifier and the solidifier/oil product float, and therefore would not reach the benthic habitats utilized by some of the listed species. The possibility of ingestion of minute quantities of the solidifier is minimal, but in the event that it does happen, the effects are deemed to be insignificant as the product is considered to have no-to-low toxicity and the quantities of any stray product would be minimal. The Conditions also require monitoring and reporting of the entire process. The use of the solidifier could also potentially prevent harm to habitats used by protected species by aiding in the recovery of petroleum products that have been spilled.

The use of the solidifier can potentially occur in areas that have been designated as critical habitat for listed species under NMFS' purview (see enclosure). However, the use of the solidifier is not likely to impact critical habitat for the same reasons that it is deemed not likely to adversely affect listed species as detailed above. No critical habitat features for sea turtles will be impacted by the proposed action. The designated leatherback sea turtle critical habitat is based on use of those waters for courting, breeding, and access to the nesting beaches. The green and hawksbill sea turtle critical habitat is based on the areas being extensively used for foraging by the turtles, especially juveniles. Green turtles utilize sea grass beds, and hawksbills specialize on sponges found on reefs and hardbottom habitats. The proposed action will not alter the physical and biological features that were the basis for designation of right whale critical habitat (water depth, water temperature, and the distribution of cow/calf pairs in relation to the distance from the shoreline to the 40-meter isobath). Critical habitat for Johnson's seagrass is based on the following physical and biological attributes, none of which will be negatively impacted by the proposed action: adequate water quality, adequate salinity levels, adequate water transparency, and stable, unconsolidated sediments free of disturbance.

The Gulf sturgeon critical habitat designation is based upon the areas having one or more of the following principle constituent elements, none of which will be impacted by the proposed action:
- Abundant prey items, such as amphipods, lancelets, polychaetes, gastropods, ghost shrimp, isopods, molluscs and/or crustaceans, within estuarine and marine habitats and substrates for subadult and adult life stages.

- Water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages;

- Sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and

- Safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (e.g., an unobstructed river or a dammed river that still allows for passage).

The use of solidifiers to clean up oil spills will not negatively impact critical habitat. The solidifier and the solidifier/oil product float, and therefore will not impact benthic habitats or sediment quality. The solidifier and solidifier/oil product will be contained and recovered, and therefore will not negatively impact water quality. The very small quantities of material that may not be recovered during an operation will have an insignificant impact on habitats as it is deemed to be low-to-non-toxic. Boat operations to clean the spills will be very localized and limited in time, and therefore won't cause additional impacts to critical habitats or their PCEs. The impacts of petroleum products left unrecovered would pose a greater threat to critical habitats than the minimal likelihood of impact posed by the use of solidifiers as detailed in the plan.

Based upon our review of the information provided, NMFS concurs with the USCG's determination that the action plan associated with the *Limited Pre-authorization and Use Policy for Chemical Countermeasures: Solidifiers* may affect, but is not likely to adversely affect, any listed species under NMFS' purview. The U.S. Fish and Wildlife Service is responsible for ESA section 7 issues for sea turtles in terrestrial environments (the beach) and therefore should be contacted for consultation regarding any potential impacts of solidifiers on the nesting beach.

This concludes the USCG's consultation responsibilities under section 7 of the ESA. A new consultation must be initiated if there is a take, if new information reveals effects of the action to listed species or critical habitat in a manner or to an extent that was not previously considered; if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not previously considered; or if a new species is listed or critical habitat designated that may be affected by the identified action.

We have enclosed additional information on other statutory requirements that may apply to this action, as well as NMFS' Public Consultation Tracking System that allows you to track the status of this ESA consultation. If you have any questions, please contact Dennis Klemm, fisheries biologist, at (727) 824-5312, or by e-mail at dennis.klemm@noaa.gov.

Sincerely yours,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosures

cc: F/SER4 – M. Croom

File: 1514-22.H.2.USCG
Ref: I/SER/2006/01903

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5511
(727) 824-5317; FAX (727) 824-5300
http://sero.nmfs.noaa.gov/

May 25, 2006 F/SER4:DD

Mr. Patrick T. Keane
Region 4 and Caribbean Regional Response Team
Seventh Coast Guard District
909 SE First Avenue, Suite 808
Miami, Florida 3313103050

Dear Mr. Keane:

NOAA's National Marine Fisheries Service (NMFS), Southeast Region, Habitat Conservation Division has reviewed the information provided with your April 26, 2006, letter regarding the proposed Caribbean Regional Response Team's Pre-Approval for Use of Solidifiers for Oil Spill Response. As specified in the Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat (EFH) consultation is required for federal actions which may adversely affect EFH.

Be advised that the Gulf of Mexico and Caribbean Fishery Management Councils recently revised their descriptions and identifications of EFH and EHF habitat areas of particular concern (HAPC) for federally managed species within their respective jurisdictions. Please find enclosed *Essential Fish Habitat: A Marine Fish Habitat Conservation Mandate For Federal Agencies - Gulf of Mexico Region* and in particular note Appendixes 5 and 6 that summarize current EFH and EHF-HAPC designations. While a similar document is currently under development for the Caribbean region also please find enclosed information extracted from their final amendment which provides current EFH and EFH-HAPC designations for that area also.

As the federal action agency in this matter, the U.S. Coast Guard has determined that the proposed action would not adversely affect EFH and, based on our review, we agree with your determination. Please be advised that further consultation on this matter is not necessary unless future modifications are proposed and you believe that resulting action may result in adverse impacts to EFH. We appreciate the opportunity to provide these comments. Questions should be directed to Mr. David Dale at (727) 824-5317 or by e-mail at David.Dale@noaa.gov.

Sincerely,

/ for

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

Enclosures

Enclosure 2. EFH Descriptions extracted from the Caribbean Fishery Management Council's Comprehensive Amendment to the Fishery Management Plans for the U.S. Caribbean, May 2005.

EFH Alternatives:

- EFH for the spiny lobster fishery in the U.S. Caribbean consists of all waters from mean high water to the outer boundary of the EEZ (habitats used by phyllosome larvae) and seagrass, benthic algae, mangrove, coral, and live/hard bottom substrates from mean high water to 100 fathoms depth (habitats used by other life stages).
- EFH for the queen conch fishery in the U.S. Caribbean consists of all waters from mean high water to the outer boundary of the EEZ (habitats used by eggs and larvae) and seagrass, benthic algae, coral, live/hard bottom and sand/shell substrates from mean high water to 100 fathoms depth (habitats used by other life stages).
- EFH for the Reef Fish Fishery in the U.S. Caribbean consists of all waters from mean high water to the outer boundary of the EEZ (habitats used by eggs and larvae) and all substrates from mean high water to 100 fathoms depth (habitats used by other life stages).
- EFH for the Coral Fishery in the U.S. Caribbean consists of all waters from mean low water to the outer boundary of the EEZ (habitats used by larvae) and coral and hard bottom substrates from mean low water to 100 fathoms depth (habitat used by other life stages).

HAPC Alternatives:

- Designate HAPCs in the Reef Fish FMP as the following areas based on the occurrence of confirmed spawning locations identified in the EIS as: Puerto Rico: Tourmaline Bank/Buoy 8; Abrir La Sierra Bank/Buoy 6; Bajo de Sico; Vieques – El Seco St. Croix: Mutton snapper spawning aggregation area; East of St. Croix (Lang Bank) St. Thomas: Hind Bank Marine Conservation District and Gramanic Bank.

- Designate HAPC For the Reef Fish FMP as those EFH habitat areas or sites identified as having particular ecological importance to Caribbean Reef Fish species identified in the EIS as: Puerto Rico: Hacienda la Esperanza, Manití; Bajuras and Tiberones, Isabela; Cabezas de San Juan, Fajardo; Jobos Bay National Estuarine Research Reserve, Jobos Bay; Bioluminescent Bays, Vieques; Boquerón State Forest; Pantano Cibuco, Vega Baja; Piñones State Forest; Río Espiritu Santo, Río Grande; Seagrass beds of Culebra Island (9 sites designated as Resource Category 1 and two additional sites); Northwest Vieques seagrass west of Mosquito Pier, Vieques; St. Thomas: Southeastern St. Thomas, including Cas Cay/Mangrove Lagoon and St. James Marine Reserves and Wildlife Sanctuaries; Saba Island/Perseverance Bay, including Flat Cay and Black Point Reef; St. Croix: Salt River Bay National Historical Park and Ecological Preserve and Marine Reserve and Wildlife Sanctuary; Altona Lagoon; Great Pond; South Shore Industrial Area; and Sandy Point National Wildlife Refuge.

- Designate HAPC for the Coral FMP as those EFH habitat areas or sites identified as having particular ecological importance to Caribbean Coral species identified as: Puerto Rico: Luis Peña Channel, Culebra; Mona/Monito; La Parguera, Lajas; Caja de Muertos, Ponce; Tourmaline Reef; Guánica State Forest; Punta Petrona, Santa Isabel; Ceiba State Forest La Cordillera, Fajardo; Guayama Reefs; Steps and Tres Palmas, Rincon; Los Corchos Reef, Culebra; Desecheo Reefs, Desecheo; St. Croix: St. Croix Coral Reef Area of Particular Concern, including the East End Marine Park; Buck Island Reef National Monument; South Shore Industrial Area Patch Reef and Deep Reef System; Frederiksted Reef System; Cane Bay; and, Green Cay Wildlife Refuge.

APPENDIX 3

What are the Benefits/Shortcomings/Comparisons of Using Solidifiers versus Sorbents?

Table 1. Benefits/shortcomings/comparisons of using solidifiers versus traditional sorbents.

Issue	Benefits	Shortcoming	Comparison with Sorbents
Effectiveness with Light Oils	Work best with light oils.		Light oils spread into thin slicks that are difficult to recover with sorbents.
Effectiveness on Sheens	Can remove even light sheens.	May Tend to overapply on sheens.	Sheens are very difficult to pick up.
Effectiveness with Heavy, Viscous Oils	Immediate broadcast over the oil will enhance solidification	Reduced effectiveness with emulsified, viscous oils due to poor mixing.	Depends on sorbent type; oil snare is very effective with viscous oil.
Low Temperature	Alternative response for cold water/ice conditions	Increased time to solidify at low temperatures due to increased oil viscosity (not sure there is sufficient data to say 'reduced effectiveness').	Temperature may have little effect on sorbents. (believe that sorbents also have reduced effectiveness at low temperatures).
Flash Point	Treated oil is less flammable		Absorbed oil may be less flammable.
Worker Training	Improved response time and effectiveness.	Need training in proper use of new products.	Sorbents are a very familiar product, but there is often overuse.
Access Limitations			Same requirements for access to deploy/retrieve.
Application Considerations	Likely to be used by trained individuals in specific response conditions.	General broadcasting of loose material could be a problem in open areas and in high wind conditions that would inhibit effective containment and recovery.	In contained form (booms, pillows and socks), would be the same as for sorbents. In loose form, both solidifiers and sorbents have problematic

			containment and recovery issues.
Recovery Methods	Manual recovery from effective containment should be straight forward.	Effective containment is an issue-especially in conditions of currents, tides, and wind. Recovery of all material from the environment is highly desirable due to product persistence.	In contained forms, recovery of solidifiers should be the same as sorbents.

Table 1. Cont.

	Benefits	**Shortcoming**	**Comparison with Sorbents**
Monitoring Considerations	Can monitor visually for effectiveness during both tests and application.	When used in loose form, constant visual monitoring should ensure: 1) proper and complete containment and recovery; 2) no adverse wildlife or fish impacts. Use should be modified or stopped if either condition is not met.	Basically similar to sorbents, but less passive, especially when using loose material. All material should be recovered as soon as it is no longer effective at removing oil.
Pickup Time for Treated Oil		Can be slow with loose product.	About the same when products are contained as booms, socks, etc.
Application on Solid Surfaces	Effective on solid surfaces; treated oil is a dry solid that can be swept up. Also can form a containment barrier.		Likely more effective than sorbents.
Waste Volume	Will increase volume proportional to application rate.		Sorbents create large waste volumes.
Waste Weight		Generates waste weight, equal to the weight of added solidifier	Sorbents themselves add little to waste weight, but, besides oil, sorbents also pick

			up significant amounts of water.
Waste Disposal - Landfill	More likely to pass leach test for landfill.		Less likely to pass leach test for landfill.
Waste Disposal – Incineration	Ideal potential for conversion of waste to energy. High btu value, would have to be managed as a separate waste stream; need preplanning to assess possible waste to energy users for this material.		Sorbents can also be incinerated but may have lower BTU compared to solidifiers, depending on the product.
Waste Disposal – Industrial intermediate for recycling of encapsulated product and oil	Can be recycled via introduction into other industrial processes, including: asphalt modification; rubber additive, etc.	Must meet TCLP and EPA / state testing procedures	Not applicable for most traditional sorbents

APPENDIX 4
List of Solidifier Products Covered by This Policy:

1) M-17 M
CI AGENT (formerly
CHEAP INSURANCE &
PETRO-CAPTURE)
OnSite Waste Management / IRST LLC
11760 Commonwealth Drive
Louisville, KY 40299
PHONE: (502) 267-0101
(800) 255-6073
FAX: (502) 267-0181
(Mr. Dan Parker)
02/25/94 06/14/95*

2) M-19 M
WASTE-SET #3200®
C.B Environmental Inc.
3374 West River Drive NW
Grand Rapids, MI 49544
PHONE: (616) 784-0770
FAX: (616) 784-5018
(Mr. Cal Blystra)
04/22/96 04/22/96

3) M-20 M
WASTE-SET #3400®
C.B Environmental Inc.
3374 West River Drive NW
Grand Rapids, MI 49544
PHONE: (616) 784-0770
FAX: (616) 784-5018
(Mr. Cal Blystra)

4) M-23 M
ALSOCUP
REVCOM Associates 1550 Rimpau Avenue #53 Corona, CA 92881
PHONE: (951) 737-0104 FAX: (951) 737-5500
E-MAIL: revcom@sbcglobal.net (Mr. Dave Naylor - President)
11/23/98

APPENDIX 5
Response Contact List

1. National Response Center
2. Environmental Protection Agency
3. USCG Sector Wilmington
4. USCG Sector Charleston
5. USCG MSD Savannah
6. USCG Sector Jacksonville
7. USCG Sector Miami
8. USCG Sector Tampa
9. USCG Sector Key West
10. USCG Sector Mobile

APPENDIX 5
Response Contact List

1. National Response Center
2. Environmental Protection Agency
3. USCG Sector Wilmington
4. USCG Sector Charleston
5. USCG MSD Savannah
6. USCG Sector Jacksonville
7. USCG Sector Miami
8. USCG Sector Tampa
9. USCG Sector Key West
10. USCG Sector Mobile

Region 4 Regional Response Team
Ballast Water Treatment
During Emergency Response Operations
Planning Issues

Developed by the
Region 4 Regional Response Team
for Area Contingency Plan Development

Revised – May 9, 2002

I. Introduction

With the implementation of the National Invasive Species Act of 1996 (NISA), voluntary ballast water management guidelines were established which apply to all vessels operating in U.S. ports, for the purpose of eliminating the introduction of aquatic non-indigenous nuisance species (ANS) to the marine eco system by way of vessel ballast water. However, it is recognized that due to the current voluntary nature of the program, it is extremely difficult to monitor and regulate. Under the guidelines, vessel records are to be kept on ballast water management. However, experience has shown that an examination of vessel records does not typically provide enough reliable information on ballast water management to allow an accurate assessment of the proper course of action to take in dealing with ballast water during an emergency response. This proved to be the case during the response to the grounding of the M/T Igloo Moon in Biscayne Bay, Florida, in 1996. Had accurate ballast water management records been available at the time, it would have provided responders with information needed to make the most informed decision regarding how to deal with the ballast water during operations conducted to re-float the vessel.

Other issues, including sampling protocols and treatment alternatives, complicate the handling of ballast water during a response.   Current sampling techniques being used to determine ANS present in ballast water are often inconclusive, and do not point the way to a specific treatment method. As in the case of the Igloo Moon, the rapid evolution of the response scenario, or other factors such as weather or sea conditions, may even preclude the ability of sample collection.

Although various mechanisms for in-situ treatment of ballast water have been tried, including shore-side treatment facilities and portable on board units, none to date have demonstrated conclusive results. Currently, there are various approaches being taken on treating ballast water, including:

- A decision not to treat;
- Physical treatment (e.g., heat or UV radiation); and
- Chemical treatment (chemical sanitization).

The course of treatment action is interactive with sampling; however, as indicated above, sampling may yield an inconclusive result. Hence, the treatment method used may be that recommended by a panel of experts, consistent with a method acceptable to any local agencies affected.

II. Actions for Consideration During Response

The following actions for consideration are based on a combination of the data compiled on the ballast water problem, lessons learned from previous response operations, and best practice. It is important to keep in mind that there are no clear guidelines or set of instructions that are “all inclusive”, or address every facet of this complicated issue.

- During an emergency response, ballast water will be a factor only if it impacts mitigation of the actual situation or the imposed threat. For example, during a vessel grounding, if removal / re-floatation can be accomplished without deballasting, that is the approach that should be considered first.

- If ballast water is a definite factor during the response, expertise can be solicited to determine best course of action for treatment. Subject matter experts include:

    - Members of scientific community;

    - Representatives of agencies affected (local/state/federal); and

    - Responsible party.

- Treatment and release decisions should consider the following factors:

    - Type treatment agent and environmental impact;

    - Reactivity;

    - Health hazards imposed to local community;

    - Hazards imposed to on-site responders/handlers;

    - Current and forecast weather (wind, temperature, humidity, etc.);

    - Areas of special environmental concern (coral reef, state park, etc.);

    - Sea conditions; or

    - Stability of vessel.

- In order to complete the primary response mission, i.e., prevention of the release of hazardous material, vessel stability will be of paramount importance. Consequently, removal (and treatment) of ballast water will be a supporting action only.

- If the decision is made to deballast the vessel, input can be received from the following:

    - Vessel engineer;

    - Marine salvors; or

    - Responsible party.

III. Points of Contact (Subject Matter Coordinators or Experts)

Name/Organization	Address	Telephone & Fax Number	Email
Brad Benggio Scientific Support Coordinator NOAA	NOAA SSC 909 SE First Avenue, Room 714 Brickell Plaza Federal Bldg Miami, FL 33131	W: (305) 530-7931 M: (206) 849-9923 F: (305) 530-7932	brad_benggio@hazmat.noaa.gov
Alan J. Mearns NOAA	Hazardous Materials Response Division Office of Response & Restoration National Ocean Service, NOAA 7600 Sand Point Way, NE Seattle, WA 98115-0070		

IV. Sources of Ballast Water Agents or Treatment Technologies

Company	Address	Telephone Number	Type of Agent or Technology Resources

Emergency Response Ballast Water Treatment Checklists

THE FOLLOWING ISSUES SHOULD BE CONSIDERED BY THE FEDERAL ON-SCENE COORDINATOR/UNIFIED COMMAND WHEN FACED WITH BALLAST WATER DECISIONS DURING EMERGENCY RESPONSE TO A POLLUTION INCIDENT		
	In order to complete the primary response mission (i.e., prevention of the release of oil or a hazardous substance, salvage of the vessel, etc.) vessel stability will be of paramount importance. Consequently, removal (and treatment) of ballast water will be a supporting action only. Is the treatment of ballast water going to have an adverse affect on the UC's ability to prevent pollution or successfully remove the vessel. If yes, disregard ballast treatment issues.	
	Unified Command decision making concerning ballast treatment should consider the following issues:	
		Type of treatment agent and environmental impact
		Reactivity
		Health hazards imposed to local community
		Hazards imposed to on-site responders/handlers
		Current and forecast weather (wind, temperature, humidity, etc.)
		Areas of special environmental concern (e.g., coral reefs, state park, sanctuaries, refuges, etc.)
		Consult with Responsible Party's Historic/Cultural Resources Specialist (if identified).
		Sea conditions
		Stability of the vessel
	Has Unified Command solicited ballast water expertise (Refer to POC Matrix)	
		Members of Scientific Community
		Representatives of agencies affected (local/state/federal)
		Responsible Party

Operational Treatment Worksheet

	Type of Treatment Agent: ____	
		Amount Needed: _______________________ *Amount Used:* ________________________
		Method of Mixing w/Ballast Water: ____
		Soak Time: ___________________
		Acceptable Ballast Water Discharge Rate: ______________________________
	Ballast Water Discharge Operation Monitoring Protocol	
		Monitoring Plan Required by Unified Command? Y/N ________
		Monitoring Process Used: • *Visual Observation* • *Discharge Water Sampling* • *Testing of Habitat*

LESSON LEARNED TO BE CONSIDERED DURING BALLAST WATER TREATMENT OPERATIONS

	Impact to Overall Operations	
		Ballast Water Treatment to impact pollution response or salvage operations
	Impact to the Environment	
		Testing or treatment agent and protocol on-site
		Capability of controlling the concentrations of the agent within the ballast water being released
		Depth of water and sensitivity of the surrounding environment
	Availability of the Ballast Water Treatment Agent and the Technology to Treat Ballast Water	
		Logistics of getting the ballast water treatment agent in significant quantities to the scene
		Ability of response crews to apply the agent or technology to sufficiently treat ballast water in tanks before release

V. References

Shipping Study, Report No. CG-D-11-95, "The Role of Shipping in the Introduction of Nonindigenous Aquatic Organisms to the Coastal Waters of the United States (other than the Great Lakes) and an Analysis of Control Options
J. Carlton, D. Reid, H. van Leeuwen, 1995.

National Ballast Information Clearinghouse, Interim Report, October 2000.

Coast Guard Regional Strategic Assessment No. 07M-01-8, Environmental Law Enforcement and Compliance, 2001.

An Evaluation of the U.S. Coast Guard's Implementation of the National Invasive Species Act (NISA), J. Elliott, 1999.

Ballast Water Treatment During Emergency Response, The Case of the *Igloo Moon*
B. Benggio, A. Mearns, T. Waite, cir. 1996.

Implementation of the National Invasive Species Act of 1996 (NISA), 33 CFR Part 151, Federal Register, Vol. 64, No. 94, May 1999.

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment

January 9, 2009

Earle McFarlane
Commander
Seventh Coast Guard District
909 SE First Avenue
Miami, FL 33131

Subject: Regional Response Team IV (RRT)
Pre-Authorization Policy for Use of Solidifiers (policy)

Dear Commander McFarlane:

The Department of Health and Environmental Control (Department) has reviewed the RRT policy on pre-authorizing the use of solidifiers for oil spill mitigation in the State of South Carolina. Per the Oil and Gas Act of South Carolina as cited below, the Department has the authority to require clean up of oil spills within our state.

> §48-43-560 of the South Carolina Code of law states, "(1) Any person discharging pollutants in violation of this article shall immediately undertake to contain, remove, and abate the discharge to the Department's satisfaction..."

The State of South Carolina concurs with the Pre-authorization policy set forth by the RRT in the case of <u>contained</u> solidifiers used in the form of pads, pillows, and other contained forms when used as sorbents per the policy. However, the approval for use of the <u>loose</u> form of any solidifier will be on a case-by-case basis. Therefore, the following additional conditions will apply in South Carolina under this RRT policy:

1. Notification regarding the use of contained solidifiers per the policy or a request for the use of loose solidifiers shall be directed to the Division of Waste Assessment and Emergency Response's Duty Officer at (888) 481-0125 (24-hour toll free number).

2. The approval for the application of LOOSE solidifiers shall be made on a **<u>case-by-case basis</u>**.

If you have any questions, please don't hesitate to contact Mr. Paul Lee of the Emergency Response Section at (803) 896-4113.

Sincerely,

Robert W. King Jr., P.E.
Deputy Commissioner
Environmental Quality Control

cc: Shane Hitchcock, USEPA
Paul Lee, DHEC

Michael F. Easley, Governor

William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E. Director
Division of Water Quality

November 7, 2006

Mr. Patrick Keane
Commander (dxc)
Seventh Coast Guard District
909 SE First Ave
Miami, FL 33131

Subject: Pre-Authorization Policy for Use of Solidifiers for Oil Spill Mitigation

Dear Sir:

Attached please find my signature for pre-authorizing the use of solidifiers for oil spill mitigation in the State of North Carolina and the waters of the State with stipulations.

North Carolina General Statute 143-215.84(a) states in part, "If it is not feasible to collect and remove the discharge, the person responsible shall take all practicable actions to contain, treat and disperse the discharge; but no chemicals or other dispersants or treatment materials which will be detrimental to the environment or natural resources shall be used for such purposes unless they shall have been previously approved by the Commission." The Commission refers to the Environmental Management Commission (EMC). Title 15A North Carolina Administrative Code Chapter 2A .0105 (a) (2) delegates the authority to approve the use of chemicals or other dispersants or treatment materials from the EMC to the Secretary of the Department of Environment and Natural Resources. In accordance with North Carolina General Statute 143B-10, the Secretary has delegated this authority to the Director of the Division of Water Quality.

As follows, my approval of the pre-authorization of the use of solidifiers is based upon three conditions that must be demonstrated to my representative or me before the actual use of solidifiers may be allowed in North Carolina.

1. Use of solidifiers shall be conducted under the direct supervision of a federal OSC.
2. Requests for the use of solidifiers from the EPA federal on-scene coordinator (OSC) shall be directed to the Division of Water Quality's Emergency Response Coordinator at (919) 733-5083 during business hours Monday through Friday from 8:00 AM to 5:00 PM or to the emergency response pager at (919) 899-4500 after business hours and on weekends and holidays.
3. Use of solidifiers shall be conducted by a person or persons adequately trained in the application, recovery and disposal of solidifiers.

Approval for the application of solidifiers shall be made **on a case-by-case basis**.

Sincerely,

Alan Klimek

Alan W. Klimek, P.E.

One North Carolina *Naturally*

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
401 CHURCH STREET
NASHVILLE, TN 37243

January 23, 2008

Shane Hitchcock
Chief
Emergency Response and Removal Branch
US Environmental Protection Agency, Region IV
61 Forsyth Street
Atlanta, GA 30303

Dear Mr. Hitchcock

Re: Pre-Authorization Policy for Use of Solidifiers for Oil Spill Mitigation in Tennessee

This letter provides pre-authorization for use of solidifiers in accordance with the National Contingency Plan and the Region 4 Regional Response Team policy of May 1, 2006. Approval under this policy is granted with the following considerations:

1. Use of solidifiers shall be conducted under the direct supervision of a federal OSC.
2. Requests for the use of solidifiers from the EPA federal on-scene coordinator shall be directed to the Division of Water Pollution Control's Emergency Response Coordinator at 615-308-1901 and by email at Robert.alexander@state.tn.us.
3. Use of solidifiers shall be conducted by a person or persons adequately trained in the application, recovery and disposal of solidifiers.

Should you have questions or concerns regarding this correspondence, contact Mr. Robert Alexander at (615) 532-0659 or robert.alexander@state.tn.us.

Sincerely,

Paul E. Davis
Director
Division of Water Pollution Control

Cc: Nick Fielder, TDEC Emergency Response
Alan Leiserson, TDEC Office of General Counsel