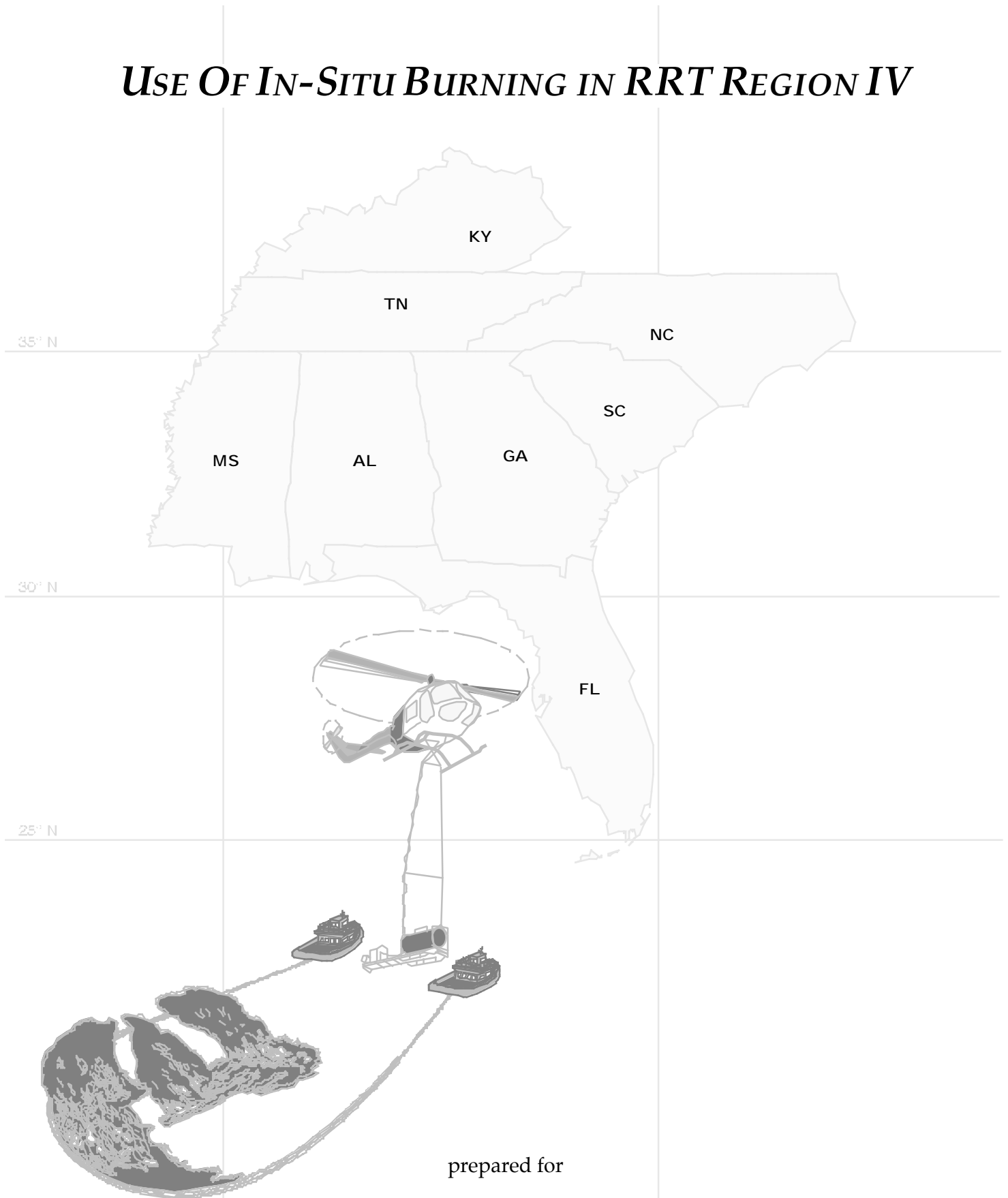


# USE OF IN-SITU BURNING IN RRT REGION IV



prepared for

REGION IV REGIONAL RESPONSE TEAM  
RESPONSE AND TECHNOLOGY COMMITTEE  
IN-SITU BURN WORKGROUP

*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



## **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  
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### **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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**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 in place 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/m<sup>3</sup> (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//*  
Captain Gerald Abrams  
United States Coast Guard  
RRT IV Co-chair

\_\_\_\_\_  
4/20/95  
DATE

\_\_\_\_\_  
*//s//*  
Mr. Myron D. Lair  
United States Environmental Protection Agency  
RRT IV Co-chair

\_\_\_\_\_  
4/20/95  
DATE

\_\_\_\_\_  
*//s//*  
Mr. James H. Lee  
U.S. Department of the Interior  
RRT IV Member

\_\_\_\_\_  
4/20/95  
DATE

\_\_\_\_\_  
*//s//*  
Mr. John Lindsay  
U.S. Department of Commerce  
RRT IV Member

\_\_\_\_\_  
4/20/95  
DATE

\_\_\_\_\_  
*//s//*  
Mr. Douglas C. White  
State of Florida  
RRT IV Member

\_\_\_\_\_  
4/20/95  
DATE

\_\_\_\_\_  
*//s//*  
Mr. R. Lewis Shaw  
Deputy Commissioner  
Environmental Quality Control  
Department of Health and Environmental Control  
State of South Carolina

\_\_\_\_\_  
6/19/95  
DATE

//s//          
Mr. Robert J. Rogers, Chief  
State of Mississippi  
RRT IV Member

        6/23/95          
DATE

        //s//          
Mr. E. John Williford  
State of Alabama  
RRT IV Member

        4/20/95          
DATE

        //s//          
Ms. Linda Forehand  
State of North Carolina  
RRT IV Member

        4/20/95          
DATE

          
Dr. Albert K. Langley  
State of Georgia  
Environmental Protection Division  
Department of Natural Resources  
Region IV RRT Member

        7/10/95          
DATE

## **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 I

## Zone Maps





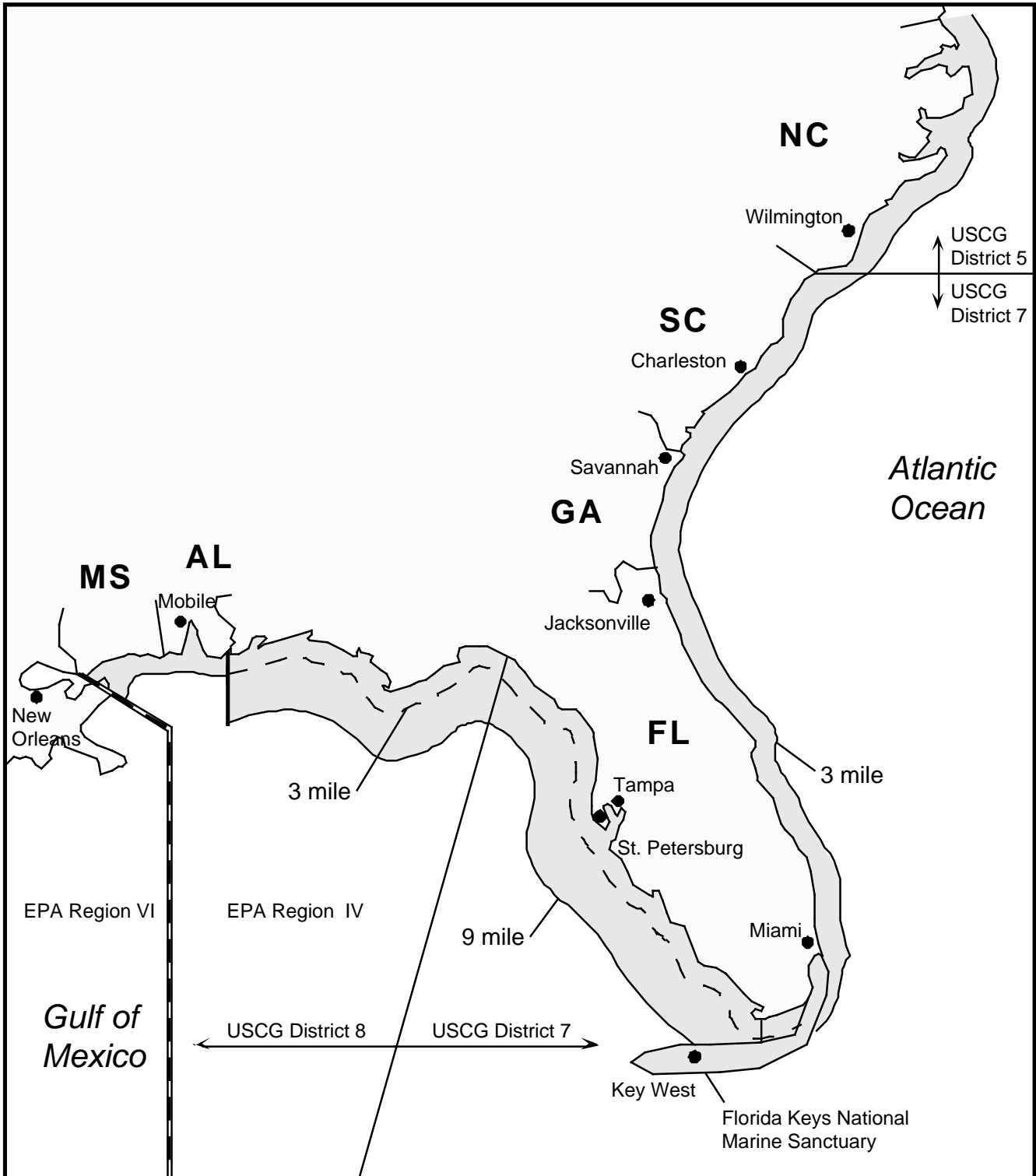
# Region IV Regional Response Team

In-Situ Burn Pre-Approval Zones  
prepared by NOAA

Date/Time:

USE ONLY AS A GENERAL REFERENCE

	Zone A
	Zone B



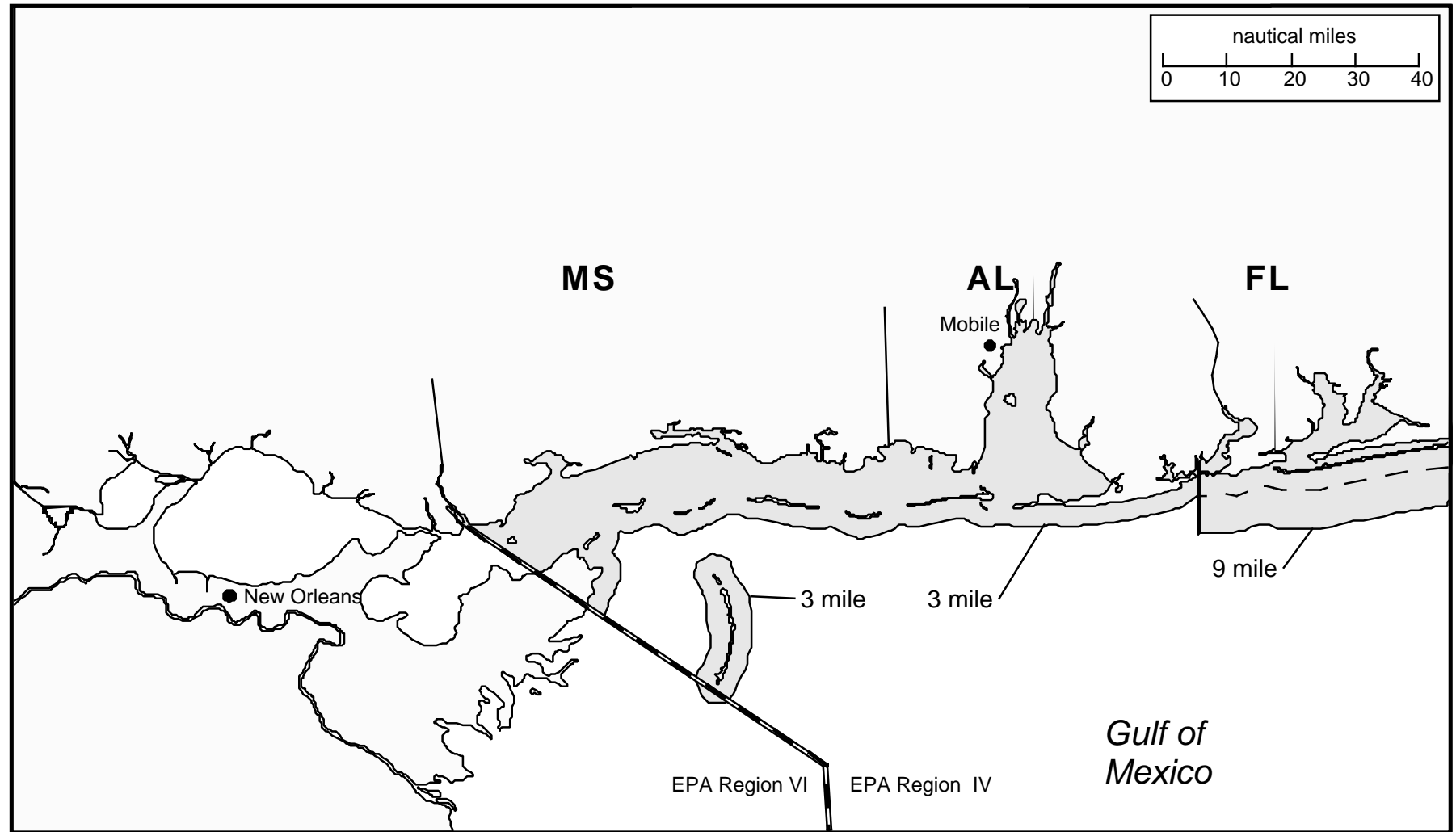
# Region IV Regional Response Team

In-Situ Burn Pre-Approval Zones  
prepared by NOAA

Date/Time:

- Zone A
- Zone B

USE ONLY AS A GENERAL REFERENCE



LA, MS, AL ISB

RAH

## **Appendix II**

# Letters of Agreement

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

- **Gray's Reef National Marine Sanctuary**

# North Carolina

State of North Carolina  
Department of Environment,  
Health and Natural Resources  
Division of Environmental Management



James B. Hunt, Jr., Governor  
Jonathan B. Howes, Secretary  
A. Preston Howard, Jr., P.E., Director

February 8, 1994

Ms. Mary Jo Pennick  
EPA Region IV  
WD/ERRB  
345 Courtland Street NE  
Atlanta, GA 30365

Dear Mary Jo:

I have drafted North Carolina's Guidelines for the use of in-situ burning to be included in the document entitled *Use of In-Situ Burning in RRT Region IV*.

If you have any questions, please call me at (919) 733-5083, ext. 526. Thanks.

Sincerely,

Linda Forchand McCollum

Attachment

cc: Dianne Williams Wilburn

ER & RB

FEB 14 2 38 PM '94

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## **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 ON 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//  
 Captain Gerald Abrams  
 Seventh Coast Guard District  
 Region IV RRT co-chair

\_\_\_\_\_  
 7/8/95  
 DATE

\_\_\_\_\_  
 //s//  
 Mr. Myron D. Lair  
 U. S. Environmental Protection Agency  
 Region IV RRT co-chair

\_\_\_\_\_  
 8/10/95  
 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//  
Mr. R. Lewis Shaw  
Deputy Commissioner  
Environmental Quality Control  
Department of Health and Environmental Control  
State of South Carolina

                  8/1/95  
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//  
Captain Gerald Abrams  
Seventh Coast Guard District  
Region IV RRT co-chair

\_\_\_\_\_  
8/15/95  
DATE

\_\_\_\_\_  
//s//  
Mr. Myron D. Lair  
U. S. Environmental Protection Agency  
Region IV RRT co-chair

\_\_\_\_\_  
8/10/95  
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 salt waters of the state at the coordinates of:  

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5. The discharged oil will be burned in situ on salt waters of the state at the coordinates of:  

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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**



**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

April 5, 1995

Captain Gerald Abrams, Chief  
Marine Safety Division  
United States Coast Guard  
7th Coast Guard District  
909 SE 1st Avenue  
Brickell Federal Building, rm 908  
Miami, FL 33131

Dear Captain Abrams:

I have discussed the potential implications and benefits of conducting in-situ burning within the boundaries of the Gray's Reef National Marine Sanctuary with Lieutenant Commander Brad Benggio, the NOAA Scientific Support Coordinator for your area of responsibility. Since in-situ burning poses minimal risk to our resources and provides the potential for a more effective and efficient means of oil removal at sea, thereby adding to the overall protection of marine resources and their habitats, the Gray's Reef National Marine Sanctuary authorizes preapproval in conducting in-situ burning as a spill response measure when deemed necessary by the On-Scene Coordinator. We do however in granting this preapproval, expect that direct consultation would occur between the On Scene Coordinator and the Sanctuary Manager regarding any incident which may effect the sanctuary.

cc:  
LCDR Brad Benggio  
USCG-MSO Savannah  
Jim Lawless, NOAA SRD

Sincerely,

Reed Bohne  
Manager



## **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 converts the oil into its primary combustion products, carbon dioxide and water, a small amount of other gases such as CO, NO<sub>2</sub>, and SO<sub>2</sub>, 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 catodon*), 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.

### **References**

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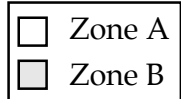
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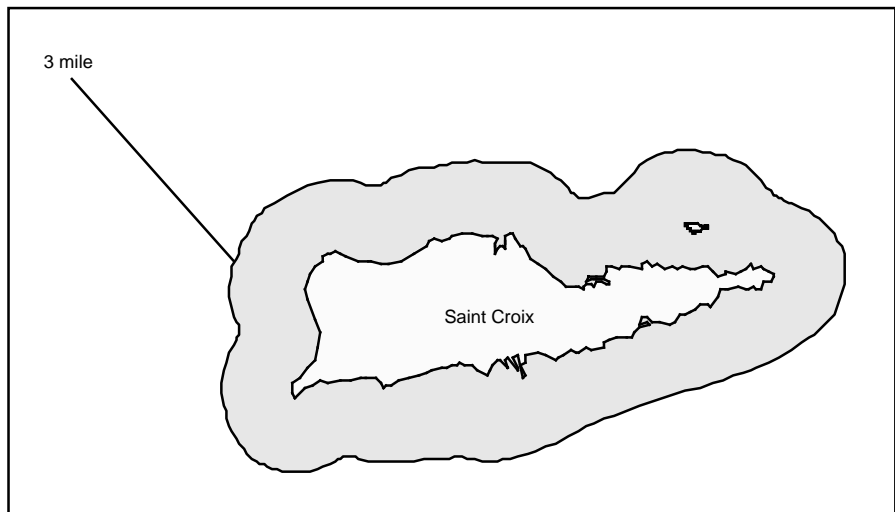
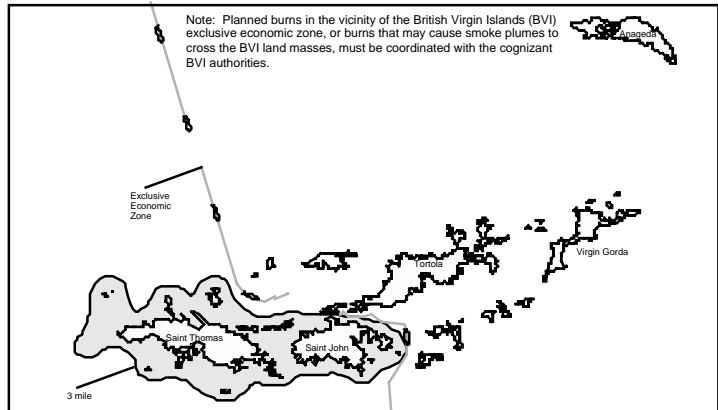
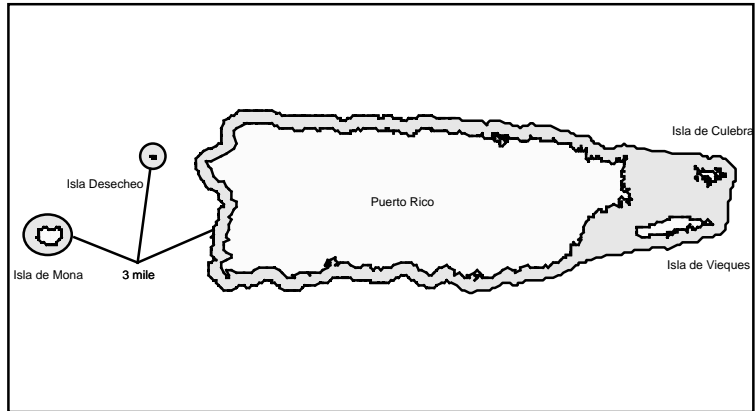
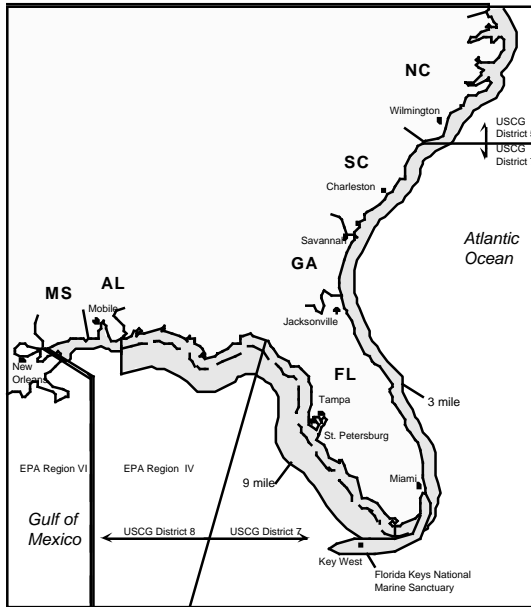
# Region IV and Caribbean Regional Response Teams

## In-Situ Burn Pre-Approval Zones

prepared by NOAA



USE ONLY AS A GENERAL REFERENCE





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Southeast Regional Office  
9721 Executive Center Dr. N.  
St. Petersburg, FL 33702

June 14, 1995 F/SEO13:DMB:jbm

Captain Gerald W. Abrams, USCG  
Chief, Marine Safety Division  
Seventh Coast Guard District  
Brickell Plaza, Federal Building  
909 SE First Avenue  
Miami, Florida 33131-3050

Dear Captain Abrams:

This responds to your February 3, 1995 letter regarding the proposed Coast Guard and Caribbean and Region IV Regional Response Team (RRT) policies for pre-authorizing in-situ burning as an oil-spill response measure. A Biological Assessment (BA) was submitted on April 3, 1995 pursuant to Section 7 of the Endangered Species Act of 1973 (ESA). We concur with the finding of the BA that the proposed policy is unlikely to adversely affect endangered or threatened species under the purview of the National Marine Fisheries Service (NMFS) or their critical habitat. We do, however, wish to make special stipulations related to designated critical habitat and to the conduct of on-scene monitoring.

NMFS believes that should listed species be present in a burn area, they could be killed or seriously injured by flame. Although it is unknown how a sea turtle might behave if burning oil is present on the sea surface, the sea turtle likely could not sense the fire by temperature sensation or vision from beneath the surface and might emerge into the flames. Similarly, a surfacing marine mammal might not detect the flames from below or be able to distinguish the burn area from other oil slicks. The BA, however, listed a number of elements which mitigate the potential negative impacts of in-situ burning: restricting the activity to beyond three miles from shore in most cases, conducting on-site surveys for listed species prior to conducting burns, consulting with natural resource specialists to determine site-specific risks to listed species, and limiting use of



burning to favorable weather conditions. Furthermore, following discussions with Mr. John Lindsay, the Department of Commerce Region IV RRT representative, we understand that use of in-situ burning as an oil-spill response tool has historically been quite limited, and would likely be rarely used in the future.

The requirement to conduct on-site surveys prior to conducting burns is probably the single most important factor in ensuring the safety of protected species. We understand that helicopters are always involved with in-situ burn operations. Aerial monitoring from the helicopters for threatened and endangered species prior to burning should allow on-scene coordinators (OSC) sufficient information to determine whether listed species are present. We are concerned, however, that the plan would authorize burning at night, when aerial surveys are unlikely to be effective; and we wish to stipulate that in-situ burns not be conducted without an effective aerial survey with a reasonable ability to determine presence of listed species. If the OSC determines that effective surveys can be conducted at night, whether by use of night-vision equipment or surface lighting or some other means, then burning may proceed if no listed species are observed.

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). Although this falls under the "B" zone for purposes of the policy, we believe that pre-authorization can be given so long as the following measures are adopted in the right whale critical habitat between December 1 and March 31:

(1) OSCs, or their designees, should contact the right whale early warning system (EWS) for information on the most recent sightings of right whales. NMFS is separately furnishing contact information for the EWS to the Jacksonville and Savannah Marine Safety offices.

(2) Burns may be conducted only during the daytime after aerial surveys have verified no right whales present within 1 nautical mile (nm) of the burn site.

(3) Should whales be present, no attempts to relocate, deter, or "haze" the animals should be made for the purpose of conducting a burn. The location of the burn may be moved to maintain 1 nm between the animals and the burn site. 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 OCS exercises the authority to conduct an in-situ burn, please forward us a copy of the post-incident briefing document prepared by the OSC. We will review the briefing document to determine whether re-consultation is necessary.

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

Sincerely yours,

*Charles A. Oran*

*for* Andrew J. Kemmerer  
Regional Director

Enclosure

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



# **United States Fish and Wildlife 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

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 converts the oil into its primary combustion products, carbon dioxide and water, a small amount of other gases such as CO, NO<sub>2</sub>, and SO<sub>2</sub>, 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. Hawksbills 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. Hawksbills 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 (*Halodule wrightii*). Manatees also may eat some species of algae, mangrove leaves and red mangrove seedlings. They have been known to haul themselves partially out of the water to consume bank vegetation. In freshwater manatees feed on a variety of plants, including *Hydrilla verticillata*, algae and water hyacinth (*Eichhornia crassipes*). Movements and aggregations of manatees, which spend several hours each day feeding, can be correlated with the distribution of seagrasses and vascular freshwater aquatic vegetation (Reynolds and Odell, 1991).

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 Humacao 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 oxyrinchus 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 of Mexico, these habitats occur in 70 feet of water as far 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).

### **Crocodylians**

Two listed crocodylian 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 niveiventris*), 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 breathe 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 effects 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, crocodylians, 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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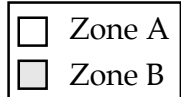
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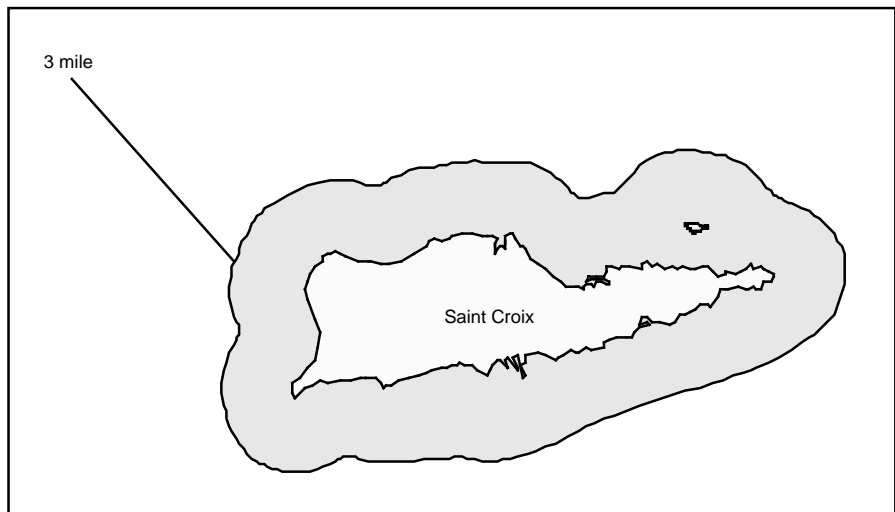
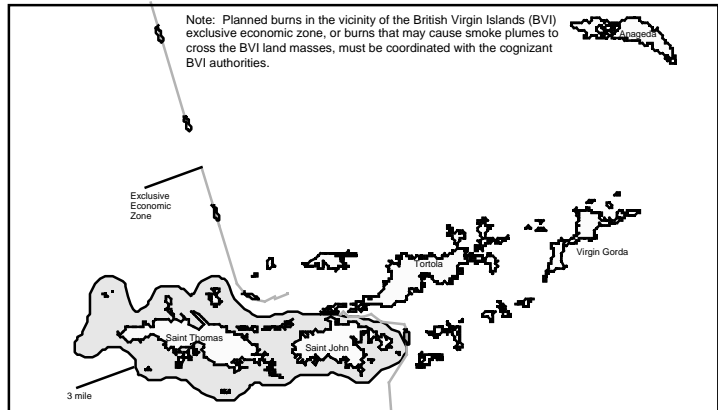
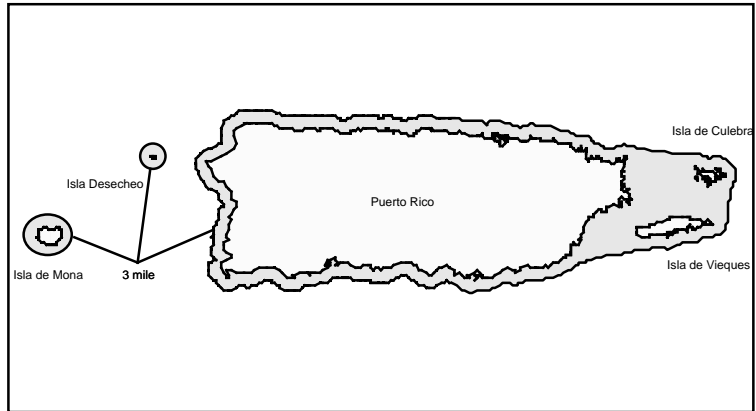
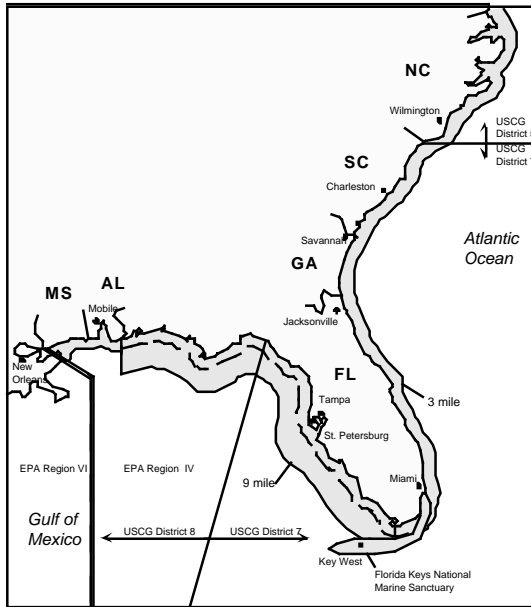
# Region IV and Caribbean Regional Response Teams

## In-Situ Burn Pre-Approval Zones

prepared by NOAA



USE ONLY AS A GENERAL REFERENCE





# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
1875 Century Boulevard  
Atlanta, Georgia 30345

IN REPLY REFER TO:

APR 19 1995

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

Dear Captain Abrams:

Thank you for your letter of March 31, 1995, transmitting a biological assessment and the draft Use of In-situ Burning in RRT Region IV document for pre-authorization to use in-situ burning as a response countermeasure for oil spills in designated off-shore areas (FWS Log No. 4-P-95-072). Your letter requests the Fish and Wildlife Service's (Service) review and concurrence with your determination that the proposed action would not likely adversely affect 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.).

Your determination was based on the premise that use of in-situ burning within offshore 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 process of in-situ burning results in (1) a rapid and efficient removal of large volumes of oil from the surface of the water, (2) response in a localized area, (3) negligible thermal effects on the water underlying the burn, (4) dissipation of toxic gases and fine particulate matter in the smoke plume to background levels within a few miles of the burn, (5) the ability to collect the burn residue, and (6) adherence to policy and procedures prepared by the Regional Response Teams (RRT) for Region IV and the Caribbean. In general, listed species under the responsibility of the Service that could be affected by the proposed action inhabit coastal wetlands and aquatic estuarine and marine habitats. This would include nesting sea turtles, manatees, Gulf sturgeon, brown pelicans, shorebirds, and beach mice. The Coast Guard proposes to provide the Federal On-Scene Coordinators (FOSC) with pre-authorization to use in-situ burning as an oil spill removal technique. The authorization protocols would rest solely with the pre-designated FOSC and could not be further delegated. The proposed action area is offshore the States of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, the.

Commonwealth of Puerto Rico, and territories of the U.S. Virgin Islands. Two zones, Zones A and B, have been designated within the action area. Zone A consists of most areas within Federal jurisdiction; and not classified as B or R zones. Zone A would be considered a pre-approved area for use of in-situ burning.

Zone B consists of areas within State or special management jurisdiction which is not classified as A or R zones. Zone B would be considered on a case-by-case basis for use of in-situ burning except where pre-authorized by individual letter of agreements between the States and the RRT's for Region IV or the Caribbean. Specific areas included in Zone B are identified below.

- o National marine sanctuaries, including the Florida Keys National Marine Sanctuary,
- o National or State wildlife refuges, units of national parks,
- o waters designated as marine reserves,
- o proposed or designated critical habitats,
- o special endangered (and threatened) species use areas designated by trustee agency representatives, and,
- o waters less than 30 feet deep containing coral reefs, submerged algal beds, and coastal wetlands including mangroves areas, saltwater marshes, salt ponds and freshwater marshes.

An R Zone is defined as any area within State or special management jurisdiction which is not classified as an A or B zone. The R zone is designated as exclusion zones where no in-situ burn operations will be conducted. Currently, there are no R zones designated in the proposed action area.

The pre-authorization protocol requires adherence to the RRT's In-situ Burn Policy that incorporates use of a decision tree to decide whether burning is appropriate. The decision tree addresses concerns related to oil type/amount and condition, environmental conditions, proximity issues, availability of personnel and equipment, and time constraints. In addition, burning could only be conducted when the wind direction would carry smoke away from the shore and no overexposure to human population centers is expected. Prior to beginning an in-situ burn, an onsite survey would be conducted, in consultation with natural resource specialists, to determine if any listed species are present in the burn area or at risk from other associated burn operations. 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 burn location to where listed species are not present, temporary employment of deterrent techniques, and physical removal of listed species individuals by appropriate and permitted agencies or entities. Burn residues would be collected immediately following an in-situ burn.

If a decision to use in-situ burning is made, the Environmental Protection Agency, the Department of Commerce, the Department of the Interior, and the appropriate State(s) will be notified through the 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.

The biological assessment (BA) described in-situ burning, 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 BA was prepared by the National Oceanographic and Atmospheric Administrator Scientific Support Coordinator for the Coast Guard Seventh District.

The descriptions of in-situ burning, 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 focused on the potential negative effects to listed species if in-situ burning is not conducted.

The primary objective of oil spill response is to rapidly remove as much oil as possible from the water, to prevent the oil from moving into coastal areas where removal is more difficult and environmental impacts most severe. The method or the results of the removal, 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 in-situ burn decision process to protect listed and proposed 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 strict adherence to the RRTs' In-Situ Burn Policy and the designated Zones A and B. The Service finds the BA sufficient to support a determination of "not likely to adversely affect" for the implementation of in-situ burn response procedures in the Region IV and Caribbean RRT areas. 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 listed species, or take of a species occurs as a result of an in-situ burn action, reinitiation of this consultation may be required.

We appreciate your efforts in coordinating and resolving issues regarding the proposed activity with us. Please contact David Flemming, Chief, Division of Endangered Species, at 404/679-7096, or Lorna Patrick of our Panama City, Florida, Field Office at 904/769-0552, extension 229, for additional information or coordination.

Sincerely yours,



for Garland B. Pardue  
Assistant Regional Director

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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  PAUL SCHULER (305) 983-9880	FORT LAUDERDALE, FL	3M	18" X 24"	750
2. TEXAS GENERAL LAND OFFICE  MANNY GONZALES (512) 463-5195	CORPUS CHRISTI, TX CURTAIN FIREGARD	KEPNER SEA	21" X 27"	500  500
3. EXXON  PAUL FREDRICK (504) 561-3450	PARADIS, LA	OIL STOP	14" X 22"	500
4. ALASKA CLEAN SEAS BRUCE MCKENZIE (907) 345-3142	NORTH SLOPE ALASKA	3M 3M 3M 3M	8' X 12" 8' X 12" 12" X 18" 18" X 24"	2,508 6,000 4,600 4,400
5. ALYESKA  STEVE HOOD (907) 835-6923	VALDEZ, ALASKA	3M	12" X 18"	2,600
6. ARCO  BRUCE METCALFE / NOVA SPACE (907) 659-7843	KUPARUK, ALASKA	3M	12" X 18"	1,000
7. COOK INLET SPILL  BILL STILLINGS JIM HICKS (907) 776-5129	NIKISKI, ALASKA PREVENTION AND RESPONSE, INC.	3M 3M 3M 3M	12" X 18" 12" X 18" 12" X 18" 18" X 24"	4,000 1,000 500 1,000
8. SUMMIT HELICOPTERS  (703) 992-5500	VIRGINIA	HELITORCH	6	

<u>ORGANIZATION</u>	<u>LOCATION</u>	<u>TYPE</u>	<u>SIZE</u>	<u>AMT. (IN FEET)</u>
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9. MSRC	MIAMI, FL	OIL STOP FIRE BOOM		500
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(305) 347-2200

10. NAVY SUPSALV

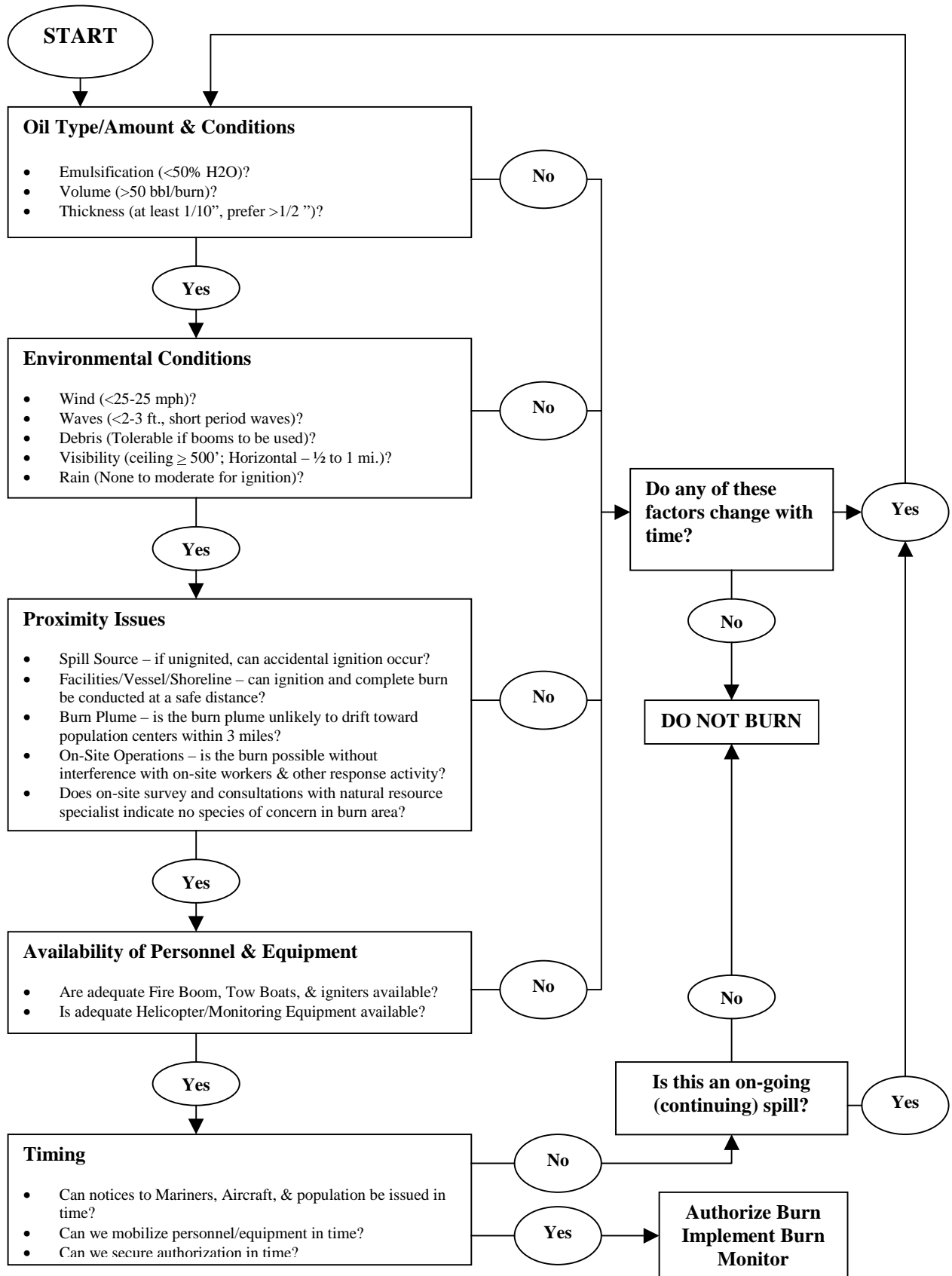
EMERGENCY SHIP SALVAGE  
MATERIAL IN-SITU BURN SYSTEM

(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 from 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/m<sup>3</sup> (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.

## **Attachment 1. 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. **Water Density**

Burn residues that are denser than the receiving waters are likely to sink. The density of fresh water is 0.997 g/cm<sup>3</sup> at 25 degrees Celsius, and the density of seawater is 1.025 g/cm<sup>3</sup>.

### 2. **Properties of the Starting Oil**

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/cm<sup>3</sup> (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. **Thickness of the Oil Slick**

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. **Efficiency of the Burn**

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 to 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.**

<b>Substance</b>	<b>Average Emission Factor for NOBE (g/kg, fuel burned)</b>	<b>Emission Rate (kg/hr)</b>	<b>Comparable Emissions from Other Known Sources</b>
C02	2,800	75,600	approx. 2-acre slash burn
CO	17.5	470	approx. 0.1a 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



## 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.

	<u>Surface</u>	<u>Forecasted</u>	<u>Transport</u>
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  $>150 \text{ ug/m}^3$ .

F. Are additional pollutants of concern present in the smoke plume?  
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/m<sup>3</sup>? 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

