U.S. Coast Guard Research and Development Center
1082 Shennecossett Road, Groton, CT 06340-6096

Report No. CG-D-17-99

PAST IN-SITU BURNING POSSIBILITIES

FINAL REPORT
JANUARY 1999

This document is available to the U.S. public through the
National Technical Information Service, Springfield, VA 22161

19990924 022

Prepared for:

U.S. Department of Transportation
United States Coast Guard
Marine Safety and Environmental Protection (G-M)
Washington, DC 20593-0001

N O T I C E

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

The United States Government does not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of this report.

This report does not constitute a standard, specification, or regulation.

Marc B. Mandler, Ph.D.
Technical Director
United States Coast Guard
Research & Development Center
1082 Shennecossett Road
Groton, CT 06340-6096

Technical Report Documentation Page

1. Report No.	2. Government Accession Number	3. Recipient's Catalog No.
CG-D-17-99		

4. Title and Subtitle	5. Report Date
Past In-Situ Burning Possibilities	January 1999
	6. Performing Organization Code Project No. 4120.5.1/UDI 146
7. Author(s) Gary Yoshioka (ICF), Eva Wong (ICF), Beverly Grossman (ICF), Wendy Drake (ICF), Bob Urban (PCCI), and Tom Hudon (PCCI)	8. Performing Organization Report No. R&DC 16/98
9. Performing Organization Name and Address ICF Incorporated, 9300 Lee Highway, Fairfax, VA 22031 PCCI, 300 North Lee Street, Alexandria, VA 22314 U.S. Coast Guard Research & Development Center, 1082 Shennecossett Road, Groton, CT 06340-6096	10. Work Unit No. (TRAIS) 11. Contract or Grant No. DTRS-57-93-D-00098
12. Sponsoring Organization Name and Address U.S. Department of Transportation United States Coast Guard Marine Safety and Environmental Protection (G-M) Washington, DC 20593-0001	13. Type of Report & Period Covered Final Report 14. Sponsoring Agency Code Commandant (G-MOR) U.S. Coast Guard Headquarters Washington, DC 20593-0001

15. Supplementary Notes

The R&D Center's technical point of contact is Mr. Kurt Hansen, 860-441-2865.

16. Abstract (MAXIMUM 200 WORDS)

This study evaluated the feasibility of conducting in-situ burning (ISB) using current technology on post 1967 major oil spills over 10,000 barrels in North America and over 50,000 barrels in South America and Europe. A diverse set of 141 spills representing various combinations of parameters affecting spill responses (e.g., spill size, oil type, weather conditions, sea temperature, and geographic location) were evaluated using four "Phase I" criteria: distance to populated area, oil weathering, logistics, and weather conditions. In Phase I, a spill that failed to meet one of the four criteria was considered an "unsuccessful" candidate for ISB. In total, 47 of the 141 spills passed the Phase I analysis. The potential effect of the plume on populated areas was the most significant of the four Phase I criteria; 59 of the 141 spills did not pass Phase I because the incident occurred near a sizable city. Spills that met all four criteria were further evaluated using a "Phase II" analysis that applied additional criteria and considered individual spill circumstances to determine if the spill should be rated a "successful," "marginal call," or "unsuccessful" ISB candidate. Fourteen spills were ultimately determined successful in the Phase II analysis, and 12 were designated marginal calls.

17. Key Words	18. Distribution Statement
in-situ burning, oil spill, past oil spills, oil type, oil weathering, weather conditions, geography, logistics, North America, South America, Europe, SINTEF	This document is available to the U.S. public through the National Technical Information Service, Springfield, VA 22161

19. Security Class (This Report)	20. Security Class (This Page)	21. No of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED	347	

Form DOT F 1700.7 (8/72) Reproduction of form and completed page is authorized.

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

EXECUTIVE SUMMARY

This study evaluated the degree to which in-situ burning (ISB) would have served as an effective response technique for past major oil spills. Through reviews of scientific and historical literature on oil spills and the collection of supplemental data, this study developed scenarios for 141 past oil spills that had a diverse set of parameters affecting spill response (e.g., spill size, oil type, weather conditions, sea temperature, and geographic location). Using criteria that could affect ISB, these scenarios were assessed and the feasibility of ISB as a response technique was determined.

The technical feasibility of ISB depends on the particular spill scenario, including the type of oil spilled, the location of the spill, the condition of the oil (both initially and over time), and weather and sea conditions on scene. These factors dictate a "window of opportunity" for executing an ISB operation. This study established criteria to assess whether a burn would have been successful based on the factors that most influence the feasibility of ISB. The criteria are based on the technology available in 1997 and address four primary factors: (1) oil weathering; (2) response logistics; (3) weather; and (4) distance to populated areas. Each spill was reviewed on the basis of the established criteria and assigned a pass or fail rating. These four criteria were applied to all 141 spills in the first phase of the evaluation. Spills that successfully met all criteria were subjected to a second analysis. This analysis provided an opportunity to consider more site-specific conditions for each spill. Instead of establishing any specific criteria, a number of factors were conjoined to assess the feasibility of ISB. Additional information was used to refine the initial assessment when it was available.

Of the 67 percent of the 141 spills that failed Phase I, 5 percent failed the weather criterion, 25 percent failed the oil weathering criterion, 30 percent failed the logistics criterion, and 42 percent failed the distance to populated area criterion. In total, 47 of the 141 spills passed the Phase I analysis. Fourteen of these (30 percent) were ultimately determined successful in the Phase II analysis, twelve (26 percent) spills were designated marginal calls, and 21 (45 percent) spills were designated unsuccessful candidates for ISB.

In general, the successful ISB candidate tended to occur in the coastal or offshore waters of the Gulf of Mexico or Caribbean Sea. The larger spills that occurred off the Atlantic coast of North America also tended to be successful. There were 7 successful ISB candidates out of the 38 spills that occurred in the Gulf of Mexico and Caribbean, and 4 successful candidates out of the eight spills of 50,000 barrels or more that occurred off the Atlantic coast of North America. None of the candidates were from inland waterways or from ocean waters off South America.

The results of the analysis show that, although there is growing interest in ISB for use on large volume oil spills, there are constraints to the widespread use of the technique. Considering the effectiveness of ISB, however, and the fact that constraints such as spill location, expected weather, and oil type are likely to be well known prior to undertaking a response, the results are encouraging. If the locations, oil types, and weather conditions of future oil spill incidents are similar to those of past incidents, then ISB may be a possible response option for a small but significant fraction of future incidents. Decision-makers must compare ISB to other response options knowing the respective limitations and effectiveness of each technique.

TABLE OF CONTENTS

EXECUTIVE SUMMARY iv

1. INTRODUCTION 1

1.1 OBJECTIVE AND SCOPE OF STUDY 1
1.2 FACTORS AFFECTING THE FEASIBILITY OF ISB 1

2. CRITERIA 4

2.1 PHASE I CRITERIA 5
2.2 PHASE II ANALYSIS 5

3. METHODOLOGY 6

3.1 ESTABLISHING A STUDY SET OF HISTORICAL OIL SPILLS 6
3.2 SOURCES OF INFORMATION ON OIL SPILLS 6
3.3 DISTANCE TO POPULATED AREA 9
3.4 WEATHER DATA COLLECTION 9
3.5 OIL WEATHERING MODELING 11
3.6 DETERMINING LOGISTICS RESPONSE TIME 11

4. RESULTS 14

4.1 GEOGRAPHIC DESCRIPTION AND SPILL SIZE 14
4.2 PHASE I RESULTS BY EACH OF THE CRITERIA 15
4.3 PHASE II RESULTS 16
4.4 COMBINED RESULTS 17

5. CONCLUSIONS 17

REFERENCES 19

LIST OF TABLES

TABLE 1. GEOGRAPHIC DISTRIBUTION OF SPILLS INCLUDED IN STUDY BY SPILL SIZE (IN BARRELS) 14
TABLE 2. ISB DETERMINATION OF SPILLS BY GEOGRAPHIC DISTRIBUTION AND SPILL SIZE (IN BARRELS) 15
TABLE 3. PHASE I RESULTS: NUMBER AND PERCENTAGE OF SPILLS FAILED BY CRITERIA 15
TABLE 4. PHASE II RESULTS 16
TABLE 5. SUMMARY OF PHASE I AND PHASE II RESULTS 17

TABLE OF CONTENTS

APPENDICES

APPENDIX A: OIL SPILLS CONSIDERED FOR ANALYSIS BY DATE
APPENDIX B: PHASES I AND II ANALYSES RESULTS
APPENDIX C: INDIVIDUAL OIL SPILL SUMMARY REPORTS

1. Introduction

In-situ burning (ISB) has been envisioned as a promising countermeasure for dealing with large spills at sea, where the volume of oil and logistics of operating offshore decrease the effectiveness of other options, such as mechanical recovery and dispersants. ISB is the controlled burning of spilled oil while the oil is still on the water's surface. This technique, as opposed to others, has the potential to rapidly convert large quantities of oil into its primary combustion products — water and carbon dioxide, with a smaller percentage of other unburned or residual byproducts. Some studies have shown ISB can be less expensive than other techniques, and require less labor and equipment. However, the residue remaining after ISB is much more viscous than the original product and may be more difficult to remove or recover. The first major oil spill in which ISB was attempted was the 1967 *Torrey Canyon* spill in Great Britain. Although the results were unsuccessful because of emulsification of the oil, there have since been ISB studies and tests on spills in many regions of the world.

1.1 Objective and Scope of Study

The objective of this study is to evaluate the degree to which ISB would have served as an effective response technique for past major oil spills. Through reviews of scientific and historical literature on oil spills and the collection of supplemental data, this study develops scenarios for 141 past oil spills that reflect a diverse set of parameters affecting spill responses (e.g., spill size, oil type, weather conditions, sea temperature, and geographic location). Considering a number of factors that could affect ISB, these scenarios provided the necessary information to assess the feasibility of ISB as a response technique. This study establishes criteria to assess whether a burn would have been successful and applies these criteria to the analysis of each of the past major oil spills. The criteria are based on the technology available in 1997 and address four primary factors: (1) oil weathering; (2) response logistics; (3) weather; and (4) distance to populated areas. Each criterion is discussed in detail in Section 2. Each spill was reviewed on the basis of the established criteria and assigned a successful, unsuccessful, or marginal rating.

This study examined spills over 10,000 barrels that occurred in North America, and spills over 50,000 barrels that occurred in Europe and South America. In addition, only those spills occurring between March 18, 1967 (the date of the *Torrey Canyon* spill) and December 1997 were considered for analysis. The set of spills was established through a review of the historical and scientific literature on past oil spills. Initially, 154 spills were identified as spills within the scope of the study. However, thirteen were eliminated because very little information was available (e.g., missing oil type and location). Appendix A is a chronological list of all spills initially identified for the study. A detailed description of the methodology and data sources used to select the spills is included in Section 3.

1.2 Factors Affecting the Feasibility of ISB

The technical feasibility of ISB depends on the particular spill scenario, including the general nature of the spill, the location of the spill, the condition of the oil (both initially and over time), and weather and sea conditions on scene. These controlling and limiting factors dictate a "window of opportunity" for executing an ISB operation.

The variations in the nature of the spill include moving or stationary sources, an instantaneous or continuous spill, and large or small flow rates. Ideally, ISB operations are best suited to a stationary source, where the oil is spilling at a continuous rate that can be handled by the equipment available. Responders include other variables in contingency plans suited for conducting ISB. In addition to the safety protocols, such as operational safety for boom-towing vessels, required for conventional cleanup, the potential hazards of ISB require safety protocols for fire, such as on-board fire-protective equipment and emergency fire procedures. The National Response Team's Science and Technology Committee has been involved with developing a site safety plan for marine ISB operations.

Each location can affect the feasibility of ISB in different ways. For example, an offshore spill may pose minimum health and safety concerns, but would require containment of the slick and generally would involve more severe wind and wave conditions. ISB is most easily and effectively implemented during the early stages of a spill. Distance from logistic support, including major equipment such as igniters, vessels, and fire booms, greatly influences the possibility of a successful in-situ burn. This is particularly evident in spills occurring in remote areas. Holding all other factors constant, as deployment time increases, combustion efficiency decreases.

Nearshore wind and wave conditions may be more favorable than offshore conditions, but burning may be prohibited because of nearby populations. Existing Regional Response Team (RRT) and state policies, which delineate zones where burning is pre-authorized, subject to RRT approval also affect the possibility and the timeliness of an ISB operation.

Weather conditions play a critical role in determining the feasibility of ISB. Sea state has a profound effect on response capabilities and the extent to which oil will disperse. Wind speed and wave height, two of the most influential factors that can affect the feasibility of ISB, are positively correlated with sea state. For example, wind speed directly affects current speed, which affects the oil's spreading rate. Spreading, which enhances the evaporation and dissolution of oil by creating a large active surface area, decreases the effectiveness of ISB. High wind speeds and rough sea states also can decrease the effectiveness of ISB by increasing the weathering and emulsification of oil. Weathering is the process that occurs as oil is exposed to the elements and loses its more volatile components. Emulsification is the process in which water gets incorporated into the oil or oil into the water. High wind speeds and rough sea state also pose logistical complications such as creating difficulty in igniting a spill, deploying fireproof booms, or containing oil within a boom. Mechanical containment, which is usually required in ISB operations to maintain combustion/slick thickness, loses its effectiveness at winds greater than 20 knots. If weather and sea conditions are calm, the window of opportunity for conducting ISB may be extended.

Wave height, currents, and tides also affect the logistics for conducting an ISB operation and influence oil weathering. For instance, elevated wave heights and strong currents cause oil to emulsify. Additionally, most existing equipment have decreased effectiveness at wave heights greater than six feet and in currents over one knot. Oil usually escapes the boom in those conditions. The rate at which droplets of oil enter the water and flow beneath a boom's barrier depends on the current speed (or the relative velocity between the barrier and the water if the barrier is being towed), boom design, and properties of the oil. Weather conditions favorable to ISB

include winds less than 20 knots, waves less than two to three feet, and currents less than ¾ knot relative velocity between the boom and the water.

Wind direction is particularly important if the spill occurs close to a populated area. Wind direction determines the direction that the smoke plume moves. If the wind is blowing towards a populated area, reasonable assurances must be made that people will not be exposed to excessive concentrations of pollutants. Wind direction also affects the direction the oil moves after an incident, and movement towards a shoreline may increase the environmental damage caused by the incident.

Local air and water temperature can affect the evaporation of oil and the competency of spill responders. Colder temperatures decrease the rate of evaporation, thus potentially increasing the feasibility of a successful ISB. Extreme temperatures can pose constraints for response personnel. Extreme temperatures increase the tendency to attempt shortcuts and also may impair one's judgment. The presence of ice can provide for natural containment of the oil; however, ice can also hamper access to the spill and complicate logistics.

Precipitation, in general, does not affect the feasibility of an ISB operation. However, rain or snow may slow the speed of the response. Further, heavy precipitation or thundershowers may present hazardous conditions, thus precluding responders from conducting ISB.

The type of oil spilled is one of the most important considerations for response and cleanup strategies. Important oil properties include the following:

- *Flash point:* The flash point is the lowest temperature at which vapors are formed which are capable of flaring up from an outside ignition source. Highly volatile oils, such as gasoline products that have flash points near 100°F/40°C, evaporate rapidly. Heavy crude oils and residual products (e.g., Venezuela crude, San Joaquin Valley crude, Bunker C, No. 6 fuel oil) are only slightly volatile, with flash points greater than 150°F/65°C, and thus, very little product is lost by evaporation. Because the more volatile components of spilled oil immediately begin to evaporate, there is less potential for successful ISB as the slick ages.

- *Specific gravity/API gravity:* Specific gravity is the ratio of the density of a substance to that of fresh water. The American Petroleum Institute (API) scale is used for hydrometers. Oil with a specific gravity greater than 1.00 (API gravity of less than 10) will sink in fresh water. Those with a specific gravity of 0.95 or higher (API gravity less than 17.5) are also at risk of sinking once they become mixed with suspended sediments. Gasoline products have a specific gravity of less than 0.80, whereas heavy crude oils and residual products have a specific gravity of 0.95 to 1.00 or an API gravity of 10 to 17.5.

- *Viscosity:* Viscosity is the resistance of a fluid to motion and it controls the rate that oil spreads on water. Low-viscosity oils spread rapidly into thin sheens, increasing the surface area and making recovery difficult. Gasoline products are an example of low viscosity oils. Viscous oils, heavy crude oils, and residual products can be so thick that they do not spread, particularly when spilled on cold water. Highly viscous oils do not readily emulsify, and it is difficult for water to be added to such oil.

- *Emulsification formation:* Under certain conditions, some oil slicks will form a water-in-oil emulsion often called "chocolate mousse." This material can contain up to 80 percent water and can be many orders of magnitude more viscous than the spilled oil. There is no simple qualitative measure of the tendency to form emulsions. When an emulsion is formed, the oil changes in appearance and viscosity, becoming much more difficult to address from a spill-response perspective; the fluid is more viscous and harder to pump, and the volume increases by a factor of four to five. Gasoline products do not emulsify. Diesel-like products and light crude oils, medium-grade crude oils and intermediate products, and heavy crude oils and residual products can form stable emulsions (API and NOAA, 1998).

The relationship of oil type to water density is an important element. It is a factor in the calculation of dissipated wave energy, which in turn is a factor in the calculation of oil-in-water dispersion, and it also affects the density of emulsion and emulsion viscosity.

Most, if not all, oils will burn if of sufficient thickness. The thickness of the oil must be maintained to avoid a heat sink effect that transfers the heat from the oil layer to the water and extinguishes the fire. Minimum thicknesses include two to three millimeters for fresh crude oil, three to five millimeters for diesel and weathered crude, and five to 10 millimeters for emulsions and Bunker C. In addition, for most crude oils, evaporation losses must be less than 30 percent to burn successfully.

Daylight factors into the safety of an ISB operation. ISB on large oil spills often involves several vessels working in relatively close proximity to one another. Further, it is difficult to see the oil in the absence of daylight. Although high intensity lighting systems are available, absence of daylight will impair visibility and may pose hazardous conditions.

2. Criteria

This study employed a bi-level methodology in determining the potential success of ISB technology in responding to a spill. Each spill included in the scope of the study was first evaluated by considering the most significant factors described in Section 1.2. The four part Phase I screening analysis incorporated the following elements: (1) oil weathering model analysis, which considered evaporation of oil from the surface of the water, dispersion of oil into the water column, and emulsification of oil and water; (2) logistics analysis, which related to the length of time necessary to arrive at the spill site and conduct ISB; (3) weather conditions (i.e., high winds that could impede response, generate rough seas, cause greater emulsification of oil, and make slick ignition difficult); and (4) distance to populated areas. These criteria were selected as important factors influencing the feasibility of ISB. A spill that failed in any one of these four categories was considered to have failed the initial analysis, and therefore, to have been an "unsuccessful" candidate for ISB. Such a spill was assigned an "unsuccessful" rating, and was not further analyzed. Spills that passed all four categories were evaluated a second time and were assigned a "successful," "marginal call," or "unsuccessful" rating. This was based on more detailed and stringent consideration of the criteria applied in Phase I, as well as site-specific limitations or conditions that would affect the success of ISB.

2.1 Phase I Criteria

Each spill included in the study was initially evaluated for four criteria: oil weathering, logistics, weather conditions, and distance to populated area. A spill that failed to meet one of the four criteria was considered an unsuccessful candidate for ISB. Spills that met all four criteria were further evaluated by examining additional criteria and individual spill circumstances to determine if the spill should receive a successful burn, marginal call, or unsuccessful burn rating as an ISB candidate. The four criteria are defined below.

- *Oil Weathering Model Analysis:* Oil was considered unburnable once the summed percentages of evaporated and dispersed oil reached 100 percent or the water content of the oil reached 75 percent, as both of these conditions prevent ignition. The "window of opportunity" for each spill is the elapsed time between the initial spill incident and the point at which the oil is no longer considered burnable. The analysis assumed that a window of opportunity of at least six hours was necessary in order for a response effort to be mobilized.

- *Logistics Analysis:* Response time includes locating and preparing appropriate equipment and transporting equipment and personnel to the spill site. As an initial screening, a spill was considered an unsuccessful candidate for ISB if the response time exceeded 1.5 times the window of opportunity. Since the weathering model only provided an approximate time for the oil to become unburnable, allowing the response time to exceed 1.5 times the window of opportunity results in a conservative measure for the potential success of ISB.

- *Weather:* Weather conditions at the time of each spill and in some cases, during the days following the spill, were assessed to determine if the weather would impede the ability to ignite the oil or respond to a spill. A spill was considered unburnable if there was no twenty-four hour period in which the average wind speed was below 20 knots (10.3 meters per second) during the first five days after a spill.

- *Distance to Populated Areas:* A "populated area" was defined as a city with 10,000 or more inhabitants, and a distance of six miles was established as the radius in which ISB could not be conducted. The six miles figure was derived from the practices of some RRTs (RRT IV, 1993).

2.2 Phase II Analysis

In the Phase I analysis, strict cutoffs were used to arrive at an initial assessment of the potential success of ISB for a given spill. For the spills that met these initial requirements, the second phase of the analysis provided an opportunity to consider more site-specific conditions for each spill. Instead of establishing any specific criteria, a number of factors were conjoined to assess the practical feasibility of ISB. Phase I criteria was reexamined to determine if the spill had only marginally passed in one or more criterion. For instance, if there were high winds at the time of a spill, and the oil was highly emulsified, this spill might fail in Phase II. Where additional information was available, we considered other factors, such as weather conditions (e.g., fog), distance to shoreline, historical occurrence and response scenarios, or historical use of ISB. For example, if a case study of a spill revealed that vessels had difficulty in responding to a spill, that

spill would likely be an unsuccessful candidate in Phase II. If an offshore spill actually caught fire, that spill may be considered a successful candidate for ISB. However, if a spill in a harbor or near a populated area caught fire, and an effort was made to extinguish the fire, the spill was considered an unsuccessful candidate for ISB. The surrounding population would likely not support ISB if an extensive effort had been expended to extinguish the fire.

For several spills, information was not available beyond that used to analyze the spill in Phase I. In these cases, the spill passed Phase II, but it was noted in the spill summary report in the "Results Summary and Phase II Evaluation" section for that spill that it passed in Phase II because no further information was available. (See Appendix C for the individual spill summary reports.)

3. Methodology

3.1 Establishing a Study Set of Historical Oil Spills

To establish a set of historical oil spills that reflected a variety of conditions and locations, a broad range of historical literature and databases containing information on oil spills were used. Before reviewing these sources, factors were established that determined whether a spill would be included in the study set. The set was to include only those spills that occurred between March 1967 and December 1997, and those over 10,000 barrels in North America and 50,000 barrels in Europe and South America. The geographical limits on spills were set at 200 miles off the coasts of Europe, North America and South America. No limits were placed on spills in the Gulf of Mexico and the Caribbean Sea . Data sources were reviewed and compiled into a database of information on spills within the scope of the analysis criteria, as shown in Appendices A and C.

3.2 Sources of Information on Oil Spills

A total of eleven separate sources were used in generating the list of spills. Because these sources sometimes contained conflicting information on spills, such as the amount of oil spilled or the location of the spill, an order of priority was established with which the information contained in a data source would be accepted. The primary data source was the 1991 NOAA report, and secondary sources were the 1995 Marine Spill Response Corporation report, the 1990 Office of Technology Assessment list from "Coping with an Oiled Sea," and the Oil Spill Intelligence Report newsletters. Spills were included that were not listed in these sources if they were listed in two or more data sources such as the Oil Spill Intelligence Report annual reports, the Minerals Management Service (MMS) Worldwide Tanker spills online database, and the NOAA Hazmat Response Reports. A detailed description of each data source consulted is presented below.

NOAA Report: Summaries of Significant U.S. and International Spills, 1961- 1991

The spills included in this source meet the following criteria:

- Exceeded 100,000 barrels internationally;
- Exceeded 10,000 barrels in U.S. waters;

- Involved the use of dispersants;
- Involved bioremediation; or
- Involved severe environmental impacts (e.g., more than 500 birds killed, more than 100 mammals killed, smothering of over a mile of intertidal zone, and closure of fisheries).

Each listing in this source contains a brief summary of the spill, including information on the location and size of the spill, the product spilled, the mitigation methods or countermeasures employed, and the types of shoreline affected. Each spill summary contains a list of references (NOAA, 1992).

NOAA Oil and Hazardous Materials Response Reports: 1990-1996

The NOAA Hazmat Response Reports were used as additional sources because the NOAA report did not cover all the years of our study. These Hazmat Response Reports detail spill incidents in the U.S. coastal zone to which NOAA provided technical or operational assistance. Each report provides an incident summary, details of the NOAA response, a summary of the resources at risk, and the cleanup countermeasures. Each report is referenced.

Marine Spill Response Corporation (MSRC) report: An Analysis of Historical Opportunities for Dispersant and In-Situ Burning Use in the Coastal Waters of the United States, Except Alaska

This report contains information on historical marine oil spills of 1,000 barrels or more that occurred in U.S. coastal and offshore waters between 1973 and the first half of 1994. Sources used in preparation of this report included U.S. Coast Guard spill databases, the Minerals Management Services database, and the Environmental Protection Agency's (EPA's) Emergency Response Notification System (ERNS). The following information is included for each spill in the MSRC report:

- Date and time of the spill;
- Name and type of the vessel;
- Cause of the spill;
- Latitude, longitude, and geographical location of the spill, including the distance from shore;
- Water body impacted by the spill and the depth of water at the spill location;
- Type and volume of oil spilled;
- Countermeasures employed; and
- List of references (Kucklick, 1995).

Oil Spill Intelligence Report: International Summary and Review

These reports were published annually from 1978 to the present. Each contains a chronologically ordered list of spills that occurred in a given year. Information on each spill is limited to the location of the spill and its source, size, composition, and cause. Reports from 1989 and later include damages caused by the spill, which were useful in determining if oil had entered navigable waters.

Department of Interior's Mineral Management Service (MMS) Database of Worldwide Tanker Spills

The MMS database includes spills from 1974 to June 15, 1990. All spills are from vessels on which a petroleum product was a cargo. The spill must be at least 1,000 barrels in size, must have been accidental, and acts of war are not included. (The MMS database is available on the Internet at http://www.etcentre.org/spills/index.htm.) The information listed for each spill includes the following parameters:

- Spill date;
- Vessel type, flag, size, and age;
- Volume of the spill, as well as lowest and highest reported volumes;
- Type of oil spilled; and
- Latitude, longitude, and location of the spill.

U.S. Coast Guard: Marine Safety Information System (MSIS) Database

The U.S. Coast Guard MSIS database provides data on spills from 1973 through 1996. The reports include all accidents or casualties involving vessels in U.S. waters. (The MSIS database is available via CD-ROM.) For each report, the following information is presented:

- Date, time, and location of the spill;
- Material spilled including the CHRIS code;
- Source of the spill; and
- Response information, including agency and cost of clean-up.

Office of Technology Assessment (OTA): Coping with an Oiled Sea

"Coping with an Oiled Sea" is a background paper, which was prepared by OTA in 1990. It contains a list of 66 oil spills greater than two million gallons (48,000 barrels), compiled from various reference sources. The spills on the list occurred between 1967 and 1989, and the information about each spill includes the year of the spill, the name of the vessel or facility, the general location, and the volume of the spill. Most of the spills were included in one or more of the other data sources, but a few were not found elsewhere (OTA, 1990).

Lloyd's Modern Shipping Disasters: 1963-1987

"Lloyd's Modern Shipping Disasters," published in 1987, contains brief narrative summaries of a number of maritime disasters involving vessels. This source was not used to identify any additional spills, but provided information describing the specific location of oil spills, as well as details of the incident (Hooke, 1987).

International Oil Spill Conference Proceedings: 1969-1997

The proceedings of the biennial International Oil Spill Conference (IOSC) provided additional detailed information on certain oil spills. These articles were particularly useful in identifying weather information at the time of a spill.

Information Sources for Recent Spills: Oil Spill Intelligence Report and Oil Pollution Bulletin

Two additional sources used for information on recent spills were the Oil Spill Intelligence Report and Golob's Oil Pollution Bulletin. Both are biweekly publications featuring information on oil spills in the U.S. and abroad as well as other oil-related news.

3.3 Distance to Populated Area

The distance between the spill location and a city with a population of 10,000 or more was estimated by using atlases and descriptions of the incident. If the distance was within six miles, then the spill failed the Phase I criterion for distance to a populated area. In some cases, the distance to a city was greater than six miles, but if the spill occurred very close to shore, that factor was considered in Phase II.

For many incidents, particularly those that occurred prior to the 1990s, the exact latitude and longitude of the spill were not reported, but a brief description of the location may have been provided. Even when a precise location was known, the location was usually the site of a collision or grounding and not an indication of the boundaries of the oil slick. In other words, some of the large spills with a reported location beyond six miles are likely to have spread out over time so that some part of the slick was within six miles of a populated area. Local policies and regulations differ, however, with respect to where ISB is allowed, and some areas may allow burning within six miles.

For these reasons, the six-mile distance is an imprecise and arbitrary cutoff. If a smaller distance had been selected, such as three miles, the number of successful ISB candidates would have been somewhat higher, but the vast majority of incidents within six miles were also within three miles of a populated area. The distance to a populated area was meant to reflect the fact that ISB of a large spill may not be feasible because of the large quantities of highly visible smoke generated and the resulting adverse public perception.

3.4 Weather Data Collection

In addition to information on spill size and location, data was obtained on oil type, wind speed, water temperature, and other factors. Inputs for the oil weathering model included the volume of oil spilled, the type of oil spilled, wind speed, and water temperature data. Information on spill size was available for most spills, but information from different sources often conflicted. When conflicts existed, more weight was given to information giving the amount of oil lost rather than the amount cleaned up. For many early spills, a specific oil type was not available. In some cases where crude oil was the only type specified, an assumption was made on the specific type of

crude oil based on the port of origin of the vessel. Wind speed and water temperature data were available for all spills in either of the following sources:

The NOAA Marine Environmental Buoy Database

These data are collected from moored buoys and Coastal-Marine Automated Network (C-MAN) stations located on piers, offshore towers, lighthouses, and beaches operated by the NOAA National Data Buoy Center (NDBC). Data are provided for the Atlantic Ocean, Gulf of Mexico, Great Lakes, central and western Pacific Ocean, North Pacific Ocean above 50°N, and Eastern Pacific Ocean. The NDBC buoys began reporting in the early 1970s and the NDBC archive holds data from February 1970. The first C-MAN stations became operational in March 1983, and the NDBC archive of C-MAN data began in 1985.

Parameters reported by both buoys and C-MAN stations include: air temperature and pressure, wind speed and direction, wind gust, and sea surface temperature. The buoys and a few C-MAN stations located on offshore towers also report wave data, usually including wave height, wave period, and wave spectra. In general, the hourly readings use an eight-minute acquisition period for data collection by sensors on board moored buoys and a two-minute acquisition period for data collected by sensors at C-MAN sites. A limited number of spills occurred in proximity to these buoys or stations during periods of operation. (The C-MAN database is available on the Internet at http://www.nodc.noaa.gov/CDR-detdesc/buoy.html.)

The Comprehensive Ocean-Atmosphere Data Set (COADS)

The information in COADS includes data sets of atmospheric variables such as sea surface temperature, wind speed, and air temperature. The data have been compiled from ship reports over the global ocean. The data set is a joint effort between NOAA's Climate Diagnostics Center (CDC), the Cooperative Institute for Research in Environmental Sciences (CIRES), the National Center for Atmospheric Research (NCAR), and NOAA's National Climactic Data Center (NCDC).

The data sets we used to obtain sea surface temperature and wind speed were:

- *COADS Monthly Time Series Set:* This data set covers a time period from 1854 to 1993 and has average daily sea surface temperature and wind speed values for every month and year.

- *COADS Monthly Climatology:* This data set has average daily sea surface temperature values for every month of the year.

Data from these sets were extrapolated to provide approximate sea surface temperatures where more exact data were unavailable. For most spills, this was the only source of data for sea surface temperature and wind speed. (The COADS database is available on the Internet at http://ferret.wrc.noaa.gov/fbin/climate_server.)

3.5 Oil Weathering Modeling

Requirements for this study included correlating weather data with oil type spilled in each incident, predicting the window of opportunity that would allow the oil to be ignited or burned, and accounting for evaporative loss and emulsification. To perform this analysis in a cost-effective manner on over a hundred spill scenarios, it was necessary to utilize existing computer-based models for predicting the properties of oil spilled on water over time. Two models for predicting the properties of oil spilled on water were used for this purpose: the Automated Data Inquiry for Oil Spills (ADIOS) model prepared by the United States National Oceanic and Atmospheric Administration and the Oil Weathering Model developed by SINTEF. The SINTEF model was used as the primary analysis tool. The ADIOS model was used for oils that were unavailable in the SINTEF database (primarily certain refined products). The most recent versions of both models were used for the analyses. These were ADIOS Version 1.1 for Windows and the SINTEF Oil Weathering Model Version 1.5a for Windows >95. Details of the two models can be found in Daling et al., 1997 and Lehr et al., 1997.

The inputs for both models were essentially the same. The first step for use of either model was the selection of the oil to be modeled. The name of the oil, type, and in some cases, the API gravity were used to ensure the correct oil was selected. Where more than one oil type was spilled, the oil with the greater spilled volume was modeled. The water temperature at the time of the spill was used as a constant temperature.

Both models allow the user to enter either constant or time-dependent winds input from a text file. Time-dependent wind files were available for three of the first five spills analyzed. The models were run using both the time-dependent wind files and the initial speed reported at the time of the spill as a constant wind speed. The resulting analyses showed little difference in the results, and the extra time involved in trying to locate and input the time-dependent wind speeds was determined not to be worth the effort. Thereafter the wind speed reported at the time of the spill was used as a constant wind speed for spill modeling.

Both models allow the density of the water to be changed from the default for salt water. This input was varied for known freshwater spills. The SINTEF model also allows changes to the water depth and fetch for limiting the calculation of wave heights. Both of these features were used, for example, in modeling the *Amazon Venture* spill in the Savannah River.

In evaluating the window of opportunity, it was important to model the changes in oil properties over time and to know whether fresh oil was released continuously or intermittently. These factors determine whether a successful burn can occur some time after the initial incident. Oil is modeled as a series of individual instantaneous releases (called slugs) so that the results of the model can be used to obtain the change in properties over time.

3.6 Determining Logistics Response Time

The determination of response times for the mobilization and deployment of equipment sufficient to conduct ISB at the spill sites took into account several factors. The latitude and longitude of each spill location, or a name associated with the location, was obtained during the

historical data review. The spill site was then located on an atlas. The nearest airport and nearest port for equipment mobilization and tow out were identified so that distances from the nearest equipment source could be measured. The potential problems related to local and international political jurisdictions delaying or preventing entry of oil spill response equipment were largely ignored except for some differences in initial mobilization time. It was also assumed that the nearest large airport could be used for international responses.

A worldwide survey of equipment necessary to complete ISB was conducted. Organizations in England, France, Norway, and the U.S. were contacted to determine the availability of equipment. It was determined that available ISB equipment suites are presently all located in the U.S. The owners, locations, and a description of these equipment suites are given below:

- *Alaska Clean Seas (ACS):* ACS maintains the following ISB burn equipment in its inventory: A helitorch airborne ignition system (with extra drums and gel mixers), 1,400 hand igniters, 17,500 feet of 3M fire boom, and 2,082 feet of old Shell fire boom. Most of their equipment is located in Anchorage, Alaska (Majors, 1997).

- *Alyeska Pipeline's Ship Escort Response Vessel System (SERVS):* SERVS has 3,600 feet of 3M fire boom and two helitorches stored in Valdez, Alaska. (The SERVS Website is located at at http:www.alyeska-pipe.com/servs/.)

- *Clean Caribbean Cooperative (CCC):* CCC has three complete systems located at their Ft. Lauderdale, Florida warehouse. One has 750 feet of 3M fire boom with 2- to 200-foot guide booms, packaged to be air transportable. The other two systems are 450 feet of Oil Stop Inflatable Fire Boom on reels, with 200 feet of guide boom at each end. All systems have support systems (e.g., blowers, power packs). They have 12 helitorches and 12 hand-held igniters in inventory. Oil Stop personnel have been identified to conduct equipment operations. CCC guidelines require that a firefighting vessel be present during ISB operations (Schuler, 1997).

- *Cook Inlet Spill Prevention and Response, Inc. (CISPRI):* CISPRI has 6,150 feet of 3M fire boom, 1,000 feet of Kepner fire boom, and a helitorch kit in inventory. All equipment is located in Kenai, Alaska (Majors, 1997).

- *Exxon Corporation:* Exxon has one system consisting of Oil Stop Inflatable Fire Boom and igniters located in Pradis, Louisiana.

- *Marine Spill Response Corporation:* Each system contains 500 feet of Oil Stop Inflatable Fire Boom on a reel, guide boom, and hand-held flare-type igniters which float. Personnel protection and fire fighting equipment standards were under development (O'Donovan, 1997). Systems are located in:

  ⇒ Edison, New Jersey (two systems);
  ⇒ Everett, Washington;
  ⇒ Galveston, Texas;

⇒ Honolulu, Hawaii;
⇒ Miami, Florida (four systems);
⇒ Pascagoula, Mississippi; and
⇒ St. Croix, U.S. Virgin Islands.

Outside of the U.S., in most of the areas in our study, ISB has not been accepted as a response option. However, Oil Spill Response Limited (OSRL), headquartered in Southampton, UK, has acquired a section of fire boom which it expended in at-sea ISB tests. Although they do not presently have ISB equipment in inventory, for the purposes of this study, it was assumed that OSRL will acquire the equipment necessary to conduct ISB, and used OSRL as the source of equipment for the spills that occurred in Europe.

The logistics response time included a mobilization time between the reported spill time and the time the ISB response equipment was ready for transport. This time was generally assumed to be two hours for domestic spills and five hours for international spills. For spills within CCC's operating area, a two-hour mobilization time was used. Likewise, for spills within the European Union, a two-hour mobilization time was used.

Transit times were calculated using the transit speeds from the latest draft of the ASTM "Guide For Estimating Oil Spill Recovery System Effectiveness." These are five knots for water transport, 35 miles per hour for land transport, and 100 knots by air transport. When equipment is not co-located at an airport or pier from which it is departing, a minimum one-hour trucking time to the airport or pier was assumed. Similarly, a minimum one-hour transit time was used from an airport to the deployment site. After arrival at the deployment site, a time of two hours to unpack and deploy the equipment was assumed.

Where the spill site was offshore, a transit time of five knots was used to calculate the estimated time to tow the equipment to site. Where distances to the spill site were small or where the mobilization site was co-located at the spill site, a minimum time of one hour to tow the boom to the site and capture the oil was used. In rare cases where the equipment location was next to the spill location (occurring most frequently in Galveston, Texas), the one hour minimum was built into the four hour total mobilization and unpack/deploy time.

The total response time was then the sum of the mobilization time, the time to truck the equipment to the airport (if used), transit time to the deployment site, unpack and deployment time, and time to tow and capture the oil.

4. Results

This study examined 141 large oil spills with a broad geographic distribution that occurred over the past 30 years. Appendix B contains a list of the 141 spills and their Phase I and Phase II ratings, and Appendix C contains detailed two-page summaries for each of the spills in the study.

4.1 Geographic Description and Spill Size

Table 1 presents the 141 spills included in this study by geographic distribution and spill size. As indicated in the table, the majority of the spills included in the scope of this study that occurred in North America were smaller than 50,000 barrels. Further, the majority of the spills that occurred in North America occurred in inland waterways or the Gulf and Caribbean regions. There were relatively few large oil spills in the South American region that were within the scope of this study. A substantial portion of the large oil spills (i.e., spills above 50,000 barrels) included in this study, occurred in Europe.

Table 1. Geographic Distribution of Spills Included in Study by Spill Size (in Barrels)

Spill Size (Barrels)	North America Offshore			North America Inland Waterways	South America	Europe	Total
	Atlantic	Pacific	Gulf/ Caribbean				
10,000-49,999	9	6	23	34	X	X	72
50,000-199,999	5	3	9	4	6	12	39
200,000 or more	3	2	6	2	3	14	30
TOTAL	17	11	38	40	9	26	**141**

Table 2 adds information regarding the Phase I and Phase II analyses of the spills to the information presented in Table 1. The table shows that, of the 72 spills of less than 50,000 barrels that occurred in North America, 15 passed Phase I and three were determined successful or passed Phase II.

Table 2. ISB Determination of Spills by Geographic Distribution and Spill Size (in Barrels)

Area	10,000-49,999		50,000-199,999		200,000 or more		Total	
	No. of Spills	Pass Phase I/ Phase II	No. of Spills	Pass Phase I/ Phase II	No. of Spills	Pass Phase I/ Phase II	No. of Spills	Pass Phase I/ Phase II
North America Total	72	15/3	21	11/5	13	5/4	106	31/12
Atlantic	9	2/0	5	5/3	3	1/1	17	8/4
Pacific	6	0/0	3	0/0	2	1/1	11	1/1
Gulf/Caribbean	23	9/3	9	6/2	6	3/2	38	18/7
Inland Waters	34	4/0	4	0/0	2	0/0	40	4/0
South America	X	X	6	2/0	3	1/0	9	3/0
Europe	X	X	12	8/1	14	5/1	26	13/2
OVERALL TOTAL	72	15/3	39	21/6	30	11/5	141	47/14

In total, 47 of the 141 spills passed the Phase I analysis. Fourteen of these (30 percent) were ultimately determined successful in the Phase II analysis, twelve (26 percent) spills were designated marginal calls, and 21 (45 percent) spills were designated unsuccessful candidates for ISB. Spills between 10,000 and 49,999 barrels had the greatest probability of being assigned an unsuccessful rating in the Phase I analysis. Only 21 percent of these spills passed the Phase I analysis and only four percent of the 72 spills were determined successful in the Phase II analysis. Forty-seven percent of the spills above 50,000 barrels that occurred in North America passed Phase I and 26 percent were determined successful in the Phase II analysis. Although an average of 33 percent of the spills that occurred in South America passed Phase I, none of the spills were determined successful in the Phase II analysis. Fifty percent of the spills that occurred in Europe passed the Phase I analysis (i.e., 13 of the 26 spills). Only eight percent of the 26 spills that occurred in Europe were determined successful in the Phase II analysis.

4.2 Phase I Results by Each of the Criteria

Table 3 below summarizes the number and percentage that failed only one criterion and the number and percentage of spills that failed multiple criteria (i.e., weather, oil weathering, logistics, and populated area).

Table 3. Phase I Results: Number and Percentage of Spills Failed by Criteria

Criteria Evaluated in PHASE I	Weather Results	Oil Weathering Results	Logistics Results	Populated Area Results
Failed This Criterion Only	4/141 (3%)	1/141 (0.7)	12/141 (9%)	41/141 (29%)
Failed Multiple Criterion	7/141 (5%)	35/141 (25%)	42/141 (30%)	59/141 (42%)

Proximity to populated areas was the most significant of the four criteria used to identify good candidates for ISB. Fifty-nine of the 141 spills did not pass the initial screening because the incident occurred near a sizable city. Nearby population can be important, in spite of the fact that some studies have shown that ISB does not necessarily produce an increased air pollution hazard. The public may perceive the highly visible smoke plume from a large ISB operation as an unacceptable health threat. Depending on spill response decision-making for a particular incident, however, at least some part of these spills may have been successfully burned. If, for example, local requirements allowed ISB between three and six miles, or if response vessels were used to tow oil farther out to sea, then many of these spills could have been successful candidates.

Two of the screening criteria considered were oil weathering characteristics and the logistics of the response. An oil weathering model estimated the amount of evaporation, dispersion, and emulsification of the spilled oil in a given incident. The type of oil spilled was an important factor, and most of the spills that did not pass the initial screening for weathering were light crude oils or light refined products that evaporated quickly. The amount of weathering must be low enough so that ISB is still feasible when the appropriate response equipment arrives at the scene. Of the 141 spills, 48 did not pass the initial screening for oil weathering or logistics, including 17 of the spills that did not pass the screening for proximity to a populated area. Those spills that did not pass tended to occur in remote locations or to involve oil types that evaporated or emulsified quickly.

The fourth screening criterion was for weather, and this factor eliminated incidents with persistently high winds following the spill. The persistence of such winds, with speeds of over 20 knots (or 10.3 m/sec), would preclude an effective ISB response. Only seven incidents did not pass the initial screening for weather, including four that did not pass on the basis of weather alone.

4.3 Phase II Results

The 47 spills that passed all the initial screening criteria in Phase I were examined more closely in Phase II to make a determination about which ones would be successful as ISB candidates. The data was reviewed for each screening criterion in conjunction with the other criteria, as well as narrative descriptions of each spill when available. This analysis led to the conclusion that many of the spills would be classified as unsuccessful or marginal calls. For example, some spills that passed the Phase I screening criteria for distance to populated areas failed the Phase II analysis because additional information indicated proximity to tourist beaches, significant populations within three miles of the incident, or other limiting factors. Some incidents that passed the screening criteria for weather and oil weathering nonetheless, were characterized by rough seas and relatively high water content (in the spilled oil), making ISB unfeasible.

Table 4 presents the counts and percentages of the 47 spills with their Phase II results. Forty-five percent (21 out of 47) of the spills analyzed in Phase II were unsuccessful.

Table 4. Phase II Results

Classification	Number/Percentage
Unsuccessful	21/47 (45%)
Marginal Call	12/47 (26%)

Successful	14/47 (30%)
TOTAL ANALYZED	47

4.4 Combined Results

Table 5 presents the combined Phase I and II determinations for all 141 spills. Eighty-two percent (115 out of 141) of the spills analyzed in the study were determined unsuccessful candidates for ISB.

Table 5. Summary of Phase I and Phase II Results

Classification	Number/Percentage
Unsuccessful	115/141 (82%)
Marginal Call	12/141 (9%)
Successful	14/141 (10%)
TOTAL ANALYZED	141

The final results identified 14 of the 141 spills as good candidates for ISB. Included among these candidates are well-known incidents, such as the 1989 *Exxon Valdez* spill, where an ISB test was in fact conducted, and the 1979 *Atlantic Empress* spill, where the vessel and spilled oil burned for several days following a collision. Several of these spills, such as the 1977 *Claude Conway* and the 1980 *Princess Anne-Marie*, are somewhat uncertain because very little information is available about the spill itself or the nature of the response. For various reasons related to the specific circumstances of the incidents, several well-documented spills, such as the 1967 *Torrey Canyon*, the 1976 *Argo Merchant*, and the 1984 *Alvenus*, were among the 12 considered to be marginal calls for ISB feasibility.

5. Conclusions

In general, the good candidates for ISB tended to occur in the coastal or offshore waters of the Gulf of Mexico or Caribbean Sea. The larger spills that occurred off the Atlantic coast of North America also tended to be successful. (There were seven successful ISB candidates out of the 38 spills that occurred in the Gulf of Mexico and Caribbean and four successful candidates out of the eight spills of 50,000 barrels or more that occurred off the Atlantic coast of North America.) None of the candidates were from inland waterways or from ocean waters off South America.

The results of the analysis show that, although there is growing interest in ISB for use on large volume oil spills, there are constraints to the widespread use of the technique. Considering the effectiveness of ISB, however, and the fact that constraints such as spill location, expected weather, and oil type are likely to be well known prior to undertaking a response, the results are encouraging. If the locations, oil types, and weather conditions of future oil spill incidents are similar to those of past incidents, then ISB may be a possible response option for a small but significant fraction of future incidents, perhaps 10 percent. Decision-makers must compare ISB to other response options knowing the respective limitations and effectiveness of each technique.

The results of this study can be significant in three ways. First, the identification of patterns and trends of past spills can help the USCG develop simulation studies for forecasting the likelihood of future oil spill disasters. The USCG can predict future oil shipments, weather conditions, major spill probabilities, and spill response time for various locations, and these predictions can be used as modeling tools to compare different prevention and response strategies. Second, this study's identification of high-risk coastal areas should be incorporated into regional preparedness planning. The USCG should help ensure that adequate response resources are available at locations where they are needed and should work with Regional Response Teams to develop appropriate response policies that include consideration of ISB. Third, as more experience is gained and more fire boom equipment is positioned, the criteria could change. The impacts on the logistics and distance to populated areas criteria would be affected the greatest. The result could be a significant increase in the number of potential spills that could use ISB. Data collected here should be reviewed as conditions and attitudes change.

REFERENCES

Aamo, O., and M. Reed, 1993. User's Manual for the IKU Oil Weathering Model, Version 1.0. IKU Petroleum Research (N-7034), Trondheim, Norway.

American Petroleum Institute (API) and the National Oceanic and Atmospheric Administration (NOAA), 1998. Inland Oil Spills: Options for Minimizing Environmental Impacts of Freshwater Spill Response Actions (Appendix 6).

Daling, P., O. Aamo, A. Lewis, and T. Strom-Kristiansen, 1997. SINTEF/IKU Oil Weathering Model X Predicting Oil's Properties At Sea. International Oil Spill Conference Proceedings. pp. 297-307.

Etkin, Dagmar Schmidt, varied years. International Oil Spills Summary. Oil Spill Intelligence Report. Arlington, MA: Cutter Information Corporation.

Hooke, N., 1987. Modern Shipping Disasters: 1963-1987. London: Lloyds of London Press.

International Oil Spill Conference (IOSC) Proceedings. Washington, D.C.: American Petroleum Institute.

Kucklick, Janet H. and Don V. Aurand, 1995. An Analysis of Historical Opportunities for Dispersant and In-situ Burning Use in the Coastal Water of the United States, Except Alaska. Washington, D.C.: Marine Spill Response Corporation (MSRC) Technical Report Series 95-005.

Lehr, W., R. Overstreet, R. Jones, L. Eclipse, and D. Simecek-Beatty, 1997. The Next Generation in Oil Weathering Modeling. International Oil Spill Conference. pp. 986-7.

Majors, L., 1997. E-mail to Bob Urban (PCCI) regarding fire boom systems, dated December 23, 1997.

NOAA Hazardous Materials Response and Assessment Division, 1992. Oil Spill Case Histories: 1967-1991, Summaries of Significant U.S. and International Spills. Springfield, VA: National Technical Information Service.

NOAA Office of Ocean Resources Conservation and Assessment, varied years. Oil and Hazardous Materials Response Reports, 1990-1996. Seattle: NOAA.

O'Donovan, D., 1997. Telephone conversation with T. Hudon (PCCI) on October 22, 1997.

Regional Response Team (RRT) IV In-Situ Burn Workgroup, 1993. Use of In-Situ Burning in RRT Region IV. May 1993.

Schuler, P., 1997. Telephone conversation with Tom Hudon (PCCI) on October 21, 1997.

U.S. Congress, Office of Technology Assessment (OTA), 1990. Coping With an Oiled Sea: An Analysis of Oil Spill Response Technologies. Washington, D.C.: U.S. Government Printing Office, OTA-BP-O-63.

APPENDIX A

Oil Spills Considered For Analysis By Date

No.	Spill Name	Date	Latitude	Longitude	City/State/Country	Continent	Size (bbls)	Oil Type	Data Source Discrepancies
1	Torrey Canyon	3/18/67	50 03 N	004 44 W	Lands End, England	Europe	860,000	Kuwait crude oil	
2	Humble Oil Pipeline	10/15/67	29 00 N	89 40 W	Offshore, LA	North America	200,000	Grand Isle	
3	Ocean Eagle	3/3/68	18 29 N	066 10 W	San Juan, PR	North America	83,400	Leona	
4	General Colocotronis	3/7/68	25 20 N	076 20 W	Eleuthera, Bahamas	North America	37,700	Lago treco	
5	Witwater	12/13/68	09 35 N	080 40 W	Galeta Island, Canal Zone, Panama	North America	14,000	Marine diesel (API 31.3) and Bunker C (API 7-14)	
6	Santa Barbara Well Blowout	1/28/69	34 10 N	119 45 W	Santa Barbara, CA	North America	100,000	Willmington crude oil	
7	Keo	11/5/69	39 00 N	68 00 W	120 miles South of Nantucket		209,523	No. 6 fuel oil	
8	Arrow	2/4/70	45 28 N	061 06 W	Nova Scotia, Canada	North America	77,000	Bunker C (No. 6 fuel) oil	
9	Chevron Main Pass Block 41	2/10/70	29 23 N	088 59 W	Nr. Mississippi River Delta, LA	North America	65,000	Crude oil (API 34)	
10	Othello*	3/20/70	59 20 N	018 20 E	Sweden	Europe	400,000	Fuel oil No. 6	
11	Polycommander	5/5/70	42 15 N	008 50 W	Spain	Europe	400,000	Souedie	
12	Mariena*	11/11/70			Sicily, Italy	Europe	100,000		
13	Shell Platform 26	12/1/70	28 46 N	090 10 W	Gulf of Mexico, off Louisiana	North America	58,640	Grand Isle	
14	Oregon Standard	1/18/71	37 40 N	122 20 W	San Francisco, CA	North America	20,400	Bunker C	
15	Texaco Oklahoma	3/27/71	36 00 N	073 00 W	Off the coast of North Carolina	North America	250,000	West Texas Sour	
16	Trader	6/11/72	36 20 N	019 43 E	Greece	Europe	260,000	Soviet export blend	
17	Schuylkill River	6/22/72	40 15 N	075 38 W	Douglassville, PA	North America	170,000	No. 6 cargo residue	
18	Bellingham Bay	1/10/73	48 45 N	122 30 W	Bellingham Bay, WA	North America	10,476	Alaskan North Slope	
19	Bayou Lafousche	3/9/73	29 38 N	094 58 W	Upper Galveston Bay, TX	North America	10,000	Louisiana crude, Bunker C	
20	Zoe Colocotronis	3/18/73	18 00 N	067 15 W	Cabo Rojo, PR	North America	37,579	Tia Juana light	
21	Oil Recovery	5/19/73	33 44 N	118 16 W	California	North America	142,857	Wilmington	
22	Esso Brussels	6/2/73	40 40 N	75 50 W	New York Harbor, NY	North America	36,650	Forcados crude	
23	Petrola	6/3/73	41 00 N	72 00 W	Off NY	North America	20,000	No. 6 fuel	
24	Napier	6/10/73	44 45 S	75 05 W	Off west of Chile	South America	270,000	Loreto Peruvian export grade	
25	Jawacta*	12/21/73							
26	Keytrader	1/18/74	29 15 N	089 25 W	Mississippi River, LA	North America	17,592	Kerosene	
27	Elias	4/9/74	40 00 N	075 00 W	Delaware River, Ft. Mifflin, Philadelphia, PA	North America	22,000	Bachaquero heavy	
28	Sea Spirit	4/15/74	34 00 N	118 15 W	Los Angeles Harbor, CA	North America	50,028	Heavy fuel oil	Exact spill date unknown; the only date found in text was 4/74.
29	Eugene Island 317	4/17/74	28 16 N	91 35 W	Gulf of Mexico, TX	North America	19,833	South Louisiana crude	
30	Barge No. 15*	8/1/74	29 30 N	90 15 W	Mississippi River (Mile 16), LA	North America	46,454	Unknown	
31	Jos Simard	8/4/74	58 43 N	062 54 W	Newfoundland, Canada	North America	10,714	No. 4 diesel fuel	
32	Metula	8/9/74	52 34 S	069 41 W	First Narrows, Straits of Magellan, Chile	South America	398,019	Light Arabian crude, Bunker C	
33	Bouchard 65	10/9/74	42 30 N	69 30 W	Atlantic Ocean, MA	North America	36,650	Fuel	
34	Ercole	10/22/74	30 10 N	091 15 W	Mississippi River (Mile 174.2), LA	North America	14,660	East Texas crude	
35	Athenian Star	1/20/75	43 00 N	59 30 W	Off of New Hampshire	North America	17,000	Arab medium crude	MMS Database: 11,905 bbls spilled.
36	Jakob Maersk	1/29/75	41 11 N	008 44W	Leixoes, N. Portugal	Europe	637,500	Iranian heavy crude	
37	Corinthos	1/31/75	39 49 N	075 25 W	Delaware River, Marcus Hook, PA	North America	266,000	Algerian crude oil	

APPENDIX A

Oil Spills Considered For Analysis By Date

No.	Spill Name	Date	Latitude	Longitude	City/State/Country	Continent	Size (bbls)	Oil Type	Data Source Discrepancies
38	Panglobal Friendship	2/11/75	11 04 N	061 34 W	Caribbean Zone, 20 Mi. off Trinidad	North America	14,660	Fuel oil	
39	IOT-105	3/3/75	32 20 N	090 50 W	Lower Mississippi River, MS	North America	20,000	Automotive gasoline	
40	B-421/Barge 13	3/5/75	31 40 N	091 25 W	Lower Mississippi River (Mile 435.8), MS	North America	24,715	East Texas crude	MMS Database: 20,395 bbls spilled.
41	Tarik Ibn Ziyad	3/26/75	22 54 S	043 10 W	Rio de Janeiro, Brazil	South America	109,950	Iranian light crude	
42	Spartan Lady	4/4/75	39 02 N	0'71 00 W	Off NJ	North America	142,857	No. 6 fuel	
43	No Name*	10/16/75			Gulf of Mexico, LA	North America	60,000		
44	Olympic Alliance	11/12/75	50 59 N	001 35 W	Dover Strait, Pas de Calais, English Channel, England	Europe	87,000	Iranian light crude oil	NOAA Case Histories: 14,000 bbls entered water at time of impact; reported to have spilled 73,000 additional bbls between site of collision and Wilhelmshaven, GDR.
45	St. Peter	2/5/76	01 30 N	079 30 W	Cabo Manglares, Colombia	South America	279,000	Oriente crude	
46	Urquiola	5/12/76	43 22 N	008 23 W	La Coruna, Spain	Europe	733,000	Light Arabian crude oil, Bunker fuel	NOAA Case Histories: 513,000 bbls burned in initial fire, 180,000-200,000 bbls polluted the coast.
47	Hackensack Estuary	5/26/76	40 44 N	074 11 W	Hackensack, NJ	North America	47,619	No. 6 fuel oil	
48	Al-Damman	6/30/76	37 50 N	021 10 E	Mediterranean, Agioi Theodoroi, Greece	Europe	110,000	Arab medium crude	
49	LSCO Petrochem*	10/4/76	29 00 N	89 00 W	Gulf of Mexico, LA	North America	109,950	Fuel oil No. 6	
50	N30*	12/3/76	21 45 N	080 00 W	American Atlantic, Trinidad, Cuba	North America	10,000	Crude	
51	Argo Merchant	12/15/76	41 02 N	069 27 W	Nantucket, MA	North America	183,330	No. 6 fuel oil, Cutter stock	
52	Sansinena	12/17/76	33 43 N	118 16 W	Los Angeles Harbor, CA	North America	30,000	Bunker C (Group V) fuel oil, Indonesian light crude	
53	Ethel H (II)	2/4/77	41 21 N	073 57 W	Hudson River, NY	North America	10,000	No. 6 fuel oil	
54	Claude Conway	3/20/77	32 45 N	75 25 W	150 Mi. SE of Cape Fear	North America	146,600	Bunker C	
55	Ekofisk Bravo Oil Field	4/22/77	56 34 N	003 12 E	Off Norway	Europe	202,381	Ekofisk crude oil	
56	Caribbean Sea	5/27/77	11 34 N	089 51 W	S. of El Salvador, Central America	North America	181,672	Bachaquero	
57	Dauntless Colocotronis	7/22/77	29 30 N	89 30 W	Mississippi River (Mile 89), Breton Sound, LA	North America	15,000	Arabian light crude	
58	Oswego Tarmac	7/29/77	12 00 N	069 00 W	Caribbean, Netherlands Antilles	North America	73,300	No. 6 fuel oil	
59	URSS 1	8/10/77	41 02 N	28 57 E	River near Black Sea, Bosporus	Europe	146,000	Soviet export blend crude	The lat/long for the URSS 1 was based on the lat/long for the Independenta, since they both took place along the Bosphorus, and lat/long information for URSS 1 was otherwise unavailable.
60	Brazilian Marina	1/9/78	23 48 S	045 43 W	San Sebastiao, Brazil	South America	73,600	Kuwait, Mina-al-Ahmadi crude (API 31.4)	OSIR 1978-81: 87,142 bbls spilled.

APPENDIX A

Oil Spills Considered For Analysis By Date

No.	Spill Name	Date	Latitude	Longitude	City/State/Country	Continent	Size (bbls)	Oil Type	Data Source Discrepancies
61	Union Oil Co. of California	2/8/78	42 24 N	071 01 W	Revere, MA	North America	35,714	Automotive gasoline	MSRC Tech. Rept.: 32,040 bbls spilled.
62	Amoco Cadiz	3/16/78	48 35 N	004 43 W	Brittany, France	Europe	1,634,952	Light Arabian crude, Iranian light crude, Bunker C	
63	Ocean 250	3/16/78	41 17 N	071 51 W	Block Island Sound, RI	North America	16,249	Aviation gasoline	
64	Interstate 19	3/20/78	39 35 N	075 35 W	Delaware City, DE	North America	15,000	JP-4 Aviation fuel, Kerosene	
65	Eleni V	5/6/78	52 49 N	001 48 E	Off Norfolk, England	Europe	52,500	Heavy fuel oil	
66	Aminona	5/26/78	02 18 S	044 13 W	Atlantic Ocean, Banco do Meio, Brazil	South America	146,600	No. 2 fuel oil	
67	Cabo Tamar	7/7/78	36 40 S	073 10 W	Talcahuano, Chile	South America	50,833	Oriente crude	
68	U.S. Strategic Petroleum Reserve	9/21/78	29 59 N	093 22 W	West Hackberry, LA	North America	32,520	Light Arabian crude	OSIR 1978-81: 67,500 bbls spilled.
69	Mara	11/12/78	12 00 N	068 00 W	Caribbean, 8 Mi. off Curacao, Netherlands	North America	73,300	Fuel oil No. 6	
70	Peck Slip	12/19/78	18 15 N	065 34 W	Cape San Juan, PR	North America	11,000	Bunker C	
71	Kosmas M	12/25/78	40 05 N	027 00 E	Akbas Nr. Canakkale, Dardanelles, Turkey	Europe	73,300	Fuel oil No. 6	
72	Andros Patria	12/31/78	43 31 N	009 37 W	Off Cape Villano, Spain	Europe	347,619	Iranian heavy crude	
73	F.W. Bekman	1/4/79	51 26 N	006 45 E	Duisberg, West Germany	Europe	61,904	Heavy fuel	
74	Messiniaki Frontis	3/2/79	34 55 N	024 48 E	Kaloi Limenes, Crete	Europe	116,214	Sirir crude	
75	Kurdistan	3/15/79	46 00 N	060 00 W	Cabot Strait, Nova Scotia, Canada	North America	43,900	Bunker C (Naptha)	
76	Simonburn	3/15/79	46 56 N	059 40 W	65 Km NE of Sydney, Nova Scotia	North America	79,990	No. 6 fuel	Exact spill date unknown; the only date found in text was 3/79.
77	Gino/Team Castor	4/28/79	48 14 N	005 50 W	Ile d' Ouessant, France	Europe	307,860	Fuel oil No. 6	
78	Ixtoc I, Petroleos Mexicanos	6/3/79		092 20 W	Bahia de Campeche, Gulf of Mexico, Mexico	North America	3,202,000	IXTOC 1 crude oil	NOAA Case Histories: 352,400 bbls spilled; OSIR 1978-81: 3,202,000 bbls spilled during 1979 and 131,333 bbls during 1980. Oil entered water from 6/3/79 to 3/23/80.
79	Aegean Captain	7/19/79	11 19 N	060 33 W	32 km North of Tobago	North America	145,261	Tia Juana medium 24	
80	Atlantic Empress	8/2/79	13 05 N	55 28 W	450 km East of Barbados	North America	987,714	Arabian medium crude	
81	Chevron Hawaii	9/1/79	29 42 N	095 08 W	Deer Park, TX	North America	20,000	Santa Maria crude, Catalytic cracker feedstock	OSIR 1978-81: 17,857 bbls spilled.
82	Titipor	10/15/79	03 06 S	060 00 W	Tomanaus Rds, Brazil	South America	158,004	Diesel fuel	Exact spill date unknown; the only date found in text was 10/79.
83	Gunvor Maersk	10/27/79	03 00 S	060 00 W	Amazon River, Manaus Rds., Brazil	South America	109,950	Fuel oil No. 6	
84	Burmah Agate	11/1/79	29 17 N	094 27 W	Galveston Bay, TX	North America	254,761	Forcados crude	
85	Independenta	11/15/79	41 02 N	028 57 E	Istanbul, Turkey	Europe	687,785	Es Sider crude oil	
86	Princess Anne-Marie	1/28/80	21 50 N	084 40 W	Cabo San Antonio, Cuba	North America	28,571	Bachaquero heavy crude	

APPENDIX A

Oil Spills Considered For Analysis By Date

No.	Spill Name	Date	Latitude	Longitude	City/State/Country	Continent	Size (bbls)	Oil Type	Data Source Discrepancies
87	Ireñes Serenade	2/23/80	36 56 N	021 42 E	Pilos, Greece	Europe	871,428	Sirir crude	Explosion and fire; sinking. Two-hundred and eighty thousand barrels burned during a 14-hour fire.
88	Tanio	3/7/80	49 10 N	004 16 W	Brittany, France	Europe	98,955	No. 6 fuel oil	OSIR 1978-81: 45,714 bbls lost and 75,476 bbls sunken.
89	Texaco North Dakota	8/21/80	28 04 N	091 39 W	100 m. S of Morgan City,Gulf of Mexico, LA	North America	18,000	Raffinate	
90	Georgia	11/22/80	29 10 N	089 15 W	Gulf of Mexico, LA	North America	32,000	Louisiana light sweet crude	
91	Hannah 4001	1/4/81	29 30 N	93 30 W	Near Galveston, TX	North America	29,320	Gasoline	
92	Concho	1/19/81	40 35 N	074 01 W	Kill Van Kull, NY	North America	18,149	No. 6 fuel oil	OSIR 1978-81: Only 1,758 bbls spilled; NOAA Case Histories: 2,381 bbls spilled into water.
93	Olympic Glory	1/28/81	29 41 N	095 00 W	Houston Ship Channel, TX	North America	23,809	Galeota crude	NOAA Case Histories: 20,000 bbls spilled.
94	Apex Houston	3/19/81	29 07 N	89 20 W	Lower Mississippi River (Mile 13), Near Pilottown	North America	25,042	No. 6 fuel	
95	Cavo Cambanos	3/29/81	41 11 N	007 09 E	Tarragona Rds, Off Corsica, Spain	Europe	148,976	Naptha	
96	Golden Dolphin	3/6/82	30 09 N	046 23 W	700 Mi. E. of Bermuda, Atlantic Ocean	North America	21,990	Fuel oil No. 6	
97	Arkas	3/31/82	30 00 N	090 28 W	Lower Mississippi River (Mile 130), Montz, LA	North America	35,000	Louisiana light sweet crude	
98	BU 42	6/29/82	34 20 N	092 00 W	Arkansas River (Mile 66), Near Pine Bluff, Arkansas	North America	28,144	No. 6 fuel	
99	Marin Mist*	1/12/83			Port, CA	North America	14,660	Fuel oil	
100	V882/V883/V884/V885	4/2/83	38 40 N	090 15 W	Mississippi River, St. Louis, MO	North America	13,212	Rainbow crude	
101	SF1 71/SF1 72	6/9/83	32 21 N	090 51 W	Vicksburg, MS	North America	14,047	No. 6 fuel	
102	Conoco	8/22/83	30 14 N	93 16 W	Calcasieu River, LA	North America	15,000	Heavy gasoil	
103	US 218	12/25/83	30 05 N	091 00 W	Lower Mississippi River (Mile 180.8), Donaldson, LA	North America	25,000	Light diesel No. 1-D	
104	Barge	1/24/84	33 40 N	091 10 W	Lower Mississippi River (Mile 694.5), AR	North America	26,119	No. 6 fuel	
105	Hoegh Mascot	2/16/84	43 20 N	124 20 W	Coos Bay, OR	North America	16,667	Clarified	
106	Chem 102*	2/26/84	30 00 N	090 20 W	Lower Mississippi River (Mile 123), LA	North America	13,830	Crude, Mineral seal	
107	Alvenus	7/30/84	29 35 N	093 15 W	11 nm S-SE of Cameron, LA	North America	65,000	Venezuelan Merey and Pilon crude	OSIR 1982-85: 66,452 bbls spilled.
108	Puerto Rican	10/31/84	37 30 N	123 02 W	San Francisco Bay, CA	North America	38,500	Bunker fuel, Lubricating	OSIR 1982-85: 8,000 bbls sunk and 40,000 burned and spilled.
109	Cape Fear River	11/21/84	33 59 N	77 58 W	Cape Fear River, NC	North America	17,000	No. 6 fuel	
110	Almar	11/26/84	12 10 N	069 00 W	Curacao, West Indies	North America	25,000	Bachaquero crude	
111	Passenger Vessel	11/26/84	40 54 N	73 26 W	Huntingdon Harbor, NY	North America	142,857	No. 1 diesel	
112	Neches River*	2/15/85	29 59 N	93 53 W	Neches River, TX	North America	30,000	Range of petroleum products	
113	Galveston Bay	7/13/85	29 17 N	94 54 W	Galveston Bay, TX	North America	25,000	Mineral seal	

APPENDIX A

Oil Spills Considered For Analysis By Date

No.	Spill Name	Date	Latitude	Longitude	City/State/Country	Continent	Size (bbls)	Oil Type	Data Source Discrepancies
114	Exxon No. 32	8/18/85	37 06 N	076 38 W	Off Norfolk, VA	North America	30,000	No. 2 fuel	
115	Grand Eagle	9/28/85	39 50 N	075 25 W	Marcus Hook, PA	North America	10,357	Ninian crude	
116	SFI 41	11/24/85	37 20 N	089 30 W	Mississippi River, MO	North America	16,300	No. 6 fuel oil	OSIR 1982-85: 7,142 bbls spilled.
117	Texas	3/7/86	37 10 N	089 30 W	Mississippi River, MO	North America	17,055	East Texas crude	
118	Texaco Storage Tank	4/27/86	09 40 N	079 05 W	Bahia Las Minas, Panama	North America	240,000	Venezuelan crude, Mexican Isthmanian crude, Medium	Approx. 140,000 bbls. not retained and entered Bahia Cativa; 1987 Oil Spill Conference Proceedings: 60,000 bbls spilled.
119	TTT-103 Chevron USA	7/31/86	30 26 N	088 33 W	Intercoastal Waterway, Pascagoula, MS	North America	14,000	Auto Gas, LPG, No. 2 fuel, Resin	
120	PEMEX	10/23/86	18 48 N	092 35 W	Bahia de Campeché, 40 Mi. NW of Cuidad del Carmen, Mexico	North America	247,000	Isthmus	
121	Amazon Venture	12/4/86	32 04 N	81 50 W	Savannah, Savannah River, GA	North America	11,900	No. 6 fuel	
122	Stuyvesant (I)	1/6/87	51 29 N	136 16 W	Valdez, Gulf of Alaska, AK	North America	14,285	North Slope crude	
123	Fuyoh Maru/Vitoria	6/23/87	49 30 N	000 30 E	Le Havre, Seine River, France	Europe	80,880	Kerosene	
124	Stuyvesant (II)	10/4/87	54 05 N	138 00 W	Gulf of Alaska, AK (100 to 200 Mi. off B.C.)	North America	14,285	North Slope crude	
125	PEMEX/YUM II	10/10/87	18 48 N	092 35 W	Gulf of Mexico, 40 Mi. NW of Ciudad de Carmen, Mexico	North America	56,000	Light crude oil	NOAA Case Histories: 58,640 bbls and referred to as "YUM II/Zapoteca."
126	Ashland Petroleum Co.	1/2/88	40 33 N	080 00 W	Floreffe, PA	North America	70,523	No. 2 diesel	NOAA Case Histories: 23,810 bbls spilled. Tank spilled 90,476 bbls; only 23810 bbls entered water.
127	Amoco Oil Co.	2/7/88	29 41 N	94 80 W	Galveston, Gulf of Mexico, TX	North America	15,576	South Louisiana light crude	OSIR 1986-88: 14,000 bbls spilled.
128	Athenian Venture	4/22/88	42 30 N	49 30 W	350-400 Mi. SE of Cape Race, Newfoundland, Canada	North America	252,429	Unleaded gasoline, Bunker	MMS Database: 4/21/88.
129	Nord Pacific	7/13/88	27 49 N	097 25 W	South side of inner harbor, Corpus Christi, TX	North America	15,350	Beatrice (North Sea) crude oil	
130	Esso (Exxon) Puerto Rico	9/3/88	29 55 N	090 15 W	Mississippi River, Baton Rouge, New Orleans, LA	North America	23,000	Fuel oil No. 6	
131	Exxon Pipeline	1/13/89	29 02 N	091 27 W	Eugene Island Block, LA	North America	14,000	Grand Isle	
132	UMTB 283	1/15/89	54 46 N	158 18 W	South of Semidi Islands, AK	North America	48,619	Diesel	NOAA Case Histories: 47,620; MMS Databse: Spill began on 12/26/88.
133	Gran Tor	2/15/89	18 35 N	069 35 W	800 yards E of Punta Nisbon, Dominican Republic	North America	16,119	Bunker C	
134	Exxon Valdez	3/24/89	61 02 N	146 05 W	Prince William Sound, AK	North America	257,142	North Slope crude	NOAA Case Histories: 240,500 bbls spilled.
135	TWE 23 De Agosto*	6/27/89			Caribbean Sea, Port in Cuba	North America	14,660	Gasoline	
136	Hess Oil Tanks*	9/20/89	17 40 N	62 90 W	Port Alucroix, Limetree Bay, St Croix, U.S.V.I.	North America	10,000	Heavy crude oil	NOAA Case Histories: 10,000 bbls spilled; only 1,000 bbls entered water.

APPENDIX A

Oil Spills Considered For Analysis By Date

No.	Spill Name	Date	Latitude	Longitude	City/State/Country	Continent	Size (bbls)	Oil Type	Data Source Discrepancies
137	Aragon	12/29/89	33 34 N	015 34 W	NE of Madeira, Portugal	Europe	175,000	Mexican Maya crude oil (Type 3)	
138	Exxon Bayway Refinery	1/2/90	40 38 N	074 14 W	Arthur Kill, NY	North America	13,500	No. 2 home heating oil	
139	Ship Shoals Block 281	1/24/90	28 18 N	90 52 W	Gulf of Mexico, TX	North America	14,423	South Louisiana crude	
140	Mega Borg	6/8/90	28 33 N	094 08 W	Gulf of Mexico, 57 Mi. SE of Galveston, TX	North America	100,000	Angolan Palanca crude oil	OSIR 1989-90: 119,047 bbls spilled. MMS Database: 6/9/90.
141	Apex Oil Co.	7/28/90	29 29 N	094 52 W	Houston Shipping Channel, Galveston Bay, TX	North America	16,476	No. 5 oil, Catalytic feedstock oil	
142	Jupiter	9/16/90	43 30 N	084 00 W	Saginaw River, Bay City, MI	North America	20,000	Unleaded gasoline	
143	Lakehead Pipeline Company*	3/3/91	47 14 N	093 38 W	Grand Rapids, MN	North America	40,476	Crude	
144	Vesta Bella	3/6/91	17 17 N	062 18 W	Nevis Isle. (U.K.), Caribbean Sea	North America	13,300	No. 6 fuel oil	OSIR 1978-81: 47,619 bbls spilled.
145	Haven	4/11/91	44 20 N	009 00 E	Genoa, Italy	Europe	142,857	Heavy Iranian crude	NOAA Case Histories: 142,857 bbls entered water; 450,000 bbls burned. Oil Spill Conference Proceedings: 179,663 bbls spilled.
146	Greenhill Petroleum	9/29/92	29 00 N	091 00 W	Gulf of Mexico, off Timbalier Bay, LA	North America	11,500	Light Crude	USCG estimated that 2,381 bbls.entered the Gulf of Mexico.
147	Aegean Sea	12/3/92	43 20 N	008 20 W	La Coruna Harbor, Spain	Europe	521,428	Brent Light Crude (North Sea Fields crude)	
148	Braer	1/5/93	59 00 N	001 30 W	Garth Ness, Shetland Islands, U.K.	Europe	595,238	Norwegian (Gullfaks) Crude	
149	Morris J. Berman	1/7/94	18 28 N	066 05 W	Off San Juan, PR	North America	17,857	Blended No. 6 fuel oil, Heavy No. 6 heating	OSIR 1994: 14,809 bbls spilled; Oil and Haz. Mat. Response Reports, FY 1994: 17,700 bbls removed from the water and leaking barge; 1995 Oil Spill Conference Proceedings: Oil Type-Low API Gravity (LAPIO) or Group V Fuel Oil.
150	San Jacinto River	10/20/94	29 48 N	095 04 W	San Jacinto River, Channelview, TX	North America	406,000	Gasoline, Arabian crude, Diesel, Natural gas	Oil and Haz. Mat. Response Reports, FY 1995: 64,000 bbls gasoline, 196,000 bbls crude oil, and 146,000 bbls fuel oil spilled; OSIR 1994: 28,571 bbls spilled.
151	North Cape	1/19/96	42 21 N	071 35 W	Narragansett, RI	North America	19,643	No. 2 fuel oil, Home heating oil	

APPENDIX A

Oil Spills Considered For Analysis By Date

No.	Spill Name	Date	Latitude	Longitude	City/State/Country	Continent	Size (bbls)	Oil Type	Data Source Discrepancies
152	Sea Empress	2/15/96	51 40 N	005 10 W	Milford Haven Harbor, Wales, U.K.	Europe	547,619	Forties Blend crude	OSIR Oil Spill Reporter 1996: 452, 300 bbls spilled.
153	Bay of Campeche Tanker	3/7/96	21 00 N	97 20 W	Bay of Campeche, Mexico	North America	250,000	Bunker C	
154	Houston	2/3/97	24 31 N	081 34 W	Maryland Shoal, Florida Keys NMS	North America	19,048	IF-30 Bunker crude oil	

*These spills were not included in the analysis because not enough information was available on oil type and/or latitude and longitude.

APPENDIX B

Phases I and II Analyses Results

No.	Spill Name	Date	Weather Results	Oil Weathering Results	Logistics Results	Populated Area Results	Phase I Evaluation	Phase II Evaluation
1	Torrey Canyon	3/18/67	Pass	Pass	Pass	Pass	Pass	Marginal Call
2	Arrow	2/4/70	Pass	Pass	Pass	Pass	Pass	Marginal Call
3	Argo Merchant	12/15/76	Pass	Pass	Pass	Pass	Pass	Marginal Call
4	Brazilian Marina	1/9/78	Pass	Pass	Pass	Pass	Pass	Marginal Call
5	Eleni V	5/6/78	Pass	Pass	Pass	Pass	Pass	Marginal Call
6	Mara	11/12/78	Pass	Pass	Pass	Pass	Pass	Marginal Call
7	Kosmas M	12/25/78	Pass	Pass	Pass	Pass	Pass	Marginal Call
8	Aegean Captain	7/19/79	Pass	Pass	Pass	Pass	Pass	Marginal Call
9	Tanio	3/7/80	Pass	Pass	Pass	Pass	Pass	Marginal Call
10	Alvenus	7/30/84	Pass	Pass	Pass	Pass	Pass	Marginal Call
11	Vesta Bella	3/6/91	Pass	Pass	Pass	Pass	Pass	Marginal Call
12	Haven	4/11/91	Pass	Pass	Pass	Pass	Pass	Marginal Call
13	Witwater	12/13/68	Pass	Pass	Pass	Pass	Pass	Successful
14	Keo	11/5/69	Pass	Pass	Pass	Pass	Pass	Successful
15	Spartan Lady	4/4/75	Pass	Pass	Pass	Pass	Pass	Successful
16	Claude Conway	3/20/77	Pass	Pass	Pass	Pass	Pass	Successful
17	Caribbean Sea	5/27/77	Pass	Pass	Pass	Pass	Pass	Successful
18	Simonburn	3/15/79	Pass	Pass	Pass	Pass	Pass	Successful
19	Gino	4/28/79	Pass	Pass	Pass	Pass	Pass	Successful
20	Atlantic Empress	8/2/79	Pass	Pass	Pass	Pass	Pass	Successful
21	Princess Anne-Marie	1/28/80	Pass	Pass	Pass	Pass	Pass	Successful
22	Cavo Cambanos	3/29/81	Pass	Pass	Pass	Pass	Pass	Successful
23	Almar	11/26/84	Pass	Pass	Pass	Pass	Pass	Successful
24	PEMEX	10/23/86	Pass	Pass	Pass	Pass	Pass	Successful
25	PEMEX/YUM II	10/10/87	Pass	Pass	Pass	Pass	Pass	Successful
26	Exxon Valdez	3/24/89	Pass	Pass	Pass	Pass	Pass	Successful
27	General Colocotronis	3/7/68	Pass	Pass	Pass	Pass	Pass	Unsuccessful
28	Polycommander	5/5/70	Pass	Pass	Pass	Pass	Pass	Unsuccessful
29	Shell Platform 26	12/1/70	Pass	Pass	Pass	Pass	Pass	Unsuccessful
30	Trader	6/11/72	Pass	Pass	Pass	Pass	Pass	Unsuccessful
31	Zoe Colocotronis	3/18/73	Pass	Pass	Pass	Pass	Pass	Unsuccessful

APPENDIX B

Phases I and II Analyses Results

No.	Spill Name	Date	Weather Results	Oil Weathering Results	Logistics Results	Populated Area Results	Phase I Evaluation	Phase II Evaluation
32	Keytrader	1/18/74	Pass	Pass	Pass	Pass	Pass	Unsuccessful
33	Jakob Maersk	1/29/75	Pass	Pass	Pass	Pass	Pass	Unsuccessful
34	Olympic Alliance	11/12/75	Pass	Pass	Pass	Pass	Pass	Unsuccessful
35	St. Peter	2/5/76	Pass	Pass	Pass	Pass	Pass	Unsuccessful
36	Al-Damman	6/30/76	Pass	Pass	Pass	Pass	Pass	Unsuccessful
37	Dauntless Colocotronis	7/22/77	Pass	Pass	Pass	Pass	Pass	Unsuccessful
38	Kurdistan	3/15/79	Pass	Pass	Pass	Pass	Pass	Unsuccessful
39	Gunvor Maersk	10/27/79	Pass	Pass	Pass	Pass	Pass	Unsuccessful
40	Hannah 4001	1/4/81	Pass	Pass	Pass	Pass	Pass	Unsuccessful
41	Barge	1/24/84	Pass	Pass	Pass	Pass	Pass	Unsuccessful
42	Exxon No. 32	8/18/85	Pass	Pass	Pass	Pass	Pass	Unsuccessful
43	SFI 41	11/24/85	Pass	Pass	Pass	Pass	Pass	Unsuccessful
44	Texaco Storage Tank	4/27/86	Pass	Pass	Pass	Pass	Pass	Unsuccessful
45	Stuyvesant (II)	10/4/87	Pass	Pass	Pass	Pass	Pass	Unsuccessful
46	Aragon	12/29/89	Pass	Pass	Pass	Pass	Pass	Unsuccessful
47	Houston	2/3/97	Pass	Pass	Pass	Pass	Pass	Unsuccessful
48	Humble Oil Pipeline	10/15/67	Pass	Fail	Fail	Pass	Unsuccessful	N/A
49	Ocean Eagle	3/3/68	Pass	Pass	Pass	Fail	Unsuccessful	N/A
50	Santa Barbara Well Blowout	1/28/69	Pass	Pass	Pass	Fail	Unsuccessful	N/A
51	Chevron Main Pass Block 41	2/10/70	Pass	Fail	Fail	Pass	Unsuccessful	N/A
52	Oregon Standard	1/18/71	Pass	Pass	Pass	Fail	Unsuccessful	N/A
53	Texaco Oklahoma	3/27/71	Pass	Pass	Fail	Pass	Unsuccessful	N/A
54	Schuylkill River	6/22/72	Pass	Pass	Pass	Fail	Unsuccessful	N/A
55	Bellingham Bay	1/10/73	Fail	Pass	Pass	Fail	Unsuccessful	N/A
56	Bayou Lafousche	3/9/73	Pass	Fail	Fail	Fail	Unsuccessful	N/A
57	Oil Recovery	5/19/73	Pass	Pass	Pass	Fail	Unsuccessful	N/A
58	Esso Brussels	6/2/73	Pass	Fail	Pass	Fail	Unsuccessful	N/A
59	Petrola	6/3/73	Pass	Pass	Pass	Fail	Unsuccessful	N/A
60	Napier	6/10/73	Pass	Pass	Fail	Pass	Unsuccessful	N/A
61	Elias	4/9/74	Pass	Pass	Pass	Fail	Unsuccessful	N/A
62	Sea Spirit	4/15/74	Pass	Pass	Pass	Fail	Unsuccessful	N/A

APPENDIX B

Phases I and II Analyses Results

No.	Spill Name	Date	Weather Results	Oil Weathering Results	Logistics Results	Populated Area Results	Phase I Evaluation	Phase II Evaluation
63	Eugene Island 317	4/17/74	Pass	Fail	Fail	Pass	Unsuccessful	N/A
64	Jos Simard	8/4/74	Pass	Pass	Fail	Pass	Unsuccessful	N/A
65	Metula	8/9/74	Pass	Fail	Fail	Pass	Unsuccessful	N/A
66	Bouchard 65	10/9/74	Pass	Pass	Fail	Pass	Unsuccessful	N/A
67	Ercole	10/22/74	Pass	Fail	Pass	Fail	Unsuccessful	N/A
68	Athenian Star	1/20/75	Pass	Pass	Fail	Pass	Unsuccessful	N/A
69	Corinthos	1/31/75	Pass	Pass	Pass	Fail	Unsuccessful	N/A
70	Panglobal Friendship	2/11/75	Pass	Fail	Fail	Pass	Unsuccessful	N/A
71	IOT-105	3/3/75	Pass	Pass	Pass	Fail	Unsuccessful	N/A
72	B-421/Barge 13	3/5/75	Pass	Fail	Fail	Pass	Unsuccessful	N/A
73	Tarik Ibn Ziyad	3/26/75	Pass	Pass	Pass	Fail	Unsuccessful	N/A
74	Urquiola	5/12/76	Pass	Fail	Fail	Pass	Unsuccessful	N/A
75	Hackensack Estuary	5/26/76	Pass	Pass	Pass	Fail	Unsuccessful	N/A
76	Sansinena	12/17/76	Pass	Pass	Pass	Fail	Unsuccessful	N/A
77	Ethel H (II)	2/4/77	Pass	Pass	Pass	Fail	Unsuccessful	N/A
78	Ekofisk Bravo Oil Field	4/22/77	Pass	Fail	Fail	Pass	Unsuccessful	N/A
79	Oswego Tarmac	7/29/77	Fail	Pass	Pass	Pass	Unsuccessful	N/A
80	URSS 1	8/10/77	Pass	Pass	Pass	Fail	Unsuccessful	N/A
81	Union Oil Co. of California	2/8/78	Pass	Pass	Pass	Fail	Unsuccessful	N/A
82	Amoco Cadiz	3/16/78	Fail	Fail	Fail	Pass	Unsuccessful	N/A
83	Ocean 250	3/16/78	Pass	Fail	Fail	Pass	Unsuccessful	N/A
84	Interstate 19	3/20/78	Pass	Pass	Pass	Fail	Unsuccessful	N/A
85	Aminona	5/26/78	Pass	Pass	Fail	Pass	Unsuccessful	N/A
86	Cabo Tamar	7/7/78	Pass	Fail	Fail	Fail	Unsuccessful	N/A
87	U.S. Strategic Petroleum Reserve	9/21/78	Pass	Fail	Pass	Fail	Unsuccessful	N/A
88	Peck Slip	12/19/78	Pass	Pass	Pass	Fail	Unsuccessful	N/A
89	Andros Patria	12/31/78	Fail	Pass	Pass	Pass	Unsuccessful	N/A
90	F.W. Bekman	1/4/79	Pass	Pass	Pass	Fail	Unsuccessful	N/A
91	Messiniaki Frontis	3/2/79	Pass	Fail	Fail	Pass	Unsuccessful	N/A
92	Ixtoc I, Petroleos Mexicanos	6/3/79	Pass	Fail	Fail	Pass	Unsuccessful	N/A
93	Chevron Hawaii	9/1/79	Pass	Fail	Fail	Fail	Unsuccessful	N/A

APPENDIX B

Phases I and II Analyses Results

No.	Spill Name	Date	Weather Results	Oil Weathering Results	Logistics Results	Populated Area Results	Phase I Evaluation	Phase II Evaluation
94	Titipor	10/15/79	Pass	Pass	Fail	Pass	Unsuccessful	N/A
95	Burmah Agate	11/1/79	Pass	Pass	Pass	Fail	Unsuccessful	N/A
96	Independenta	11/15/79	Pass	Fail	Fail	Fail	Unsuccessful	N/A
97	Irenes Serenade	2/23/80	Pass	Fail	Fail	Pass	Unsuccessful	N/A
98	Texaco North Dakota	8/21/80	Pass	Pass	Fail	Pass	Unsuccessful	N/A
99	Georgia	11/22/80	Pass	Fail	Fail	Pass	Unsuccessful	N/A
100	Concho	1/19/81	Pass	Pass	Pass	Fail	Unsuccessful	N/A
101	Olympic Glory	1/28/81	Pass	Fail	Fail	Fail	Unsuccessful	N/A
102	Apex Houston	3/19/81	Pass	Pass	Pass	Fail	Unsuccessful	N/A
103	Golden Dolphin	3/6/82	Pass	Pass	Fail	Pass	Unsuccessful	N/A
104	Arkas	3/31/82	Pass	Pass	Pass	Fail	Unsuccessful	N/A
105	BU 42	6/29/82	Pass	Pass	Pass	Fail	Unsuccessful	N/A
106	V882/V883/V884/V885	4/2/83	Pass	Fail	Fail	Fail	Unsuccessful	N/A
107	SF1 71/SF1 72	6/9/83	Pass	Pass	Pass	Fail	Unsuccessful	N/A
108	Conoco	8/22/83	Pass	Pass	Pass	Fail	Unsuccessful	N/A
109	US 218	12/25/83	Pass	Pass	Pass	Fail	Unsuccessful	N/A
110	Hoegh Mascot	2/16/84	Pass	Pass	Pass	Fail	Unsuccessful	N/A
111	Puerto Rican	10/31/84	Pass	Fail	Fail	Fail	Unsuccessful	N/A
112	Cape Fear River	11/21/84	Pass	Pass	Pass	Fail	Unsuccessful	N/A
113	Passenger Vessel	11/26/84	Pass	Pass	Pass	Fail	Unsuccessful	N/A
114	Galveston Bay	7/13/85	Pass	Pass	Pass	Fail	Unsuccessful	N/A
115	Grand Eagle	9/28/85	Pass	Fail	Fail	Fail	Unsuccessful	N/A
116	Texas	3/7/86	Pass	Fail	Fail	Fail	Unsuccessful	N/A
117	TTT-103 Chevron USA	7/31/86	Pass	Pass	Pass	Fail	Unsuccessful	N/A
118	Amazon Venture	12/4/86	Pass	Pass	Pass	Fail	Unsuccessful	N/A
119	Fuyoh Maru/Vitoria	6/23/87	Pass	Pass	Pass	Fail	Unsuccessful	N/A
120	Stuyvesant (I)	1/6/87	Fail	Pass	Pass	Pass	Unsuccessful	N/A
121	Ashland Petroleum Co.	1/2/88	Pass	Fail	Pass	Fail	Unsuccessful	N/A
122	Amoco Oil Co.	2/7/88	Pass	Fail	Pass	Pass	Unsuccessful	N/A
123	Athenian Venture	4/22/88	Pass	Pass	Fail	Pass	Unsuccessful	N/A
124	Nord Pacific	7/13/88	Pass	Pass	Pass	Fail	Unsuccessful	N/A

APPENDIX B

Phases I and II Analyses Results

No.	Spill Name	Date	Weather Results	Oil Weathering Results	Logistics Results	Populated Area Results	Phase I Evaluation	Phase II Evaluation
125	Esso (Exxon) Puerto Rico	9/3/88	Pass	Pass	Pass	Fail	Unsuccessful	N/A
126	Exxon Pipeline	1/13/89	Pass	Fail	Fail	Pass	Unsuccessful	N/A
127	UMTB 283	1/15/89	Fail	Pass	Pass	Pass	Unsuccessful	N/A
128	Gran Tor	2/15/89	Pass	Pass	Pass	Fail	Unsuccessful	N/A
129	Exxon Bayway Refinery	1/2/90	Pass	Fail	Pass	Fail	Unsuccessful	N/A
130	Ship Shoals Block 281	1/24/90	Pass	Pass	Fail	Pass	Unsuccessful	N/A
131	Mega Borg	6/8/90	Pass	Fail	Fail	Pass	Unsuccessful	N/A
132	Apex Oil Co.	7/28/90	Pass	Pass	Pass	Fail	Unsuccessful	N/A
133	Jupiter	9/16/90	Pass	Pass	Fail	Fail	Unsuccessful	N/A
134	Greenhill Petroleum	9/29/92	Pass	Pass	Fail	Pass	Unsuccessful	N/A
135	Aegean Sea	12/3/92	Pass	Fail	Fail	Fail	Unsuccessful	N/A
136	Braer	1/5/93	Fail	Fail	Fail	Pass	Unsuccessful	N/A
137	Morris J. Berman	1/7/94	Pass	Pass	Pass	Fail	Unsuccessful	N/A
138	San Jacinto River	10/20/94	Pass	Pass	Pass	Fail	Unsuccessful	N/A
139	North Cape	1/19/96	Pass	Fail	Fail	Pass	Unsuccessful	N/A
140	Sea Empress	2/15/96	Pass	Fail	Fail	Fail	Unsuccessful	N/A
141	Bay of Campeche Tanker	3/7/96	Pass	Pass	Pass	Fail	Unsuccessful	N/A
Total Failed			**7/141**	**35/141**	**42/141**	**59/141**	**94/141**	**21/47[1]**
Total Failed (Percentage)			**5%**	**25%**	**30%**	**42%**	**67%**	**45%**

[1]The number of spills that passed Phase I that was 47. Therefore, 47 spills were analyzed in Phase II.

APPENDIX C

Aegean Captain

GENERAL INFORMATION:

Spill Name:	Aegean Captain
Date:	7/19/79
Spill Time (local):	19:00
Spill Size (bbls):	145,261
Oil Type:	Tia Juana medium 24

LOCATION:

City/State/ Country:	32 km North of Tobago
Water Body:	Caribbean Sea
Latitude:	11 19 N
Longitude:	060 33 W

WEATHER DATA:

Wind Speed:	5-6 m/sec (day 1)
Wind Direction:	
Water Temperature:	28 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Twenty-five percent evaporates and 5% disperses by day 5; water content reaches 25% by day 5.

Logistics Analysis: Spill requires 13 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Aegean Captain

OCCURENCE SCENARIO:

At 19:00 on July 19, 1979, the Aegean Captain collided with the Atlantic Empress in the Caribbean Sea. The Aegean Captain caught on fire and was severely damaged; at least one casualty occurred. An overflight conducted on the morning of July 21 determined that the fire had been extinguished. A light-to-medium thickness slick about 10 miles in length and two miles wide was observed. Because it appeared that tourist beaches and coral reefs of Tobago were threatened, responders examined the possibility of using aerial and vessel-mounted dispersant spraying to stop the oil movement with the wind while it was in deep water. An overflight on July 22, however, found significant slick dissipation. Lands were not immediately threatened; thus, a decision was made to delay dispersant spraying operations. Slick size and movement were monitored two to three times each day. In the meantime, the Atlantic Empress sank after burning for 14 days. Through a coordinated effort and considerable assistance from natural forces, no oil came ashore and no harmful pollution resulted.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Marginal Call**

The spill passes Phase I, and although the vessel burned for over a day, ISB of the spilled oil could have been attempted subsequently. In Phase II, the spill is a marginal call as an ISB candidate.

APPENDIX C

Aegean Sea

GENERAL INFORMATION:

Spill Name:	Aegean Sea
Date:	12/3/92
Spill Time (local):	4:50
Spill Size (bbls):	521,428
Oil Type:	Brent Light Crude (North Sea Fields crude)

LOCATION:

City/State/ Country:	La Coruna Harbor, Spain
Water Body:	La Coruna Harbor
Latitude:	43 20 N
Longitude:	008 20 W

WEATHER DATA:

Wind Speed:	27 m/sec (day 1)
Wind Direction:	
Water Temperature:	15 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Dispersed and evaporated oil reaches 100% within 6 hours; water content also reaches 70% within 0.5 hours and 75% within 1 hour.

Logistics Analysis: Spill requires 15 hour response time; window of opportunity is less than 1 hour.

Populated Area Analysis: Within 3 miles of La Coruna.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Aegean Sea

OCCURENCE SCENARIO:

On December 3, 1992, the Greek bulk oil carrier Aegean Sea ran aground off La Coruna, Spain. The vessel broke apart, exploded, and caught fire, losing more than 90 percent of its cargo to either burning or spilling. Weather conditions did not allow the containment and recovery of oil at sea; therefore the response operations concentrated mainly on protecting sensitive areas, collecting oil in estuaries and harbors, shoreline cleanup, and recovery of crude oil and bunker remaining onboard the damaged ship.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Al-Damman

GENERAL INFORMATION:

Spill Name:	Al-Damman
Date:	6/30/76
Spill Time (local):	
Spill Size (bbls):	110,000
Oil Type:	Arab medium crude

LOCATION:

City/State/ Country:	Mediterranean, Agioi Theodoroi, Greece
Water Body:	Mediterranean Sea
Latitude:	37 50 N
Longitude:	021 10 E

WEATHER DATA:

Wind Speed:	4-5 m/sec (day 1)
Wind Direction:	
Water Temperature:	22-23 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Over 30% evaporates and close to 2% disperses by day 5; water content reaches 70% by day 2 and remains so through day 5.

Logistics Analysis: Spill requires 19 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Al-Damman

OCCURENCE SCENARIO:

On June 29, 1976, Al-Damman, a Saudi Arabian motor tanker, was extensively damaged by a fire that broke out near Agioi Theodoroi, Greece. The tanker was subsequently towed to Piraeus on July 13.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Unsuccessful

The spill passes Phase I, and although it did not occur within six miles of a city, it was apparently not far from the Greek coast. Our analysis indicates a response time of nearly one day and a 70 percent water content in the spilled oil by day 2. Based on the limited information available, in Phase II, the spill fails as an ISB candidate.

APPENDIX C

Almar

GENERAL INFORMATION:

Spill Name:	Almar
Date:	11/26/84
Spill Time (local):	
Spill Size (bbls):	25,000
Oil Type:	Bachaquero crude

LOCATION:

City/State/ Country:	Curacao, West Indies
Water Body:	Caribbean Sea
Latitude:	12 10 N
Longitude:	069 00 W

WEATHER DATA:

Wind Speed:	7-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	27-28 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Fifteen percent evaporates and over 5% disperses by day 5; water content reaches 8% by day 5.

Logistics Analysis: Spill requires 11 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Almar

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, and based on the limited information available for the spill, it passes Phase II as a successful ISB candidate.

APPENDIX C

Alvenus

GENERAL INFORMATION:

Spill Name:	Alvenus
Date:	7/30/84
Spill Time (local):	12:36
Spill Size (bbls):	65,000
Oil Type:	Venezuelan Merey and Pilon crude

LOCATION:

City/State/ Country:	11 nm S-SE of Cameron, LA
Water Body:	Gulf of Mexico
Latitude:	29 35 N
Longitude:	093 15 W

WEATHER DATA:

Wind Speed:	7-10 m/sec (day 1)
Wind Direction:	E (day 1)
Water Temperature:	27 °C (day 1)
Air Temperature:	2.84 °C (day 1)

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Fourteen percent evaporates and 3% disperses by day 5; water content reaches 7% by day 5.

Logistics Analysis: Spill requires 13 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Alvenus

OCCURENCE SCENARIO:

At 12:36 p.m. on July 30, 1984, the United Kingdom tank vessel Alvenus grounded with catastrophic structural failure in the Calcasieu River Bar Channel about 11 nautical miles south-southeast of Cameron, Louisiana. Between July 30 and August 4, 1984, the Alvenus discharged approximately 65,000 barrels of viscous Venzuelan Merey and Pilon crude oil into international waters of the Gulf of Mexico. The grounding was later attributed to a combination of vessel squat and isolated channel shoaling. Attempts to contain and recover the oil at sea were rendered ineffective by rough seas and the magnitude of the spill. The Coast Guard and cleanup crews encountered a major problem when a large portion of the slick approached the shoreline, absorbed suspended solid particles, and sank in the nearshore surf zones at Galveston Island. Cleanup crews had to wait until the oil beached itself, a process that took several weeks.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Marginal Call**

The spill passes Phase I, but it occurred within 11 miles of shore. The response was hampered by rough weather and winds up to 10 m/s. Some of the spilled oil sank. For these reasons, in Phase II the spill is a marginal call as an ISB candidate.

APPENDIX C

Amazon Venture

GENERAL INFORMATION:

Spill Name:	Amazon Venture
Date:	12/4/86
Spill Time (local):	23:30
Spill Size (bbls):	11,900
Oil Type:	No. 6 fuel

LOCATION:

City/State/ Country:	Savannah, Savannah River, GA
Water Body:	Savannah River
Latitude:	32 04 N
Longitude:	81 50 W

WEATHER DATA:

Wind Speed:	5-10 m/sec (day 1)
Wind Direction:	N (day 1)
Water Temperature:	19 °C (day 1)
Air Temperature:	8 °C (day 1)

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Less than 10% of the oil disperses within 5 days; less than 5% of the oil evaporates; water content reaches 35% on day 1 and remains so through day 5.
Logistics Analysis:	Spill requires a 19 hour response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	Towns with population greater than 10,000 are within 3 to 5 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Amazon Venture

OCCURENCE SCENARIO:

The USCG received a report on December 4, 1986 at 11:30 p.m. of an oil spill of unknown origin at the Garden City (near Savannah), Georgia container berths on the Savannah River. The response began with the deployment of containment booms before the source of the oil was certain. At first light the Amazon Venture was boarded and inspected and it was determined that the source of the spill were three malfunctioning valves in the ballast and cargo discharge piping of the vessel. The amount of oil spilled was inititally estimated to be less than 50 barrels. On December 6 USCG personnel estimated that approximately 11,000 barrels of oil were in the water, and the final estimate was reached four days later when it was determined that 12,000 barrels of the cargo were misisng. During the first two days of the spills, much of the floating oil remained beneath the eighteen acres of docks and wharf at the river's edge. Northeast winds the first fews days of the spill resulted in heavy oiling of the Georgia coast. The wind then shifted and, with the help of tidal influences, transported the oil from beneath the docks toward the Savannah National Wildlife Refuge. Approximately 25 miles of the Savannah River and its tributaries were affected by the spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Aminona

GENERAL INFORMATION:

Spill Name:	Aminona
Date:	5/26/78
Spill Time (local):	
Spill Size (bbls):	146,600
Oil Type:	No. 2 fuel oil

LOCATION:

City/State/ Country:	Atlantic Ocean, Banco do Meio, Brazil
Water Body:	Atlantic Ocean
Latitude:	02 18 S
Longitude:	044 13 W

WEATHER DATA:

Wind Speed:	5-6 m/sec (day 1)
Wind Direction:	
Water Temperature:	27 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS used to model; dispersion and evaporation totals 100% after 18 hours; ADIOS predicts that the product will not emulsify.

Logistics Analysis: Spill requires 34 hour response time; window of opportunity is 18 hours.

Populated Area Analysis: Ten miles off San Joaode Cortes.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Aminona

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Amoco Cadiz

GENERAL INFORMATION:

Spill Name:	Amoco Cadiz
Date:	3/16/78
Spill Time (local):	
Spill Size (bbls):	1,634,952
Oil Type:	Light Arabian crude, Iranian light crude, Bunker C

LOCATION:

City/State/ Country:	Brittany, France
Water Body:	Gulf of Mexico
Latitude:	48 35 N
Longitude:	004 43 W

WEATHER DATA:

Wind Speed:	11 m/sec (day 1) 10-11 m/sec (day 2) 10-11 m/sec (day 3) 10-11 m/sec (day 4) 10-11 m/sec (day 5)
Wind Direction:	
Water Temperature:	8-9 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Fail
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Less than 20% disperses by day 1, exceeding 50% by day 5; 20% evaporates within 6 hours, reaching 30% by day 5; water content reaches and remains around 78% within 3 hours.

Logistics Analysis: Spill requires 9 hour response time; window of opportunity is 2 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Amoco Cadiz

OCCURENCE SCENARIO:

The tank vessel ran aground on Portsall Rocks, three miles off the coast of Brittany. The entire cargo was spilled, and northwesterly winds drove the oil into the coastline. The isolated location of the grounding and rough seas restricted cleanup efforts for two weeks following the incident. Severe weather resulted in the complete breakup of the ship before any oil could be pumped out of the wreck. In most areas, boom was largely ineffective because of strong currents and enormous quantities of oil. The nature of the oil and rough seas contributed to the rapid formation of a "chocolate mousse" emulsification of oil and water.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Amoco Oil Co.

GENERAL INFORMATION:

Spill Name:	Amoco Oil Co.
Date:	2/7/88
Spill Time (local):	
Spill Size (bbls):	15,576
Oil Type:	South Louisiana light crude

LOCATION:

City/State/ Country:	Galveston, Gulf of Mexico, TX
Water Body:	Gulf of Mexico
Latitude:	29 41 N
Longitude:	94 80 W

WEATHER DATA:

Wind Speed:	10 m/sec (day 1)
Wind Direction:	
Water Temperature:	16 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Approximately 30% of oil evaporates by day 5; 37% disperses by day 5; water content reaches 75% within 5 hours.
Logistics Analysis:	Spill requires 4 hour response time; window of opportunity is 5 hours.
Populated Area Analysis:	33.47 nm from shore.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Amoco Oil Co.

OCCURENCE SCENARIO:

On February 7, 1988, an Amoco Oil Co. pipeline began spilling South Louisiana light crude oil. An anchor that was dragging at the platform was identified as the cause of the spill. No dispersants were deployed.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Andros Patria

GENERAL INFORMATION:

Spill Name:	Andros Patria
Date:	12/31/78
Spill Time (local):	
Spill Size (bbls):	347,619
Oil Type:	Iranian heavy crude

LOCATION:

City/State/ Country:	Off Cape Villano, Spain
Water Body:	Atlantic Ocean
Latitude:	43 31 N
Longitude:	009 37 W

WEATHER DATA:

Wind Speed:	11 m/sec (day 1) 11 m/sec (day 2) 11 m/sec (day 3) 11 m/sec (day 4) 11 m/sec (day 5)
Wind Direction:	
Water Temperature:	13 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Fail
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Thirty-five percent evaporates and 35% disperses by day 5; water content reaches 70% by the 12th hour and remains so through day 5.
Logistics Analysis:	Spill requires 25 hour response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Andros Patria

OCCURENCE SCENARIO:

The tank vessel Andros Patria ran into bad weather conditions. The vessel experienced a ruptured hull, leakage, and explosion. Slight pollution was reported.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Apex Houston

GENERAL INFORMATION:

Spill Name:	Apex Houston
Date:	3/19/81
Spill Time (local):	19:00
Spill Size (bbls):	25,042
Oil Type:	No. 6 fuel

LOCATION:

City/State/ Country:	Lower Mississippi River (Mile 13), Nr. Pilottown,
Water Body:	Mississippi River
Latitude:	29 07 N
Longitude:	89 20 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	NW (day 1)
Water Temperature:	21 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Less than 5% disperses or evaporates by day 5; water content less than 20% within 6 hours, approaching 35% by day 1 and leveling at 35% on day 2.
Logistics Analysis:	Spill requires 8 hours response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	Pilottown within 5 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Apex Houston

OCCURENCE SCENARIO:

The barge Apex Houston experienced a collusion and structural hull rupture. Weather conditions were fair. Dispersants were not deployed.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Apex Oil Co.

GENERAL INFORMATION:

Spill Name:	Apex Oil Co.
Date:	7/28/90
Spill Time (local):	14:30
Spill Size (bbls):	16,476
Oil Type:	No. 5 oil, Catalytic feedstock oil

LOCATION:

City/State/ Country:	Houston Shipping Channel, Galveston Bay, TX
Water Body:	Galveston Bay
Latitude:	29 29 N
Longitude:	094 52 W

WEATHER DATA:

Wind Speed:	3 m/sec (day 1)
Wind Direction:	N (day 1)
Water Temperature:	28 °C (day 1)
Air Temperature:	29 °C (day 1)

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS predicts no dispersion in 5 days; 38% evaporation by day 4; insufficient distillation data to determine water-in-oil content.

Logistics Analysis: Spill requires 6 hours response time; window of opportunity is greater than 4 days.

Populated Area Analysis: Within 3 miles of Baytown and Strang.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Apex Oil Co.

OCCURENCE SCENARIO:

On July 28, 1990 the vessel Shinoussa collided with the tank barges Apex 3417 and Apex 3503 in the Houston Ship Channel in Galveston Bay, Texas. Cargo tanks on both barges were damaged, spilling nearly 17,000 barrels of No. 5 oil into the Bay. The Apex 3417 sank with its stern resting on the bottom, releasing all of its cargo over two days. Apex 3503 released only 1,130 barrels into the water. By late afternoon on July 28, a sheen to the south of Apex 3417 was three miles long. Oil landed on the eastern shoreline of Red Fish Island on July 29, with heavy accumulation along the mile long shoreline. By the morning of August 3, oil had reached the northern shoreline of Galveston Bay.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Aragon

GENERAL INFORMATION:

Spill Name:	Aragon
Date:	12/29/89
Spill Time (local):	
Spill Size (bbls):	175,000
Oil Type:	Mexican Maya crude oil (Type 3)

LOCATION:

City/State/ Country:	NE of Madeira, Portugal
Water Body:	Atlantic Ocean
Latitude:	33 34 N
Longitude:	015 34 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	18-19 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Evaporation reaches 23% and dispersion reaches 5% after five days; water content reaches 45% after 9 hours, increasing to 47% after 12 hours and remaining constant through day 5.

Logistics Analysis: Spill requires 43 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Aragon

OCCURENCE SCENARIO:

The tank vessel suffered damage during a storm approximately 360 miles off the coast of Morocco. Following the initial reporting and tracking, the oil was lost and was believed to have moved below the surface. Approximately three weeks after the spill, oil impacted the island of Porto Santo. There was no response at sea because conditions were too rough to use removal equipment.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

Although the spill passes the Phase I evaluation, the oil weathering analysis suggests that the water content was relatively high, reaching 47% after 12 hours, and the logistics analysis indicates a long response time of 43 hours. The wind speed at the time of the spill was 6-7 m/s, low enough to pass Phase I, but descriptions of the incident say that rough seas precluded an at-sea response. Furthermore, the oil apparently sank below the surface soon after the initial spill. When these circumstances are considered in the Phase II analysis, the spill fails as an ISB candidate.

APPENDIX C

Argo Merchant

GENERAL INFORMATION:

Spill Name:	Argo Merchant
Date:	12/15/76
Spill Time (local):	6:00
Spill Size (bbls):	183,330
Oil Type:	No. 6 fuel oil, Cutter stock

LOCATION:

City/State/ Country:	Nantucket, MA
Water Body:	Atlantic Ocean
Latitude:	41 02 N
Longitude:	069 27 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	
Water Temperature:	10 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 15% disperses by day 5; less than 3% evaporates by day 5; approximately 25% water content by day 1, remaining around 25% for at least 5 days.

Logistics Analysis: Spill requires 24 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Argo Merchant

OCCURENCE SCENARIO:

On December 15, 1976, the tank vessel went aground on Nantucket Shoals, 29 nautical miles southeast of Nantucket Island, MA, in high winds and 10-foot seas. On December 21, the vessel broke in two and on December 22, the bow section capsized. Prevailing currents carried the oil away from the shorelines and beaches of Nantucket. In-situ burning was attempted on two occasions. At one location on December 27, the flame failed to spread, and at another location on December 31, attempts to ignite the slick failed to sustain a burn.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Marginal Call

The spill passes Phase I. Although the grounding occurred and the spill began on December 15, 1976, much of the oil was released the following week as the vessel broke in two and the bow section capsized. High winds and rough seas characterized most of the month, with a few periods when the weather would permit response actions. ISB was first attempted on December 27, but was unsuccessful. Nevertheless, if ISB could have been tried sooner using current technology, the outcome may have been different, because our oil weathering analysis indicates a relatively low water content in the spilled oil. In Phase II, the spill is a marginal call as an ISB candidate.

APPENDIX C

Arkas

GENERAL INFORMATION:

Spill Name:	Arkas
Date:	3/31/82
Spill Time (local):	
Spill Size (bbls):	35,000
Oil Type:	Louisiana light sweet crude

LOCATION:

City/State/ Country:	Lower Mississippi River (Mile 130), Montz, LA
Water Body:	Mississippi River
Latitude:	30 00 N
Longitude:	090 28 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	19 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Evaporation reaches 40% and dispersion reaches 7% after 5 days; water content reaches 50% in 3 hours and 75% in nine hours.
Logistics Analysis:	Spill requires 6 hour response time; window of opportunity is 9 hours.
Populated Area Analysis:	Towns of Lucy, Edgard, and Lions are within 5 to 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Arkas

OCCURENCE SCENARIO:

The tanker Arkas experienced a collision in the lower Mississippi River near mile marker 130. The tank ruptured and caught on fire.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: N/A

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Arrow

GENERAL INFORMATION:

Spill Name:	Arrow
Date:	2/4/70
Spill Time (local):	9:35
Spill Size (bbls):	77,000
Oil Type:	Bunker C (No. 6 fuel) oil

LOCATION:

City/State/ Country:	Nova Scotia, Canada
Water Body:	Atlantic Ocean
Latitude:	45 28 N
Longitude:	061 06 W

WEATHER DATA:

Wind Speed:	10 m/sec (day 1)
Wind Direction:	
Water Temperature:	0-2 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis:	Less than 10% disperses by day 2, exceeding 20% by day 5; less than 3% evaporates by day 5; water content approximately 10% within 6 hours reaching and remaining around 18% by day 1.
Logistics Analysis:	Spill requires 21 hour response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	No populated area within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Arrow

OCCURENCE SCENARIO:

The steam tanker Arrow ran hard aground on Cerberus Rock in Chedabucto Bay off the coast of Nova Scotia, Canada. The vessel broke in two pieces eight days later. There were low temperatures and high winds and seas at the time of the spill. Oil moved under the influence of tides and currents and impacted the shoreline generally between the mid and high tide line. In-situ burning experiments were conducted on two-inch thick patches of oil that had been exposed to water for more than two weeks. In two separate sites, peat moss was used as a wick and fuel was used to start the fire burning. The results of both tests were negative because of the amount of weathering that had already taken place. Pumping operations to remove remaining cargo began three weeks after the spill and were hindered by extremely adverse weather conditions, including snow, ice, high seas, and gale-force winds.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Marginal Call

The spill, which passes the Phase I analysis, did not occur within six miles of a city, but it was close to the Nova Scotia shore in Chedabucto Bay. Although there were periods of time when the weather conditions may have allowed ISB, high winds and seas occurred for much of the time, including at the time of the spill and during removal of the remaining cargo. Wave action helped to disperse the large oil slicks. ISB was attempted on patches of oil that had weathered for two weeks, but the results were negative. For the Phase II, given that the logistics analysis shows that ISB could have been attempted sooner, the spill is a marginal call as an ISB candidate.

APPENDIX C

Ashland Petroleum Co.

GENERAL INFORMATION:

Spill Name:	Ashland Petroleum Co.
Date:	1/2/88
Spill Time (local):	
Spill Size (bbls):	70,523
Oil Type:	No. 2 diesel

LOCATION:

City/State/ Country:	Floreffe, PA
Water Body:	Monongahela River
Latitude:	40 33 N
Longitude:	080 00 W

WEATHER DATA:

Wind Speed:	9-10 m/sec (day 1)
Wind Direction:	
Water Temperature:	8-9 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Almost 95% disperses after 6 hours; 5% evaporates after 6 hours; water content is 15% after 6 hours.
Logistics Analysis:	Spill requires 9 hour response time; window of opportunity is 6 hours.
Populated Area Analysis:	Towns of Highland, Bryant, and Alisonpark are within 3 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Ashland Petroleum Co.

OCCURENCE SCENARIO:

A storage tank collapsed in Floreffe, PA, and spilled oil into the Monongahela River, 27 miles south of Pittsburgh. The Coast Guard deployed booms at seven sites along the river near Pittsburgh. Skimmers and sorbents were used in other areas along the river. The effort to recover oil was hindered by emulsification and dispersion of the oil, and by ice cover on the Monongahela and Ohio Rivers. Efforts along the Ohio River additionally were hindered by the presence of dams and locks. The Monongahela was temporarily closed to vessel traffic, rail and motor vehicle traffic was halted along some routes near the river because of concerns about human health and fire hazards, and water service was interrupted.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Athenian Star

GENERAL INFORMATION:

Spill Name:	Athenian Star
Date:	1/20/75
Spill Time (local):	
Spill Size (bbls):	17,000
Oil Type:	Arab medium crude

LOCATION:

City/State/ Country:	Off of New Hampshire
Water Body:	Mid-Atlantic Ocean
Latitude:	43 00 N
Longitude:	59 30 W

WEATHER DATA:

Wind Speed:	9 m/sec (day 1)
Wind Direction:	W-SW (day 1)
Water Temperature:	4 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Close to 30% evaporates and 25% disperses by day 5; water content reaches 50% within 4 hours and reaches 70% within 12 hours.
Logistics Analysis:	Spill requires 53 hour response time; window of opportunity is 12 hours.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Athenian Star

OCCURENCE SCENARIO:

The Athenian Star came across bad weather while in open water. The tanker began leaking oil. No dispersants were deployed.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Athenian Venture

GENERAL INFORMATION:

Spill Name:	Athenian Venture
Date:	4/22/88
Spill Time (local):	
Spill Size (bbls):	252,429
Oil Type:	Unleaded gasoline, Bunker

LOCATION:

City/State/ Country:	350-400 Mi. SE of Cape Race, Newfo., Canada
Water Body:	Atlantic Ocean
Latitude:	42 30 N
Longitude:	49 30 W

WEATHER DATA:

Wind Speed:	7-9 m/sec (day 1)
Wind Direction:	
Water Temperature:	10 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	ADIOS used to model; dispersion and evaporation total approximately 100% in 48 hours; model predicts no emulsification.
Logistics Analysis:	Spill requires 85 hour response time; window of opportunity is 2 days.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Athenian Venture

OCCURENCE SCENARIO:

The tanker apparently experienced an explosion, broke in two, and caught on fire 400 miles southeast of Cape Race, Newfoundland. Weather conditions were good, but most of the cargo of gasoline burned in the extensive fires or was lost to evaporation. No countermeasures were taken.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Atlantic Empress

GENERAL INFORMATION:

Spill Name:	Atlantic Empress
Date:	8/2/79
Spill Time (local):	19:00
Spill Size (bbls):	987,714
Oil Type:	Arabian medium crude

LOCATION:

City/State/ Country:	450 km East of Barbados
Water Body:	Atlantic Ocean
Latitude:	13 05 N
Longitude:	55 28 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	28 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Evaporation reaches 35% and dispersion reaches 7% at day 5; water content reaches 50% after 24 hours and levels off at 60% after two days.

Logistics Analysis: Spill requires 48 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Atlantic Empress

OCCURENCE SCENARIO:

The Atlantic Empress collided with the Aegean Captain at 7 PM on July 19, 1979, in the Caribbean Sea 20 miles northeast of Tobago. Both vessels were fully loaded and both vessels caught fire. The Atlantic Empress, which had been carrying 276,000 tons of light crude oil, was drifting and on fire, surrounded by a large oil slick. On July 21, the first overflight was made of the scene of the collision. The entire starboard side of the Atlantic Empress was on fire. The oil slick from this vessel covered an area of two by 15 miles, and was approximately 10 miles from the north coast of Tobago. Winds were 15 to 20 knots from the northeast. The vessel was towed for several days to the north, away from Tobago. After attempts were made to extinguish the fire on July 29, the vessel exploded. Oil on the vessel and in the water burned as the fires continued. The vessel continued to burn until August 2, when firefighting efforts ceased and the vessel sank, approximately 350 miles east-northeast of Trinidad. The slick which remained after the sinking was thin and disappeared by August 9.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, but in this incident the vessel and spilled oil burned for several days until the vessel sank. Thus, in Phase II, the spill is a successful ISB candidate.

APPENDIX C

B-421/Barge 13

GENERAL INFORMATION:

Spill Name:	B-421/Barge 13
Date:	3/5/75
Spill Time (local):	
Spill Size (bbls):	24,715
Oil Type:	East Texas crude

LOCATION:

City/State/ Country:	Lower Mississippi River (Mile 435.8), MS
Water Body:	Mississippi River
Latitude:	31 40 N
Longitude:	091 25 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	
Water Temperature:	21 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Close to 45% evaporates and 15% disperses by day 5; water content reaches 50% after half an hour and 80% within 3 hours.
Logistics Analysis:	Spill requires 13 hour response time; window of opportunity is three hours.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

B-421/Barge 13

OCCURENCE SCENARIO:

On March 15, 1975, USA barges B-421/Barge 24 experienced a collision. A structural hull rupture followed and East Texas crude oil was spilled in the lower Mississippi River.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Barge

GENERAL INFORMATION:

Spill Name:	Barge
Date:	1/24/84
Spill Time (local):	
Spill Size (bbls):	26,119
Oil Type:	No. 6 fuel

LOCATION:

City/State/ Country:	Lower Mississippi River (Mile 694.5), AR
Water Body:	Mississippi River
Latitude:	33 40 N
Longitude:	091 10 W

WEATHER DATA:

Wind Speed:	8-9 m/sec (day 1)
Wind Direction:	
Water Temperature:	21 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 5% evaporation and 8% dispersion by day 5; water content reaches 35% by day 2 and remains constant through day 5.

Logistics Analysis: Spill requires 14 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Barge

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes the Phase I analysis, and although it did not occur within 6 miles of a city, it was an inland spill of heavy fuel oil on the Cape Fear River in NC. Based on the limited amount of information available for the spill, in Phase II it fails as an ISB candidate.

APPENDIX C

Barge No. 15

GENERAL INFORMATION:

Spill Name:	Barge No. 15
Date:	8/1/74
Spill Time (local):	
Spill Size (bbls):	46,454
Oil Type:	Unknown

LOCATION:

City/State/ Country:	Mississippi River (Mile 16), LA
Water Body:	Mississippi River
Latitude:	29 30 N
Longitude:	90 15 W

WEATHER DATA:

Wind Speed:	5-6 m/sec (day 1)
Wind Direction:	
Water Temperature:	29 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: N/A

Oil Weathering Analysis: Not enough information available on oil type to analyze this spill.

Logistics Analysis: Not enough information available on oil type to analyze this spill.

Populated Area Analysis: Towns of Bohemia, Happy Jack, and Potash Port are within 5 to 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Barge No. 15

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available on oil type to analyze this spill.

APPENDIX C

Bay of Campeche Tanker

GENERAL INFORMATION:

Spill Name:	Bay of Campeche Tanker
Date:	3/7/96
Spill Time (local):	
Spill Size (bbls):	250,000
Oil Type:	Bunker C

LOCATION:

City/State/ Country:	Bay of Campeche, Mexico
Water Body:	Bay of Campeche
Latitude:	21 00 N
Longitude:	97 20 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	25 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Three percent evaporates and 5% disperses by day 5; water content reaches 40% by day 3, remaining constant through day 5.

Logistics Analysis: Spill requires 23 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: Within 3 miles of populated area.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Bay of Campeche Tanker

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Bayou Lafousche

GENERAL INFORMATION:

Spill Name:	Bayou Lafousche
Date:	3/9/73
Spill Time (local):	
Spill Size (bbls):	10,000
Oil Type:	Louisiana crude, Bunker C

LOCATION:

City/State/ Country:	Upper Galveston Bay, TX
Water Body:	Galveston Bay
Latitude:	29 38 N
Longitude:	094 58 W

WEATHER DATA:

Wind Speed:	18 m/sec (day 1)
Wind Direction:	
Water Temperature:	17 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Fifty percent disperses within 12 hours; greater than 30% evaporates within 12 hours; no oil remains on water surface by end of day 2; water content exceeds 75% within 2 hrs.
Logistics Analysis:	Spill requires 4 hours response time; window of opportunity is 1.5 hours.
Populated Area Analysis:	Baytown is within 5 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Bayou Lafousche

OCCURENCE SCENARIO:

The tank vessel T/V Mayo Lykes collided with the Bayou Lafousche/Barge PC 2901 and oil from the barge spilled into Upper Galveston Bay, Texas. Weather conditions were extremely adverse. Extensive fog, winds of 30 to 35 knots with 40 knot gusts, and seas of three to four feet hampered early containment attempts, by causing poor visibility, reduced vessel maneuverability, and safety hazards to responders. Prevailing southeasterly winds rapidly carried oil to beaches.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Bellingham Bay

GENERAL INFORMATION:

Spill Name:	Bellingham Bay
Date:	1/10/73
Spill Time (local):	20:00
Spill Size (bbls):	10,476
Oil Type:	Alaskan North Slope

LOCATION:

City/State/ Country:	Bellingham Bay, WA
Water Body:	Bellingham Bay
Latitude:	48 45 N
Longitude:	122 30 W

WEATHER DATA:

Wind Speed:	10-11 m/sec (day 1) 10-11 m/sec (day 2) 10-11 m/sec (day 3) 10-11 m/sec (day 4) 10-11 m/sec (day 5)
Wind Direction:	
Water Temperature:	8-9 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Fail
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Twenty-five percent evaporates and 50% disperses by day 5; water content reaches 50% within 12 hours and 70% within 5 days.

Logistics Analysis: Spill requires a seven hour response time; window of opportunity is greater than five days.

Populated Area Analysis: Within 3 miles of Bellingham.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Bellingham Bay

OCCURENCE SCENARIO:

On January 10, 1973, a naval vessel spilled crude oil in Bellingham Bay. No further information available regarding this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Bouchard 65

GENERAL INFORMATION:

Spill Name:	Bouchard 65
Date:	10/9/74
Spill Time (local):	
Spill Size (bbls):	36,650
Oil Type:	Fuel

LOCATION:

City/State/ Country:	Atlantic Ocean, MA
Water Body:	Atlantic Ocean
Latitude:	42 30 N
Longitude:	69 30 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	17 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Evaporation reaches 22% in 6 hours; 75% disperses within 6 hours; water content reaches 15% in 6 hours and levels off at 18% within 12 hours.
Logistics Analysis:	Spill requires 23 hour response time; window of opportunity is 10 hours.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Bouchard 65

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Braer

GENERAL INFORMATION:

Spill Name:	Braer
Date:	1/5/93
Spill Time (local):	
Spill Size (bbls):	595,238
Oil Type:	Norwegian (Gullfaks) Crude

LOCATION:

City/State/ Country:	Garth Ness, Shetland Islands, U.K.
Water Body:	Atlantic Ocean
Latitude:	59 00 N
Longitude:	001 30 W

WEATHER DATA:

Wind Speed:	14-15 m/sec (day 1) 14-15 m/sec (day 2) 14-15 m/sec (day 3) 14-15 m/sec (day 4) 15 m/sec (day 5)
Wind Direction:	
Water Temperature:	8 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Fail
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Evaporation is just under 30% and dispersion reaches 70% on day 2; water content reaches 50% in one quarter hour and 80% in two hours.
Logistics Analysis:	Spill requires 14 hour response time; window of opportunity is two hours.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Braer

OCCURENCE SCENARIO:

On January 5, 1989, the Liberian tanker Braer lost power in gale-force winds and drifted aground at Garths Ness, a rocky headland near the southern part of the Shetland Islands. The Braer was en route from Mongstad, Norway to the St. Romuald refinery near Quebec City, Quebec. The Braer ruptured its hull. Severe weather and heavy seas played a major role in the cause of the spill. As of January 8, powerful winds and heavy seas continued to buffet the tanker. The tanker lost all of its cargo over a course of eight days. Because of the lightness of the crude and the severe weather, the bulk of the oil dispersed naturally and very little came ashore. Aerial spraying of dispersants on the oil took place for three days.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Brazilian Marina

GENERAL INFORMATION:

Spill Name:	Brazilian Marina
Date:	1/9/78
Spill Time (local):	
Spill Size (bbls):	73,600
Oil Type:	Kuwait, Mina-al-Ahmadi crude (31.4 API gravity)

LOCATION:

City/State/ Country:	San Sebastiao, Brazil
Water Body:	Sao Sebastiao Channel
Latitude:	23 48 S
Longitude:	045 43 W

WEATHER DATA:

Wind Speed:	2-3 m/sec (day 1)
Wind Direction:	NE (day 1)
Water Temperature:	25 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Thirty percent evaporates after five days; 1% disperses after 5 days; water content reaches 50% on day 2 and 60% on day 5.

Logistics Analysis: Spill requires 41 hours response time, window of opportunity is greater than five days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Brazilian Marina

OCCURENCE SCENARIO:

In January 9, 1978, the tanker Brazilian Marina, while under tow, struck rock in Sao Sebastiao Channel, Sao Paulo, Brazil. Prevailing winds and currents carried the oil to the northeast, polluting the coasts in the states of Sao Paulo and Rio de Janeiro. The tanker grounded in the Sao Sebastiao Channel, Sao Paulo, Brazil. About one-fourth of the spilled oil impacted the shoreline, and the remainder drifted out to sea. Dispersants were initially used on some tourist beaches, but application was stopped because of negative ecological effects.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Marginal Call

The spill passes Phase I, and although it did not occur within six miles of a city, it was close to the coastline of Brazil. Water content of the spilled oil was relatively high, reaching 50 percent by day 2 and 60 percent by day 5. In Phase II, the spill is a marginal call as an ISB candidate.

APPENDIX C

BU 42

GENERAL INFORMATION:

Spill Name:	BU 42
Date:	6/29/82
Spill Time (local):	
Spill Size (bbls):	28,144
Oil Type:	No. 6 fuel

LOCATION:

City/State/ Country:	Arkansas River (Mile 66), Nr. Pine Bluff, Arkansas
Water Body:	Arkansas River
Latitude:	34 20 N
Longitude:	092 00 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	25-26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Three percent evaporates and 4% disperses by day 5; water content reaches 40% by day 5.
Logistics Analysis:	Spill requires 16 hour response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	3-5 miles to Pine Bluff, population greater than 25,000.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

BU 42

OCCURENCE SCENARIO:

The accumulated oil was mixed with a tremendous amount of debris carried downstream by the high water. The first set of booms in the remote canal didn't stay in place. The locks and dams already in place provided a means of containment; however, because of the high river flow, gates on the dam had to remain open and containment was less effective than it would have been under summertime conditions.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Burmah Agate

GENERAL INFORMATION:

Spill Name:	Burmah Agate
Date:	11/1/79
Spill Time (local):	10:00
Spill Size (bbls):	254,761
Oil Type:	Forcados crude

LOCATION:

City/State/ Country:	Galveston Bay, TX
Water Body:	Galveston Bay
Latitude:	29 17 N
Longitude:	094 27 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	22 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Less than 10% disperses by day 1 and greater than 20% by day 5; 15% evaporates within 6 hours exceeding 20% by hour 12, but only reaching 30% by day 5; water content exceeds 60% within 6 hours and exceeds 75% within 9 hours.

Logistics Analysis: Spill requires 6 hour response time; window of opportunity is 9 hours.

Populated Area Analysis: Within 6 miles of Galveston.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Burmah Agate

OCCURENCE SCENARIO:

The Liberian motor tanker Burmah Agate, en route from the Bahamas to Houston, collided with the Liberian motor bulk carrier Mimosa while anchored about four miles off the entrance of Galveston Bay. Explosions resulted and fire erupted in both tankers; the Burmah Agate continued to burn out of control for over two months. Early recovery efforts were hampered by weather and burning slicks which destroyed booms too close to the ship.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: N/A

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Cabo Tamar

GENERAL INFORMATION:

Spill Name:	Cabo Tamar
Date:	7/7/78
Spill Time (local):	
Spill Size (bbls):	50,833
Oil Type:	Oriente crude

LOCATION:

City/State/ Country:	Talcahuano, Chile
Water Body:	Pacific Ocean
Latitude:	36 40 S
Longitude:	073 10 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	
Water Temperature:	17 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Thirty percent evaporates and 22% disperses within 5 days; water content reaches 50% within 3 hours and 75% within 6 hours.
Logistics Analysis:	Spill requires 47 hour response time; window of opportunity is less than 6 hours.
Populated Area Analysis:	Within 5 to 10 miles of Talcohuano (population above 250,000). (direction)

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Cabo Tamar

OCCURENCE SCENARIO:

On July 7, 1978 the Chilean motor tanker, Cabo Tamar, was en route from Balao Terminal, Ecuador to San Vicente, Chile when it ran aground in San Vicente Bay, near Talcahuano. The Cabo Tamar was successfully refloated on July 29 and then anchored in a more sheltered position to complete the discharge.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Cape Fear River

GENERAL INFORMATION:

Spill Name:	Cape Fear River
Date:	11/21/84
Spill Time (local):	9:00
Spill Size (bbls):	17,000
Oil Type:	No. 6 fuel

LOCATION:

City/State/ Country:	Cape Fear River, NC
Water Body:	Cape Fear River
Latitude:	33 59 N
Longitude:	77 58 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	
Water Temperature:	22 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Three percent evaporated by day 5 and over 5% dispersed. Water content reached 35% by day 5.

Logistics Analysis: Spill requires a 15 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: 3-5 miles from Wilmington and Kure Beaches.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Cape Fear River

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Caribbean Sea

GENERAL INFORMATION:

Spill Name:	Caribbean Sea
Date:	5/27/77
Spill Time (local):	
Spill Size (bbls):	181,672
Oil Type:	Bachaquero

LOCATION:

City/State/ Country:	S. of El Salvador, Central America
Water Body:	Pacific Ocean
Latitude:	11 34 N
Longitude:	089 51 W

WEATHER DATA:

Wind Speed:	10-11 m/sec (day 1)
Wind Direction:	
Water Temperature:	25-26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Fifteen percent evaporates by day 5; about 20% disperses by day 5; water content reaches 7% by day 5.

Logistics Analysis: Spill requires 42 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Caribbean Sea

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, and based on the limited amount of information available for the spill, it passes Phase II as a successful ISB candidate.

APPENDIX C

Cavo Cambanos

GENERAL INFORMATION:

Spill Name:	Cavo Cambanos
Date:	3/29/81
Spill Time (local):	
Spill Size (bbls):	148,976
Oil Type:	Naptha

LOCATION:

City/State/ Country:	Tarragona Rds, Off Corsica
Water Body:	Mediterranean Sea
Latitude:	41 11 N
Longitude:	007 09 E

WEATHER DATA:

Wind Speed:	3 m/sec (day 1)
Wind Direction:	
Water Temperature:	14 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: ADIOS model used; evaporation reaches 65% in five days; dispersion reaches 9% in five days; no emulsification is predicted.

Logistics Analysis: Spill requires 32 hour response time; window of opportunity is 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Cavo Cambanos

OCCURENCE SCENARIO:

On March 29, 1981, while anchored in Tarragona Roads awaiting a berth to discharge her cargo of naptha that had been loaded at Sarroch, Sardinia, an explosion occurred in the engine-room of the Greek motor tanker Cavo Cambanos. The explosion was immediately followed by a fire that spread throughout the vessel. Tugs assisted in fire-fighting operations but, in view of the imminent danger of sinking, the tanker was towed 26 miles out to sea, where the fire was eventually extinguished. She turned turtle on April 4, remaining afloat with her bow out of the water. She drifted in the western Mediterranean for over three months before being deliberately sunk by a French Navy commando team using explosives under the hull.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, and based on the limited amount of information available for the spill, it passes Phase II as a successful ISB candidate.

APPENDIX C

Chem 102

GENERAL INFORMATION:

Spill Name:	Chem 102
Date:	2/26/84
Spill Time (local):	
Spill Size (bbls):	13,830
Oil Type:	Crude, Mineral seal

LOCATION:

City/State/ Country:	Lower Mississippi River (Mile 123), LA
Water Body:	Mississippi River
Latitude:	30 00 N
Longitude:	090 20 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	20 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **N/A**

Oil Weathering Analysis: Not enough information available on oil type to analyze this spill.

Logistics Analysis: Not enough information available on oil type to analyze this spill.

Populated Area Analysis: Within 3 miles of Metairie (population between 100,000-250,000).

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Chem 102

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available on oil type to analyze this spill.

APPENDIX C

Chevron Hawaii

GENERAL INFORMATION:

Spill Name:	Chevron Hawaii
Date:	9/1/79
Spill Time (local):	14:12
Spill Size (bbls):	20,000
Oil Type:	Santa Maria crude, Catalytic cracker feedstock

LOCATION:

City/State/ Country:	Deer Park, TX
Water Body:	Houston Ship Channel
Latitude:	29 42 N
Longitude:	095 08 W

WEATHER DATA:

Wind Speed:	17 m/sec (day 1)
Wind Direction:	
Water Temperature:	30 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Less than 6% disperses in 5 days; 23% evaporates within 6 hours, increasing slowly to greater than 40% by day 5; Adios model predicts water content exceeds 75% in one hour.

Logistics Analysis: Spill requires 4 hours response time; window of opportunity is 1 hour.

Populated Area Analysis: Within 3 miles of Pasadena and Houston.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Chevron Hawaii

OCCURENCE SCENARIO:

The tank vessel exploded, burned, and sank while discharging cargo at the Deer Park Shell Oil company terminal on the south side of the Houston, TX, ship channel. Lightning apparently ignited accumulated cargo vapors on the deck of the vessel. Weather during the incident was warm and windy with heavy downpours and lightning. The maximum reported wind gust for the day was 33 knots. Because the spill occurred over a holiday weekend, it was difficult to recruit companies with equipment specifically needed for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Chevron Main Pass Block 41

GENERAL INFORMATION:

Spill Name:	Chevron Main Pass Block 41
Date:	2/10/70
Spill Time (local):	
Spill Size (bbls):	65,000
Oil Type:	Crude oil (API 34)

LOCATION:

City/State/ Country:	Nr. Mississippi River Delta, LA
Water Body:	Gulf of Mexico
Latitude:	29 23 N
Longitude:	088 59 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	18 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Slightly more than 30% evaporates by day 5; less than 15% disperses; water content reaches 75% after 5 hours.
Logistics Analysis:	Spill requires a 15 hour response time; window of opportunity is 5 hours.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Chevron Main Pass Block 41

OCCURENCE SCENARIO:

The 41C platform caught on fire on February 10, 1970, and burned until March 10. By March 12, moderate slicks extended 15 miles to the southeast and northwest. Heavy weather on March 17 caused extensive damage to barges and booms, and most booms needed to be replaced. Skimmers and skimmer boats were unable to operate in the high seas generated by the weather. Oil and gas flowed from the well until March 31. It was estimated that of the oil spilled, 25 to 30 percent evaporated, 10 to 20 percent was recovered, and one percent dissolved.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Claude Conway

GENERAL INFORMATION:

Spill Name:	Claude Conway
Date:	3/20/77
Spill Time (local):	
Spill Size (bbls):	146,600
Oil Type:	Bunker C

LOCATION:

City/State/ Country:	150 m SE of Cape Fear
Water Body:	Atlantic Ocean
Latitude:	32 45 N
Longitude:	75 25 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	
Water Temperature:	8 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis:	Close to 5% evaporates and over 10% disperses by day 5; water content reaches 25% by day 5.
Logistics Analysis:	Spill requires 31 hour response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Claude Conway

OCCURENCE SCENARIO:

On March 20, 1977, while on a ballast passage from New York to Freeport, Bahamas, the Panamanian steam tanker Claude Conway broke in two after an explosion on board about 150 miles south-esat of Cape Fear. The two sections drifted apart. The bow section was sunk by Coast Guard gunfire on March 24 and the stern section was towed to New York, where it was subsequently scrapped.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, and based on the limited amount of information available for the spill, it passes Phase II as a successful ISB candidate.

APPENDIX C

Concho

GENERAL INFORMATION:

Spill Name:	Concho
Date:	1/19/81
Spill Time (local):	
Spill Size (bbls):	18,149
Oil Type:	No. 6 fuel oil

LOCATION:

City/State/ Country:	New York, NY
Water Body:	Kill Van Kull
Latitude:	40 35 N
Longitude:	074 01 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	
Water Temperature:	4 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Less than 3% disperses by day 5 and less than 3% evaporates; water content reaches 10% within 6 hours approaching 20% by day 1 and remaining around 20% through day 5.

Logistics Analysis: Spill requires 6 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: Forth Wadsworth and South Beach are within 3 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Concho

OCCURENCE SCENARIO:

The tank vessel grounded on the eastern end of Kill Van Kull, off the northeastern tip of Staten Island, NY. The bottom of the ship suffered damage. The vessel was deliberately grounded in Gravesend Bay off Brooklyn to prevent its sinking. Some shorelines and beaches were oiled. Ice in the water hindered containment, recovery, and lightering operations.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Conoco

GENERAL INFORMATION:

Spill Name:	Conoco
Date:	8/22/83
Spill Time (local):	
Spill Size (bbls):	15,000
Oil Type:	Heavy gasoil

LOCATION:

City/State/ Country:	Calcasieu River, LA
Water Body:	Calcasieu River
Latitude:	30 14 N
Longitude:	93 16 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	29-30 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Dispersion reaches 40% in 5 days; evaporation reaches 25% in 5 days; ADIOS predicts no emulsification.
Logistics Analysis:	Spill reqiures 9 hours response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	Towns of Moss Bluff and Ararat are within 3 miles. Also close to Lake Charles (population between 25,000 to 100,000).

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Conoco

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Corinthos

GENERAL INFORMATION:

Spill Name:	Corinthos
Date:	1/31/75
Spill Time (local):	0:30
Spill Size (bbls):	266,000
Oil Type:	Algerian crude oil

LOCATION:

City/State/ Country:	Delaware River, Marcus Hook, PA
Water Body:	Delaware River
Latitude:	39 49 N
Longitude:	075 25 W

WEATHER DATA:

Wind Speed:	3 m/sec (day 1)
Wind Direction:	
Water Temperature:	11 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Less than 3% disperses by day 5; less than 45% evaporates by day 5; approximately 40% water content after 6 hours, exceeding 75% by day 1.

Logistics Analysis: Spill requires 8 hour response time; window of opportunity is approximately 36 hours.

Populated Area Analysis: Within 3 miles of Marcus Hook and Linwood.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Corinthos

OCCURENCE SCENARIO:

The Corinthos was rammed by the Edgar M. Queeny at the British Petroleum terminal at Marcus Hook, PA, causing an explosion and fire. Burning crude covered a 10-mile stretch of the Delaware River. Pollution contractors were on scene within 77 minutes of notification and began booming creeks and wildlife areas. Heavy, asphalt-like material adhered to the shoreline along the river.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Dauntless Colocotronis

GENERAL INFORMATION:

Spill Name:	Dauntless Colocotronis
Date:	7/22/77
Spill Time (local):	
Spill Size (bbls):	15,000
Oil Type:	Arabian light crude

LOCATION:

City/State/ Country:	Mississippi River (Mile 89), Breton Sound, LA
Water Body:	Mississippi River
Latitude:	29 30 N
Longitude:	89 30 W

WEATHER DATA:

Wind Speed:	4 m/sec (day 1)
Wind Direction:	
Water Temperature:	29 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 3% disperses by day 5; 30% evaporates by day 1 increasing slightly to 35% by day 5; water content 70% within 6 hours, reaching 75% within 9 hours.

Logistics Analysis: Spill requires 5 hour response time; window of opportunity is 9 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Dauntless Colocotronis

OCCURENCE SCENARIO:

The vessel Dauntless Colocotronis collided with a sunken barge near a pier in Breton Sound, Louisiana, on July 22, 1977. The collision caused the release of 15,000 barrels of Arabian Light crude oil.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes Phase I, and although it did not occur within six miles of a city, it was an inland spill located 15 miles down the Mississippi River from New Orleans. A fire on the vessel burned for six hours. The water content of the spilled oil was high, reaching 70 percent within six hours and 75 percent within nine hours. In Phase II, the spill fails as an ISB candidate.

APPENDIX C

Ekofisk Bravo Oil Field

GENERAL INFORMATION:

Spill Name:	Ekofisk Bravo Oil Field
Date:	4/22/77
Spill Time (local):	
Spill Size (bbls):	202,381
Oil Type:	Ekofisk crude oil

LOCATION:

City/State/ Country:	Off Norway
Water Body:	North Sea
Latitude:	56 34 N
Longitude:	003 12 E

WEATHER DATA:

Wind Speed:	8.5 m/sec (day 1)
Wind Direction:	
Water Temperature:	8 °C (day 1)
Air Temperature:	23 °C (day 1)

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Approximately 43% of oil evaporates by day 5; approximately 30% disperses; water content reaches 75% in 3 hours.
Logistics Analysis:	Spill requires 40 hour response time; window of opportunity is 3 hours.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Ekofisk Bravo Oil Field

OCCURENCE SCENARIO:

Well B-14 on the Phillips Petroleum Company's "Bravo" production platform in the Norwegian Ekofisk field experienced an oil and natural gas blowout. This platform is 180 miles southwest of the Ekofisk oil field center. The oil escaped at a rate of 1,170 barrels per hour before the well was capped seven days later, but less oil entered the water because of rapid evaporation. The area of the platform was experiencing 4-6 foot seas and below average sea surface temperatures at the time of the blowout. No shorelines were oiled and wave action helped break up much of the oil. Boom would have been ineffective in the rough seas that are characteristic of the North Sea.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Eleni V

GENERAL INFORMATION:

Spill Name:	Eleni V
Date:	5/6/78
Spill Time (local):	
Spill Size (bbls):	52,500
Oil Type:	Heavy fuel oil

LOCATION:

City/State/ Country:	Off Norfolk, England
Water Body:	North Sea
Latitude:	52 49 N
Longitude:	001 48 E

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	9 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 5% disperses or evaporates by day 5; 36% water content at day and 45% water content by day 2, remaining around 45% through day 5.

Logistics Analysis: Spill requires 11 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Eleni V

OCCURENCE SCENARIO:

On the morning of May 6, 1978, the tanker Eleni V was cut in two in a collision with the vessel Roseline in foggy conditions off the southeast coast of England. The collision resulted in the release of 52,500 barrels of oil. The aft section of the vessel was towed from the collision site and the cargo was removed. The forward section of the vessel drifted for several days until it ran aground on a sandbank off the English coast with approximately 800 barrles of oil aboard. Attempts to salvage the vessel failed, and authorities decided to blow it up. Following the explosions, a large part of the remaining oil burned.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Marginal Call**

The spill passes Phase I, and ISB was used in the incident to remove some of the oil that had not spilled, after a section of the vessel had been towed several miles offshore. The water content of the spilled oil was relatively high, reaching 45 percent by day 2, and wind conditions ranged from calm to gale force during the response. In Phase II, the spilled oil is a marginal call as an ISB candidate.

APPENDIX C

Elias

GENERAL INFORMATION:

Spill Name:	Elias
Date:	4/9/74
Spill Time (local):	
Spill Size (bbls):	22,000
Oil Type:	Bachaquero heavy

LOCATION:

City/State/ Country:	Delaware River, Ft. Mifflin, Philadelphia, PA
Water Body:	Delaware River
Latitude:	40 00 N
Longitude:	075 00 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	9 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Close to 7% evaporates and 3% disperses by day 5; water content reaches 2% by day 5.

Logistics Analysis: Spill requires 8 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: Tacony and Palmyra are within 3 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Elias

OCCURENCE SCENARIO:

On April 9, 1974, while the Greek tanker Elias was discharging her cargo on the Delaware River at Fort Mifflin Marine Terminal, Philadelphia, a violent explosion occurred followed by a fire. The vessel was heavily damaged and sank to the river bottom.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Ercole

GENERAL INFORMATION:

Spill Name:	Ercole
Date:	10/22/74
Spill Time (local):	
Spill Size (bbls):	14,660
Oil Type:	East Texas crude

LOCATION:

City/State/ Country:	Mississippi River (Mile 174.2), LA
Water Body:	Mississippi River
Latitude:	30 10 N
Longitude:	091 15 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	25-26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Over 40% evaporates and 8% disperses by day 5; water content reaches 50% within an hour and 80% within 6 hours.
Logistics Analysis:	Spill requires 6 hour respone time; window of opportunity is 6 hours (1.5 x 6).
Populated Area Analysis:	Too close to Donaldsonville (with population above 25,000).

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Ercole

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: N/A

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Esso (Exxon) Puerto Rico

GENERAL INFORMATION:

Spill Name:	Esso (Exxon) Puerto Rico
Date:	9/3/88
Spill Time (local):	
Spill Size (bbls):	23,000
Oil Type:	Fuel oil No. 6

LOCATION:

City/State/ Country:	Mississippi River, Baton Rouge, New Orleans, LA
Water Body:	Mississippi River
Latitude:	29 55 N
Longitude:	090 15 W

WEATHER DATA:

Wind Speed:	5 m/sec (day 1)
Wind Direction:	
Water Temperature:	29 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Three percent evaporates and 3% disperses by day 5; water content reaches 45% by day 5.
Logistics Analysis:	Spill requires 6 hour resonse time; window of opportunity is greater than 5 days.
Populated Area Analysis:	Within 3 to 5 miles of Marrero (population between 25,000-100,000) and Bel Chasse.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Esso (Exxon) Puerto Rico

OCCURENCE SCENARIO:

The tank vessel struck an anchor at the Kenner Bend Anchorage (river mile 114), opening the No.1 starboard tank and releasing carbon black feedstock. This cargo is a very heavy liquid (API of 2.0 to -1.5, specific gravity of 1.1), also known as RFD Extract, Aromatic Concentrate, or Aromatic Tar. The oil appeared to be churned into tiny globules and droplets by actions of the vessel's propwash and dissipated with the river currents. Only small amounts of the original spill were ever detected.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Esso Brussels

GENERAL INFORMATION:

Spill Name:	Esso Brussels
Date:	6/2/73
Spill Time (local):	
Spill Size (bbls):	36,650
Oil Type:	Forcados crude

LOCATION:

City/State/ Country:	New York, NY
Water Body:	New York Harbor
Latitude:	40 40 N
Longitude:	75 50 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	16 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Close to 30% evaporates and over 10% disperses by day 5; water content reaches 80% by day 1.

Logistics Analysis: Spill requires 8 hour response time; window of opportunity is one day.

Populated Area Analysis: Within 3 miles radius of New York City.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Esso Brussels

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Ethel H (II)

GENERAL INFORMATION:

Spill Name:	Ethel H (II)
Date:	2/4/77
Spill Time (local):	
Spill Size (bbls):	10,000
Oil Type:	No. 6 fuel oil

LOCATION:

City/State/ Country:	West Point, NY
Water Body:	Hudson River
Latitude:	41 21 N
Longitude:	073 57 W

WEATHER DATA:

Wind Speed:	9 m/sec (day 1)
Wind Direction:	
Water Temperature:	4-5 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Less than 5% evaporates and 35% disperses after 5 days; water content nears 40% on day 1 and remains so through day 5.
Logistics Analysis:	Spill requires 8 hour resonse time; window of opportunity is greater than five days.
Populated Area Analysis:	Towns of Cornwall and Nelsonville are within 2 to 3 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Ethel H (II)

OCCURENCE SCENARIO:

On February 4, 1977, at approximately 19:00, the tank barge ran aground in the Hudson River near West Point, NY, while being towed by the tug McAllister Brothers. Because of darkness and heavy ice conditions, no oil was observed to be leaking at the time of the grounding. At 02:55 on February 5, leaking oil was reported, and on February 6, oil was observed two miles north and three miles south of the grounding area. Ice and cold weather created unusual problems for the response. The ice movement, magnified by tidal action, often stressed and broke boom. Skiffs and skimmers were unable to maneuver around the ice, and seven cleanup personnel fell into the water after slipping on ice.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Eugene Island 317

GENERAL INFORMATION:

Spill Name:	Eugene Island 317
Date:	4/17/74
Spill Time (local):	
Spill Size (bbls):	19,833
Oil Type:	South Louisiana crude

LOCATION:

City/State/ Country:	Gulf of Mexico, TX
Water Body:	Gulf of Mexico
Latitude:	28 16 N
Longitude:	91 35 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	
Water Temperature:	23 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Greater than 15% disperses by day 5; greater than 30% evaporates by day 5; water content exceeds 75% within 6 hours.

Logistics Analysis: Spill requires 27 hour response time; window of opportunity is less than 6 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Eugene Island 317

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Exxon Bayway Refinery

GENERAL INFORMATION:

Spill Name:	Exxon Bayway Refinery
Date:	1/2/90
Spill Time (local):	3:00
Spill Size (bbls):	13,500
Oil Type:	No. 2 home heating oil

LOCATION:

City/State/ Country:	New York, NY
Water Body:	Arthur Kill
Latitude:	40 38 N
Longitude:	074 14 W

WEATHER DATA:

Wind Speed:	7-9 m/sec (day 1)
Wind Direction:	NW (day 1)
Water Temperature:	3 °C (day 1)
Air Temperature:	0 °C (day 1)

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Evaporation reaches 90% after 6 hours, and dispersion reaches 10% after 6 hours; water content nears 20% after 9 hours and remains steady for 5 days.

Logistics Analysis: Six hour response time required; window of opportunity is 6 hours.

Populated Area Analysis: Cartaret is within 3 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Exxon Bayway Refinery

OCCURENCE SCENARIO:

On January 2, 1990, at 3:00 a.m., an Exxon underwater pipeline at the mouth of Mrose Creek discharged approximately 13,500 barrels of No. 2 heating oil into the Arthur Kill waterway between New Jersey and Staten Island, New York. The spill extended to ecologically sensititve Pralls Island, Shooters Island, and Fresh Kills. Tri-State Bird Rescue treated over 100 oiled birds, and cleanup crews found over 600 dead birds.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Exxon No. 32

GENERAL INFORMATION:

Spill Name:	Exxon No. 32
Date:	8/18/85
Spill Time (local):	
Spill Size (bbls):	30,000
Oil Type:	No. 2 fuel

LOCATION:

City/State/ Country:	Off Norfolk, VA
Water Body:	James River
Latitude:	37 06 N
Longitude:	076 38 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	27 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Thirty percent evaporates after 9 hours; over 70% disperses after 9 hours; water content close to 18% after 5 days.

Logistics Analysis: Spill requires six hour response time; window of opportunity is 9 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Exxon No. 32

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes Phase I, but it apparently occurred within 10 miles of major cities at the mouth of the James River in VA. Our weathering analysis shows that the spilled oil evaporates and disperses quickly. Based on the limited amount of information available for the spill, in Phase II it fails as an ISB candidate.

APPENDIX C

Exxon Pipeline

GENERAL INFORMATION:

Spill Name:	Exxon Pipeline
Date:	1/13/89
Spill Time (local):	
Spill Size (bbls):	14,000
Oil Type:	Grand Isle

LOCATION:

City/State/ Country:	Eugene Island Block, LA
Water Body:	Gulf of Mexico
Latitude:	29 02 N
Longitude:	091 27 W

WEATHER DATA:

Wind Speed:	4-5 m/sec (day 1)
Wind Direction:	
Water Temperature:	19-20 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Thirty percent evaporates and 3% disperses by day 5; water content reaches 50% within 2.5 hours and 75% within 6 hours.

Logistics Analysis: Spill requires 16 hour response time; window of opportunity is 6 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Exxon Pipeline

OCCURENCE SCENARIO:

On January 13, 1989, an Exxon Pipeline ruptured due to external corrosion. Almost all of the oil was recovered.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Exxon Valdez

GENERAL INFORMATION:

Spill Name:	Exxon Valdez
Date:	3/24/89
Spill Time (local):	
Spill Size (bbls):	257,142
Oil Type:	North Slope crude

LOCATION:

City/State/ Country:	Prince William Sound, AK
Water Body:	Prince William Sound
Latitude:	61 02 N
Longitude:	146 05 W

WEATHER DATA:

Wind Speed:	3 m/sec (day 1)
Wind Direction:	
Water Temperature:	7 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 15% evaporates in first 6 hours, reaching approximately 25% in 5 days; 1% disperses in 5 days; water content reached 50% on day 3.

Logistics Analysis: Spill requires 13 hour response time; window of opportunity is greater than five days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Exxon Valdez

OCCURENCE SCENARIO:

On March 24, 1989, the tanker Exxon Valdez ran aground on Bligh Reef in Prince William Sound, Alaska. Within six hours of the grounding, the vessel had spilled approximately 10.9 million gallons of its 53 million gallon cargo. The oil generally moved south and west from the vessel. A storm on March 26 generated winds over 70 miles per hour and weathered much of the oil. By March 30, the oil extended 90 miles from the spill site; at its greatest extent the oil would extend more than 500 miles from Bligh Reef. Over 1,100 miles of non-continuous shoreline were impacted. Dispersants were applied to oil on March 26, but the storm which began that evening turned the oil into mousse that could not be dissipated by the dispersants. A test in-situ burn on March 25 burned approximately 15,000 to 30,000 gallons of oil, and it was determined that the burn had performed with 98 percent efficiency. The storm on March 26 eliminated the possibility of further in-situ burning.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, and an ISB test was actually conducted the day after the spill. The spill passes Phase II as a successful ISB candidate.

APPENDIX C

F.W. Bekman

GENERAL INFORMATION:

Spill Name:	F.W. Bekman
Date:	1/4/79
Spill Time (local):	
Spill Size (bbls):	61,904
Oil Type:	Heavy fuel

LOCATION:

City/State/ Country:	Duisberg, Germany
Water Body:	Ruhr River
Latitude:	51 26 N
Longitude:	006 45 E

WEATHER DATA:

Wind Speed:	8-9 m/sec (day 1)
Wind Direction:	
Water Temperature:	10-11 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Within 5 days 2.5% evaporates and 11% disperses; water content reaches 27% in 5 days.

Logistics Analysis: Spill requires 8 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: Duisberg is within 5 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

F.W. Bekman

OCCURENCE SCENARIO:

On January 4, 1979, an equipment spark led to an explosion and fire at a tank farm in Duisburg, Germany.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Fuyoh Maru/Vitoria

GENERAL INFORMATION:

Spill Name:	Fuyoh Maru/Vitoria
Date:	6/23/87
Spill Time (local):	
Spill Size (bbls):	80,880
Oil Type:	Kerosene

LOCATION:

City/State/ Country:	Le Havre, France
Water Body:	Seine River
Latitude:	49 30 N
Longitude:	000 30 E

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	14-15 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS used to model; total disperses and evaporates reaches approximately 100% within 60 hours; ADIOS predicts no emulsification.

Logistics Analysis: Spill requires 7 hour response time; window of opportunity is 60 hours.

Populated Area Analysis: Within 3 miles of several cities at the mouth of the Seine.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Fuyoh Maru/Vitoria

OCCURENCE SCENARIO:

The vessels Fuyoh Maru and Vitoria collided and an explosion occurred. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Galveston Bay

GENERAL INFORMATION:

Spill Name:	Galveston Bay
Date:	7/13/85
Spill Time (local):	15:00
Spill Size (bbls):	25,000
Oil Type:	Mineral seal

LOCATION:

City/State/ Country:	Galveston Bay, TX
Water Body:	Galveston Bay
Latitude:	29 17 N
Longitude:	94 54 W

WEATHER DATA:

Wind Speed:	4 m/sec (day 1)
Wind Direction:	
Water Temperature:	29 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS model predicts less than 1% dispersion in 6 hours; 30% evaporation within 6 hours; model predicts no emulsification.

Logistics Analysis: Spill requires a 4 hour response time; window of opportunity is approximately 5 days.

Populated Area Analysis: Within 3 miles of Baytown.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Galveston Bay

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

General Colocotronis

GENERAL INFORMATION:

Spill Name:	General Colocotronis
Date:	3/7/68
Spill Time (local):	
Spill Size (bbls):	37,700
Oil Type:	Lago treco

LOCATION:

City/State/ Country:	Eleuthera, Bahamas
Water Body:	Atlantic Ocean
Latitude:	25 20 N
Longitude:	076 20 W

WEATHER DATA:

Wind Speed:	7-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	22-23 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Over 25% evaporates and close to 15% disperses by day 5; water content reaches 45% by day 5.

Logistics Analysis: Spill requires 7 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

General Colocotronis

OCCURENCE SCENARIO:

The tank vessel General Colocotronis ran aground on the east side of Eleuthera Island in the Bahamas. The hull was severely damaged and the vessel spilled oil into the Atlantic Ocean at a location one and one-half miles offshore. The resulting slick spread out along the coast and caused an impact on recreational beaches and private residential shoreline. Chemical dispersants were the primary response tool used during the cleanup operation, and a test burning of dry weed that had been used to mop up oil also was conducted but determined to be impractical. There was a potential risk of the fire spreading to the dry scrub in the back-beach area. The remaining cargo was offloaded during extremely severe weather.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes Phase I, but the water content was relatively high, reaching 45 percent by day 5. Although the spill was not within six miles of a city, it was less than two miles from the recreational beaches of Eleuthera Island. Winds were over 10 m/s on the day after the spill and seas were very rough. High winds and heavy swells occurred much of the time for the next several weeks. In Phase II, the spill fails as an ISB candidate.

APPENDIX C

Georgia

GENERAL INFORMATION:

Spill Name:	Georgia
Date:	11/22/80
Spill Time (local):	6:00
Spill Size (bbls):	32,000
Oil Type:	Louisiana light sweet crude

LOCATION:

City/State/ Country:	Gulf of Mexico, LA
Water Body:	Gulf of Mexico
Latitude:	29 10 N
Longitude:	089 15 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	E-NE (day 1)
Water Temperature:	23 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Evaporation reaches 41% by day 5; dispersion reaches 12% by day 5; water content reaches 50% within 3 hours and 75% within 6 hours.

Logistics Analysis: Spill requires 12 hour response time; window of opportunity is 6 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Georgia

OCCURENCE SCENARIO:

The Georgia was holed by an anchor chain. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Gino/Team Castor

GENERAL INFORMATION:

Spill Name:	Gino/Team Castor
Date:	4/28/79
Spill Time (local):	
Spill Size (bbls):	307,860
Oil Type:	Fuel oil No. 6

LOCATION:

City/State/ Country:	Ile d' Ouessant, France
Water Body:	Atlantic Ocean
Latitude:	48 14 N
Longitude:	005 50 W

WEATHER DATA:

Wind Speed:	7-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	11-12 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Three percent evaporates and 12% disperses by day 5; water content reaches 30% by day 5.

Logistics Analysis: Spill requires 16 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Gino/Team Castor

OCCURENCE SCENARIO:

The Liberian ore/bulk/oil motor vessel Gino was en route from Port Arthur, Texas, to Le Havre. She sank following a collision in dense fog with the Norwegian motor chemical tanker Team Castor about 40 miles off the coast of Brittany on April 28, 1979. Gino's cargo had the consistency of thick toffee.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, and based on the limited amount of information available for the spill, it passes Phase II as a successful ISB candidate.

APPENDIX C

Golden Dolphin

GENERAL INFORMATION:

Spill Name:	Golden Dolphin
Date:	3/6/82
Spill Time (local):	
Spill Size (bbls):	21,990
Oil Type:	Fuel oil No. 6

LOCATION:

City/State/ Country:	700 Mi. E. of Bermuda, Atlantic Ocean
Water Body:	Atlantic Ocean
Latitude:	30 09 N
Longitude:	046 23 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	20-21 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Evaporation reaches 3% and dispersion reaches 9% within five days; water content reaches 35% on day 2 and remains constant through day 5.

Logistics Analysis: Site is too remote for response.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Golden Dolphin

OCCURENCE SCENARIO:

On March 6, 1982 the Golden Dolphin, an American steam tanker, was on a ballast trip from New Orleans to Port Said when an explosion, followed by a fire, occurred in the tank about 700 miles east of Bermuda. The Golden Dolphin drifted until sinking on March 7.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Gran Tor

GENERAL INFORMATION:

Spill Name:	Gran Tor
Date:	2/15/89
Spill Time (local):	
Spill Size (bbls):	16,119
Oil Type:	Bunker C

LOCATION:

City/State/ Country:	800 yards E of Punta Nisbon, Dominican Republic
Water Body:	Caribbean Sea
Latitude:	18 35 N
Longitude:	069 35 W

WEATHER DATA:

Wind Speed:	7-9 m/sec (day 1)
Wind Direction:	
Water Temperature:	24-26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Over 5% evaporates by day 5; over 25% disperses by day 5; water content reaches 40% by day 2, remaining constant through day 5.

Logistics Analysis: Spill requires 13 hour response time; window of opportunity is greater than five days.

Populated Area Analysis: Within 800 yards E of Punta Nisbon, Dominican Republic.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Gran Tor

OCCURENCE SCENARIO:

On February 15, 1989, the barge Gran Tor ran aground on a reef 800 yards east of Punta Nisbon. It subsequently began leaking Bunker C oil.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Grand Eagle

GENERAL INFORMATION:

Spill Name:	Grand Eagle
Date:	9/28/85
Spill Time (local):	23:30
Spill Size (bbls):	10,357
Oil Type:	Ninian crude

LOCATION:

City/State/ Country:	Marcus Hook, PA
Water Body:	Delaware River
Latitude:	39 50 N
Longitude:	075 25 W

WEATHER DATA:

Wind Speed:	10 m/sec (day 1)
Wind Direction:	
Water Temperature:	22 °C (day 1)
Air Temperature:	20 °C (day 1)

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Water content exceeds 75% in 1.5 hours; 20% disperses by day 5 and 40% evaporates by day 5.

Logistics Analysis: Spill requires a 8 hour response time; the window of opportunity is 1.5 hours because, according to the oil weathering model, the water content exceeded 75% at that time.

Populated Area Analysis: Within 3 miles of Marcus Hook.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Grand Eagle

OCCURENCE SCENARIO:

The tank vessel ran aground near midnight in the Delaware River near Marcus Hook, PA, where a cargo tank ruptured, and oil impacted a 12 mile section of the river and surrounding shoreline. The weather was clear, and winds were from the north-northwest at 17 to 21 knots. Booms were placed around the vessel and across the Salem River.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Greenhill Petroleum

GENERAL INFORMATION:

Spill Name:	Greenhill Petroleum
Date:	9/29/92
Spill Time (local):	17:00
Spill Size (bbls):	11,500
Oil Type:	Light Crude

LOCATION:

City/State/ Country:	Gulf of Mexico, off Timbalier Bay, LA
Water Body:	Gulf of Mexico
Latitude:	29 00 N
Longitude:	091 00 W

WEATHER DATA:

Wind Speed:	5 m/sec (day 1)
Wind Direction:	N (day 1)
Water Temperature:	27 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Water content reaches 75% within the first 12 hours; less than 3% disperses and 40% evaporates by day 5. The window of opportunity is 12 hours.

Logistics Analysis: Spill requires a 18 hour response time; window of opportunity is 12 hours (1.5 x window of opportunity = 18 hours).

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Greenhill Petroleum

OCCURENCE SCENARIO:

At 5:00 p.m. on September 29, 1992, an oil well owned by Greenhill Petroleum blew out and began spilling oil into the Gulf of Mexico near Timbalier Island. The well caught fire on October 1 and burned for the next eight days. Oil flowed from the well at a rate of 42 gallons per minute. However, 92 percent of this oil burned, and USCG estimated that only 2,381 barrels of oil actually entered the water. About 4,000 gallons of oil impacted the shoreline of Timbalier Island.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Gunvor Maersk

GENERAL INFORMATION:

Spill Name:	Gunvor Maersk
Date:	10/27/79
Spill Time (local):	
Spill Size (bbls):	109,950
Oil Type:	Fuel oil No. 6

LOCATION:

City/State/ Country:	Amazon River, Manaus Rds., Brazil
Water Body:	Amazon River
Latitude:	03 00 S
Longitude:	060 00 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	24-25 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis:	Less than 5% evaporates and 10% disperses within 5 days; water content reaches 38% at day 2 and remains constant through day 5.
Logistics Analysis:	Spill requires 18 hour response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Gunvor Maersk

OCCURENCE SCENARIO:

The Gunvor Maersk, a Danish motor tanker, was en route from Santos to the River Amazon port of Manaus. Explosions and fire resulted after the tanker struck a submerged object in Manaus Roads on October 27, 1979. Several minor explosions occurred as the tanker continued to burn for eight days before being extinguished on November 4. The tanker then sank to the bottom of the river. Renamed Titipor, the tanker was refloated on April 11, 1980.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Unsuccessful

The spill passes Phase I, and although it did not occur within six miles of a city, it was an inland spill on the Amazon River. Explosions occurred as the vessel burned for eight days. Assuming that firefighters had been attempting to extinguish the fire on the river, in Phase II the spill is unsuccessful as an ISB candidate because igniting another fire under these circumstances would seem to be inappropriate.

APPENDIX C

Hackensack Estuary

GENERAL INFORMATION:

Spill Name:	Hackensack Estuary
Date:	5/26/76
Spill Time (local):	
Spill Size (bbls):	47,619
Oil Type:	No. 6 fuel oil

LOCATION:

City/State/ Country:	Hackensack, NJ
Water Body:	Hackensack River
Latitude:	40 44 N
Longitude:	074 11 W

WEATHER DATA:

Wind Speed:	5-6 m/sec (day 1)
Wind Direction:	
Water Temperature:	13-15 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Less than 5% evaporation in 5 days; less than 2% dispersion in 5 days; water content is 5% in 6 hours, reaching 30% in 5 days.
Logistics Analysis:	The spill requires a 6 hour response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	Within 3 miles of Rutherford and within 5 miles of W. New York.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Hackensack Estuary

OCCURENCE SCENARIO:

Oil spilled into the Hackensack River estuary from the Wellen Oil Company tank farm in Jersey City, New Jersey. The slick moved upriver on incoming tides, and the riverbank and marshes as far north as Secaucus were oiled. On the day after the spill, river currents reached four knots during the flood tide, and booms placed across the river and tributaries failed.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Hannah 4001

GENERAL INFORMATION:

Spill Name:	Hannah 4001
Date:	1/4/81
Spill Time (local):	
Spill Size (bbls):	29,320
Oil Type:	Gasoline

LOCATION:

City/State/ Country:	Near Galveston, TX
Water Body:	Gulf of Mexico
Latitude:	29 30 N
Longitude:	93 30 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	19 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: ADIOS predicts total dispersed and evaporated oil reaches 100% by 9 hours.

Logistics Analysis: Spill requires fourteen hours response time; window of opportunity is 9 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Hannah 4001

OCCURENCE SCENARIO:

On January 4, 1981, while in tow of the tug Offshore Mariner, the American non-propelled tank barge Hannah 4001, in a loaded condition, struck bottom at Galveston. She sprang a leak and subsequently sank at Laguna Madre, Mexico, 100 miles south of Brownsville, on January 8, 1981.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Unsuccessful

The spill passes Phase I, but our weathering analysis shows that the spilled gasoline evaporates quickly. Based on the limited amount of information available for the spill, in Phase II it fails as an ISB candidate.

APPENDIX C

Haven

GENERAL INFORMATION:

Spill Name:	Haven
Date:	4/11/91
Spill Time (local):	
Spill Size (bbls):	142,857
Oil Type:	Heavy Iranian crude

LOCATION:

City/State/ Country:	Genoa, Italy
Water Body:	Gulf of Genoa
Latitude:	44 20 N
Longitude:	009 00 E

WEATHER DATA:

Wind Speed:	5-6 m/sec (day 1)
Wind Direction:	
Water Temperature:	15 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Twenty percent evaporates within 6 hours, reaching just over 30% in five days; less than 5% disperses within five days; water content reaches 50 percent after 12 hours and levels at 65% on day 2.

Logistics Analysis: Spill requires 12 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: Genoa and Santa Margatrita are within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Haven

OCCURENCE SCENARIO:

On April 11, 1991, the tanker caught fire while anchored seven miles off of Genoa, Italy, suffering a series of explosions and breaking into three parts. Part of the vessel sank, part sank seven miles off Arenzano, and part sank 1.5 miles off Arenzano on April 14. On April 17, oil impacted the beaches at Arenzano, Cogoleto, and Varazze. Over one-third of the spilled oil was directly transported to the subtidal sediments. Much of the sunken oil had been heated (not burned) during the fire, essentially distilling over 60 percent of the most volatile hydrocarbons. (Michel and Galt, 1995.)

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Marginal Call

The spill passes Phase I, and although it was not within six miles of a city, it was just seven miles off Genoa, Italy. The water content was high, reaching 50 percent after 12 hours and 65 percent in day 2. A large amount of the spilled oil sank beneath the water surface. High winds and waves six days after the spill temporarily halted response efforts. In Phase II, the spill is a marginal call as an ISB candidate.

APPENDIX C

Hess Oil Tanks

GENERAL INFORMATION:

Spill Name:	Hess Oil Tanks
Date:	9/20/89
Spill Time (local):	4:00
Spill Size (bbls):	10,000
Oil Type:	Heavy crude oil

LOCATION:

City/State/ Country:	Port Alucroix, Limetree Bay, St Croix, U.S.V.I.
Water Body:	Limetree Bay
Latitude:	17 40 N
Longitude:	62 90 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	27-29 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **N/A**

Oil Weathering Analysis: Not enough information available on oil type to analyze this spill.

Logistics Analysis: Not enough information available on oil type to analyze this spill.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Hess Oil Tanks

OCCURENCE SCENARIO:

On September 18, 1989, Hurricane Hugo, with winds in excess of 140 miles per hour, damaged five storage tanks at the facility in Port Alucroix, St. Croix. Of the 10,000 barrels released, approximately 9,000 barrels were contained within earthen berms, and 1,000 barrels entered the facility's main tanker harbor in Limetree Bay. Almost all the oil was recovered. Widespread destruction on the island caused many logistical and operational problems. The oil remained within the narrow harbor limits, pressed against the shoreline. Hess Oil Virgin Islands Corp. quickly placed a boom in the harbor to contain the spill, deployed a second boom, applied oil-snare absorbent to the entrained oil, and used a clamshell bucket to recover the oil from the natural catchment and deposited it into a temporary earthen sump.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available on oil type to analyze this spill.

APPENDIX C

Hoegh Mascot

GENERAL INFORMATION:

Spill Name:	Hoegh Mascot
Date:	2/16/84
Spill Time (local):	4:00
Spill Size (bbls):	16,667
Oil Type:	Clarified

LOCATION:

City/State/ Country:	Coos Bay, OR
Water Body:	Coos Bay
Latitude:	43 20 N
Longitude:	124 20 W

WEATHER DATA:

Wind Speed:	10 m/sec (day 1)
Wind Direction:	
Water Temperature:	12 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	ADIOS used to model; predicts approximately 100% evaporation and dispersion after 36 hours; predicts no emulsification.
Logistics Analysis:	Spill requires 18 hour response time; window of opportunity is 36 hours.
Populated Area Analysis:	Within 3 miles of Coos Bay and within 5 miles of Eastside.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Hoegh Mascot

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Houston

GENERAL INFORMATION:

Spill Name:	Houston
Date:	2/3/97
Spill Time (local):	
Spill Size (bbls):	19,048
Oil Type:	IF-30 Bunker oil

LOCATION:

City/State/ Country:	Maryland Shoal, Florida Keys NMS
Water Body:	Gulf of Mexico
Latitude:	24 31 N
Longitude:	081 34 W

WEATHER DATA:

Wind Speed:	7-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	25 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Evaporation reaches 15% by day 5; dispersion reaches approximately 10% on day 5, and water content reaches 50% in 3 hours and levels at 70 percent after nine hours.

Logistics Analysis: Spill requires 10 hour response time; window of opportunity is greater than five days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C
Houston

OCCURENCE SCENARIO:

During the night of February 3, 1997, the container ship Houston ran aground while en route from New Orleans, Louisiana to Spain. Most of the fuel carried was a heavy fuel oil. The ship also contained marine diesel and lube oil. Fuel was lightered from the vessel on February 8 and the ship was refloated and pulled free of the reef during high tide that evening.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes Phase I, and although it was not within six miles of a city, it occurred on a reef just off the Florida keys. The water content was high, reaching 50 to 70 percent even before response equipment could arrive. For these reasons, the spill fails Phase II as an ISB candidate.

APPENDIX C

Humble Oil Pipeline

GENERAL INFORMATION:

Spill Name:	Humble Oil Pipeline
Date:	10/15/67
Spill Time (local):	
Spill Size (bbls):	200,000
Oil Type:	Grand Isle

LOCATION:

City/State/ Country:	Offshore, LA
Water Body:	Gulf of Mexico
Latitude:	29 00 N
Longitude:	89 40 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	25-26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Thirty-five evaporates and 12% disperses by day 5; water content reaches 50% within 1.5 hours and 75% within 5 hours.

Logistics Analysis: Spill requires 10 hour response time; window of opportunity is 5 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Humble Oil Pipeline

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Independenta

GENERAL INFORMATION:

Spill Name:	Independenta
Date:	11/15/79
Spill Time (local):	
Spill Size (bbls):	687,785
Oil Type:	Es Sider crude oil

LOCATION:

City/State/ Country:	Istanbul, Turkey
Water Body:	Bosporous
Latitude:	41 02 N
Longitude:	028 57 E

WEATHER DATA:

Wind Speed:	11 m/sec (day 1)
Wind Direction:	
Water Temperature:	17 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Approximately 40% evaporates and 45% disperses within 5 days; water content reaches 75% within one hour.
Logistics Analysis:	Spill requires 26 hour response time; window of opportunity is less than 1 hour.
Populated Area Analysis:	Within a 3 miles of Istanbul.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Independenta

OCCURENCE SCENARIO:

On the morning of November 15, 1979, the Independenta and the Evrialy collided at the southern entrance of the Bosporous. The Independenta exploded and both vessels began to burn. The tanker grounded a half mile from the port of Hydarpasa, suffered another major explosion on December 6, and burned until December 14. Most of the oil on the tanker burned, but some spilled and drifted toward the port. Strong prevailing winds prevented the boom across the harbor from being more effective.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Interstate 19

GENERAL INFORMATION:

Spill Name:	Interstate 19
Date:	3/20/78
Spill Time (local):	12:00
Spill Size (bbls):	15,000
Oil Type:	JP-4 Aviation fuel, Kerosene

LOCATION:

City/State/ Country:	Delaware City, DE
Water Body:	Delaware River
Latitude:	39 35 N
Longitude:	075 35 W

WEATHER DATA:

Wind Speed:	9 m/sec (day 1)
Wind Direction:	
Water Temperature:	7 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS used to model; predicts approximately 100% combined evaporation and dispersion within 30 hours; ADIOS predicts no emulsification.

Logistics Analysis: Spill requires 8 hours response time; window of opportunity is approximately 30 hours.

Populated Area Analysis: Delaware City within 3 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Interstate 19

OCCURENCE SCENARIO:

On March 20, 1978 an explosion and fire occurred on board the barge. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

IOT-105

GENERAL INFORMATION:

Spill Name:	IOT-105
Date:	3/3/75
Spill Time (local):	
Spill Size (bbls):	20,000
Oil Type:	Automotive gasoline

LOCATION:

City/State/ Country:	Lower Mississippi River, MS
Water Body:	Mississippi River
Latitude:	32 20 N
Longitude:	090 50 W

WEATHER DATA:

Wind Speed:	7-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	18-19 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	ADIOS used to model; evaporation and disperstion total approximately 100% within 18 hours; ADIOS predicts no emulsification.
Logistics Analysis:	Spill requires 10 hour response time; window of opportunity is 18 hours.
Populated Area Analysis:	Within 3 miles of Vickburg, population over 25,000.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

IOT-105

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: N/A

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Irenes Serenade

GENERAL INFORMATION:

Spill Name:	Irenes Serenade
Date:	2/23/80
Spill Time (local):	16:30
Spill Size (bbls):	871,428
Oil Type:	Sirir crude

LOCATION:

City/State/ Country:	Pilos, Greece
Water Body:	Navarino Bay
Latitude:	36 56 N
Longitude:	021 42 E

WEATHER DATA:

Wind Speed:	7-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	17 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Water content reaches 75% within 1 hour.

Logistics Analysis: Spill requires 24 hour response time; window of opportunity less than 1 hour.

Populated Area Analysis: Within 3 miles of Pilos. Population is less than 10,000.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Irenes Serenade

OCCURENCE SCENARIO:

The Greek motor tanker, Irenes Serenade, en route from Ceyhan Terminal (near Mersin), southern Turkey, to Trieste destined for various Austrian refineries, suddenly burst into flames after an explosion occurred in the forecastle area. The tanker was anchoring to refuel to take provisions in Navarino Bay off Pilos when the explosion occurred. The fire quickly enveloped the tanker within 30 minutes. The tanker sank, still ablaze, off Sfaktiria Island 13 hours later. Thousands of gallons of crude oil were released, causing a huge oil slick, much of which was on fire. Burning oil was carried by the wind to the eastern coast of Sfaktiria Island, where it ignited vegetation. Most of the oil on board was lost to the sea or burned in the fire.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: N/A

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Ixtoc I, Petroleos Mexicanos

GENERAL INFORMATION:

Spill Name:	Ixtoc I, Petroleos Mexicanos
Date:	6/3/79
Spill Time (local):	
Spill Size (bbls):	3,202,000
Oil Type:	IXTOC 1 crude oil

LOCATION:

City/State/ Country:	Bahia de Campeche, Gulf of Mexico, Mexico
Water Body:	Bay of Campeche
Latitude:	19 25 N
Longitude:	092 20 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	28 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS model predicts no dispersion; less than 15% evaporation after 5 days; water content reaches 50% in 2 hours and 80% in 6 hours.

Logistics Analysis: Spill requires 31 hour response time; window of opportunity less than 6 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Ixtoc I, Petroleos Mexicanos

OCCURENCE SCENARIO:

On June 3, 1979, the exploratory well blew out in the Bahia de Campeche, 600 miles south of Texas in the Gulf of Mexico. The oil and gas blowing out of the well ignited, causing the platform to catch fire and collapse. Northerly currents carried the spilled oil toward the U.S., and the Texas coast was impacted in August. Dispersants were used in Mexico, and skimmers and booms were used to protect bays and lagoons in Texas. The well continued to spill oil at a rate of 10,000 to 30,000 barrels per day until it was capped on March 23, 1980.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Jakob Maersk

GENERAL INFORMATION:

Spill Name:	Jakob Maersk
Date:	1/29/75
Spill Time (local):	
Spill Size (bbls):	637,500
Oil Type:	Iranian heavy crude

LOCATION:

City/State/ Country:	Leixoes, N. Portugal
Water Body:	Atlantic Ocean
Latitude:	41 11 N
Longitude:	008 44 W

WEATHER DATA:

Wind Speed:	10 m/sec (day 1)
Wind Direction:	
Water Temperature:	14 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Close to 35% evaporates and over 25% disperses by day 5; water content reaches 70% by the 12th hour and remains so through day 5.

Logistics Analysis: Spill requires 14 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: Matosinhos is within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Jakob Maersk

OCCURENCE SCENARIO:

The vessel struck bottom, exploded, and broke in two on January 31. Rough seas were present on the first 10 days of February.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes the Phase I analysis, but for several reasons, it would not be a good ISB candidate. The spill occurred in the harbor of a relatively small port, but the larger cities of Matosinhos and Porto are nearby, within several miles. The spill began with an explosion and fire on January 29, but the vessel broke in two with heavy leakage of burning oil two days later, and heavy seas persisted over the first 10 days of February. Fumes from the burning oil reportedly caused casualties to local inhabitants. According to our oil weathering analysis, the water content of the spilled oil was high, reaching 70 percent by the 12th hour. In Phase II, the spill fails as an ISB candidate.

APPENDIX C

Jawacta

GENERAL INFORMATION:

Spill Name: Jawacta

Date: 12/21/73

Spill Time (local):

Spill Size (bbls):

Oil Type:

LOCATION:

City/State/ Country:

Water Body:

Latitude:

Longitude:

WEATHER DATA:

Wind Speed:

Wind Direction:

Water Temperature:

Air Temperature:

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	N/A
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	N/A

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **N/A**

Oil Weathering Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

Logistics Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

Populated Area Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Jawacta

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available on oil type or latitude and longitude to analyze this spill.

APPENDIX C

Jos Simard

GENERAL INFORMATION:

Spill Name:	Jos Simard
Date:	8/4/74
Spill Time (local):	
Spill Size (bbls):	10,714
Oil Type:	No. 4 diesel fuel

LOCATION:

City/State/ Country:	Newfoundland, Canada
Water Body:	Atlantic Ocean
Latitude:	58 43 N
Longitude:	062 54 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	7-8 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS predictes less than 2% dispersion within 6 hours; approximately 10% evaporation; and no emulsification.

Logistics Analysis: Site is so remote that response is not an option. Source of boom tow boats is uncertain.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Jos Simard

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: N/A

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Jupiter

GENERAL INFORMATION:

Spill Name:	Jupiter
Date:	9/16/90
Spill Time (local):	
Spill Size (bbls):	20,000
Oil Type:	Unleaded gasoline

LOCATION:

City/State/ Country:	Saginaw River, Bay City, MI
Water Body:	Saginaw River
Latitude:	43 30 N
Longitude:	084 00 W

WEATHER DATA:

Wind Speed:	5-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	20-21 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS used to model; evaporation and dispersion reach approximately 100% within 13 hours; ADIOS predicts no emulsification.

Logistics Analysis: Spill requires 27 hour response time; window of opportunity is 13 hours.

Populated Area Analysis: Within 3 miles of Bay City (population above 25,000).

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Jupiter

OCCURENCE SCENARIO:

The tank vessel caught fire and exploded at the Total Oil Company refinery on the Saginaw River near Bay City, MI. Residual gasoline in the broken transfer hose was believed to have been ignited by a spark on the dock. Area marinas were evacuated and vessel traffic was halted. The pier fire was extinguished while the fire onboard the vessel remained out of control. The gasoline was not relesed rapidly, and little environmental damage resulted from the incident.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Keo

GENERAL INFORMATION:

Spill Name:	Keo
Date:	11/5/69
Spill Time (local):	
Spill Size (bbls):	209,523
Oil Type:	No. 6 fuel oil

LOCATION:

City/State/ Country:	120 miles South of Nantucket
Water Body:	Atlantic Ocean
Latitude:	39 00 N
Longitude:	68 00 W

WEATHER DATA:

Wind Speed:	8-9 m/sec (day 1)
Wind Direction:	
Water Temperature:	16 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Three percent evaporates and 22% disperses by day 5; water content reaches 30% by day 5.

Logistics Analysis: Spill requires 18 hour response time; window of opportunity is greater than five days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Keo

OCCURENCE SCENARIO:

The Liberian steam tanker Keo was approximately 12 miles southeast of Nantucket when it broke into two pieces. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, and based on the limited information available for the spill, it passes Phase II as a successful ISB candidate.

APPENDIX C

Keytrader

GENERAL INFORMATION:

Spill Name:	Keytrader
Date:	1/18/74
Spill Time (local):	
Spill Size (bbls):	17,592
Oil Type:	Kerosene

LOCATION:

City/State/ Country:	Mississippi River, LA
Water Body:	Mississippi River
Latitude:	29 15 N
Longitude:	089 25 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	17-18 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Sixty percent evaporates and 30% dispersed by day 2; ADIOS predicts that this product will not emulsify.

Logistics Analysis: Spill requires 8 hour response time; window of opportunity is two days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Keytrader

OCCURENCE SCENARIO:

En route from Orleans to Searsport, Maine, Keytrader, an American steam tanker, collided with the Norwegian steam ore carrier, Baune, in the Mississippi River in dense fog. Both vessels became enveloped in fire. The Keytrader was refloated on January 30.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Unsuccessful

The spill passes the Phase I analysis, and although it did not occur within 6 miles of a city, it was an inland spill on the Mississippi River. After the collision, the vessel burned for days. The oil weathering analysis indicates that 90 percent of the spilled oil evaporated or dispersed within two days. In Phase II, the spill fails as an ISB candidate.

APPENDIX C

Kosmas M

GENERAL INFORMATION:

Spill Name:	Kosmas M
Date:	12/25/78
Spill Time (local):	
Spill Size (bbls):	73,300
Oil Type:	Fuel oil No. 6

LOCATION:

City/State/ Country:	Akbas Nr. Canakkale, Turkey
Water Body:	Dardanelles
Latitude:	40 05 N
Longitude:	027 00 E

WEATHER DATA:

Wind Speed:	3-4 m/sec (day 1)
Wind Direction:	
Water Temperature:	14-15 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Three percent of oil evaporates and less than 1% disperses within 5 days; water content reaches 23% after 5 days.

Logistics Analysis: Spill requires 26 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Kosmas M

OCCURENCE SCENARIO:

A fire broke out in the engine room off the coast of Akbas, near Canakkale, Dardanelles, on December 25, 1978. The crew was unable to control the blaze and left the vessel anchored off Akbas while explosions occurred in the engine room.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Marginal Call

The spill passes Phase I, and although it did not occur within six miles of a city, it was close to shore in the Dardanelles. A fire and explosions caused the spill. Based on the limited amount of information available for the spill, in Phase II it is a marginal call as an ISB candidate.

APPENDIX C

Kurdistan

GENERAL INFORMATION:

Spill Name:	Kurdistan
Date:	3/15/79
Spill Time (local):	
Spill Size (bbls):	43,900
Oil Type:	Bunker C (Naptha)

LOCATION:

City/State/ Country:	Cabot Strait, Nova Scotia, Canada
Water Body:	Cabot Strait
Latitude:	46 00 N
Longitude:	060 00 W

WEATHER DATA:

Wind Speed:	6-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	1 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 5% evaporation in 5 days; approximately 5% dispersion in five days; water content is less than 20% after five days.

Logistics Analysis: Spill requires 17 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Kurdistan

OCCURENCE SCENARIO:

On March 15, 1979, the tank vessel broke in two sections south of Cabot Strait, Newfoundland. A wide band of pack ice initially prevented the spilled oil from reaching the shoreline. The oil appeared to float a meter or two below the surface of the water. Ice-oil mixtures were seen eight days after the spill. Oil washed ashore from mid-April throughout the summer along 700 miles of eastern Nova Scotia and southern Newfoundland shoreline. Bags of oil-soaked debris were collected on uninhabited Scatarie Island and burned in a temporary on-site incinerator.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes Phase I, but ice hindered response efforts. The heavy Bunker C oil in the spill appeared to float a meter or two below the surface. In Phase II, the spill fails as an ISB candidate.

APPENDIX C

Lakehead Pipeline Company

GENERAL INFORMATION:

Spill Name:	Lakehead Pipeline Company
Date:	3/3/91
Spill Time (local):	
Spill Size (bbls):	40,476
Oil Type:	Crude

LOCATION:

City/State/ Country:	Grand Rapids, MN
Water Body:	Prairie River
Latitude:	47 14 N
Longitude:	093 38 W

WEATHER DATA:

Wind Speed:	4 m/sec (day 1)
Wind Direction:	
Water Temperature:	
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **N/A**

Oil Weathering Analysis: Not enough information available on oil type to analyze this spill.

Logistics Analysis: Not enough information available to analyze this spill.

Populated Area Analysis: Within 3 miles of Grand Rapids (population above 25,000).

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Lakehead Pipeline Company

OCCURENCE SCENARIO:

A pipeline ruptured approximately two miles north of Grand Rapids, MN, and spilled oil into the surrounding area. Oil spread into a wetland area and a storm sewer, impacting the Prairie River. Some of the oil formed pools on top of the ice sheets in the river. Cleanup reportedly would have been much more difficult if the ice had melted, or if warmer weather had allowed the oil to move more rapidly.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available on oil type to analyze this spill.

APPENDIX C

LSCO Petrochem

GENERAL INFORMATION:

Spill Name:	LSCO Petrochem
Date:	10/4/76
Spill Time (local):	
Spill Size (bbls):	109,950
Oil Type:	Fuel oil No. 6

LOCATION:

City/State/ Country:	Gulf of Mexico, LA
Water Body:	Gulf of Mexico
Latitude:	29 00 N
Longitude:	89 00 W

WEATHER DATA:

Wind Speed:

Wind Direction:

Water Temperature: 26 °C (day 1)

Air Temperature:

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	N/A
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	N/A

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: N/A

Oil Weathering Analysis: Not enough information available to analyze this spill.

Logistics Analysis: Not enough information available to analyze this spill.

Populated Area Analysis: Not enough information available to analyze this spill.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

LSCO Petrochem

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available to analyze this spill.

APPENDIX C

Mara

GENERAL INFORMATION:

Spill Name:	Mara
Date:	11/12/78
Spill Time (local):	
Spill Size (bbls):	73,300
Oil Type:	Fuel oil No. 6

LOCATION:

City/State/ Country:	Curacao, Netherlands Antilles
Water Body:	Caribbean Sea
Latitude:	12 00 N
Longitude:	068 00 W

WEATHER DATA:

Wind Speed:	7-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	28 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Three percent evaporated within 5 days; 11% disperses within 5 days; water content reaches 42% by day 2 and remains constant through day 5.

Logistics Analysis: Spill requires 15 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Mara

OCCURENCE SCENARIO:

On November 12, 1978 when the Venezuelan steam tanker Mara was about eight miles off Curacao, discharging some of her cargo of fuel oil into the Russian steam tanker Kavkaz, an explosion occurred in the ballast pump turbine in the engine room. The engine room flooded. Still partly loaded, the Mara was towed to Willemstad.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Marginal Call

The spill passes Phase I, and although it did not occur within six miles of a city, it was about eight miles off the island of Curacao. Water content was moderately high, reaching 42 percent by day 2. Based on the limited amount of information available for the spill, in Phase II it is a marginal call as an ISB candidate.

APPENDIX C

Mariena

GENERAL INFORMATION:

Spill Name:	Mariena
Date:	11/11/70
Spill Time (local):	
Spill Size (bbls):	100,000
Oil Type:	

LOCATION:

City/State/ Country:	Sicily, Italy
Water Body:	Mediterranean Sea
Latitude:	
Longitude:	

WEATHER DATA:

Wind Speed:	
Wind Direction:	
Water Temperature:	
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	N/A
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	N/A

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **N/A**

Oil Weathering Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

Logistics Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

Populated Area Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Mariena

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available on oil type or latitude and longitude to analyze this spill.

APPENDIX C

Marin Mist

GENERAL INFORMATION:

Spill Name:	Marin Mist
Date:	1/12/83
Spill Time (local):	
Spill Size (bbls):	14,660
Oil Type:	Fuel oil

LOCATION:

City/State/ Country:	Port, CA
Water Body:	
Latitude:	
Longitude:	

WEATHER DATA:

Wind Speed:	
Wind Direction:	
Water Temperature:	
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	N/A
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	N/A

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: N/A

Oil Weathering Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

Logistics Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

Populated Area Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Marin Mist

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available on oil type or latitude and longitude to analyze this spill.

APPENDIX C

Mega Borg

GENERAL INFORMATION:

Spill Name:	Mega Borg
Date:	6/8/90
Spill Time (local):	23:30
Spill Size (bbls):	100,000
Oil Type:	Angolan Palanca crude oil

LOCATION:

City/State/ Country:	Gulf of Mexico, 57SE of Galveston, TX
Water Body:	Gulf of Mexico
Latitude:	28 33 N
Longitude:	094 08 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	29 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Water content reaches 80% within 3 hours; less than 30% evaporates within 6 hours and close to 50% by day 5; over 15% disperses by day 5.

Logistics Analysis: Spill requires 12 hour response time; window of opportunity is less than 3 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Mega Borg

OCCURENCE SCENARIO:

An explosion occurred in the pump room of the tank vessel Mega Borg shortly before midnight on June 8, 1990, during lightering operations with the Fraqmura. The explosion ignited a fire that spread on board the vessel, and approximately 100,000 barrels of Angolan Palanca crude oil was burned or released during the next seven days. The ship was in the Gulf of Mexico, 57 miles southeast of Galveston, Texas, in the U.S. exclusive economic zone. Oil was kept off-shore for many days by wind and currents, reaching shore twenty days after the spill on the southwest Lousiana coast. The slick on water was thin, however, and much of the oil was lost to evaporation or burned. The Mega Borg burned until June 15, and the oil remaining on the vessel was lightered. The vessel stopped leaking oil on June 16.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Messiniaki Frontis

GENERAL INFORMATION:

Spill Name:	Messiniaki Frontis
Date:	3/2/79
Spill Time (local):	
Spill Size (bbls):	116,214
Oil Type:	Sirir crude

LOCATION:

City/State/ Country:	Kaloi Limenes, Crete
Water Body:	Mediterranean Sea
Latitude:	34 55 N
Longitude:	024 48 E

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	15-16 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Evaporation reaches 33% and dispersion reaches 5% within five days; water content exceeds 75% in one hour.
Logistics Analysis:	Spill requires 56 hour response time; window of opportunity is less than one hour.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Messiniaki Frontis

OCCURENCE SCENARIO:

The Messiniaki Frontis tanker spill was caused by grounding. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Metula

GENERAL INFORMATION:

Spill Name:	Metula
Date:	8/9/74
Spill Time (local):	22:18
Spill Size (bbls):	398,019
Oil Type:	Light Arabian crude, Bunker C

LOCATION:

City/State/ Country:	First Narrows, Straits of Magellan, Chile
Water Body:	Magellan Straits
Latitude:	52 34 S
Longitude:	069 41 W

WEATHER DATA:

Wind Speed:	5-6 m/sec (day 1)
Wind Direction:	
Water Temperature:	8-9 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Thirty percent evaporates by day 5; nearly 8% disperses by day 5; water content exceeds 75% within 6 hours.
Logistics Analysis:	Spill requires 66 hour response time; window of opportunity is 6 hours.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Metula

OCCURENCE SCENARIO:

The VLCC Metula ran hard aground on Satellite Bank, at the western end of First Narrows in the Strait of Magellan near the southern tip of South America. Oil immediately began pouring into the water from ruptured cargo and fuel tanks. The oil was driven by currents as high as 10 knots and winds from the northwest at 30 to 50 knots. Within the first three weeks, the wind forced the oil onto the northern shoreline of Tierra del Fuego. There was no action taken to contain or disperse the oil because operations were hampered by rough weather, logistical difficulties, and financial responsibility. Boom was expected to be ineffective because of the strong currents and tides. Chemical dispersants and the equipment to apply them were not available. Much of the affected shoreline was inaccessible to heavy equipment.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Morris J. Berman

GENERAL INFORMATION:

Spill Name:	Morris J. Berman
Date:	1/7/94
Spill Time (local):	4:00
Spill Size (bbls):	17,857
Oil Type:	Blended No. 6 fuel oil, Heavy No. 6 heating

LOCATION:

City/State/ Country:	Off San Juan, PR
Water Body:	Caribbean Sea
Latitude:	
Longitude:	

WEATHER DATA:

Wind Speed:	9-10 m/sec (day 1)
Wind Direction:	
Water Temperature:	26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Close to 30% dispersion and 40% evaporation by day 5; water content reaches 40% by day 5.
Logistics Analysis:	Spill requires 8 hour response time; window of opportunity is approximately 5 days.
Populated Area Analysis:	Within a few hundred meters of San Juan.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Morris J. Berman

OCCURENCE SCENARIO:

The Morris J. Berman barge went aground in the surf zone off Escambron Beach in San Juan, Puerto Rico. After its towing cable parted, the barge grounded on hard bottom consisting of rocky substrate with scattered coral. Due to strong northerly winds, the surf at the grounding site was quite strong, creating a hazardous situation as waves pounded the deck of the vessel. The specific gravity of the oil when spilled was lower than the surrounding waters so it floated. Oil, in the form of large mats, accumulated on the surface and on the bottom of the lagoons. This submerged oil posed a major cleanup problem during the response. Responders used booms, skimmers, vacuum trucks, and dispersants to remove the oil. The lagoon was dredged to remove subsurface oil that continued leaking from the sunken barge. The grounded barge was not boomed because of the intensity of the surf. Crews worked in extremely hazardous conditions to lighter oil from the Morris J. Berman to another barge. As time progressed, the oil became more viscous and difficult to pump making lightering ineffective. However, lightering efforts continued until the barge was prepared for towing to the scuttle site. Due primarily to sea conditions, collection of offshore oil met with limited success. Recovery of submerged oil proved to be difficult and costly.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

N30

GENERAL INFORMATION:

Spill Name:	N30
Date:	12/3/76
Spill Time (local):	
Spill Size (bbls):	10,000
Oil Type:	Crude

LOCATION:

City/State/ Country:	Trinidad, Cuba
Water Body:	Caribbean Sea
Latitude:	21 45 N
Longitude:	080 00 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **N/A**

Oil Weathering Analysis: Not enough information on oil type to analyze this spill.

Logistics Analysis: Not enough information on oil type to analyze this spill.

Populated Area Analysis: Within 3 miles of Trinidad.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

N30

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information on oil type to analyze this spill.

APPENDIX C

Napier

GENERAL INFORMATION:

Spill Name:	Napier
Date:	6/10/73
Spill Time (local):	
Spill Size (bbls):	270,000
Oil Type:	Loreto Peruvian export grade

LOCATION:

City/State/ Country:	Off west coast of Chile
Water Body:	Pacific Ocean
Latitude:	44 45 S
Longitude:	75 05 W

WEATHER DATA:

Wind Speed:	5-6 m/sec (day 1)
Wind Direction:	
Water Temperature:	16-17 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Thirty-five percent evaporates and close to 2% disperses by day 5; water content reaches 80% by the 12th hour.

Logistics Analysis: Spill requires 77 hour response time; window of opportunity is less than 12 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Napier

OCCURENCE SCENARIO:

En route from Arica, Chile to Rio de Janeiro, the Liberian steam tanker, Napier, ran aground and broke in two in stormy weather off Guamblin Island, on the west coast of Chile. To prevent the crude oil from contaminating nearby waters and beaches, incendiary bombs were dropped on Napier on June 12 to ignite and destroy the vessel and cargo.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Neches River

GENERAL INFORMATION:

Spill Name:	Neches River
Date:	2/15/85
Spill Time (local):	
Spill Size (bbls):	30,000
Oil Type:	Range of petroleum products

LOCATION:

City/State/ Country:	Neches River, TX
Water Body:	Neches River
Latitude:	29 59 N
Longitude:	93 53 W

WEATHER DATA:

Wind Speed:	
Wind Direction:	
Water Temperature:	
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	N/A
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	N/A

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: N/A

Oil Weathering Analysis:	Not enough information on oil type available to analyze this spill.
Logistics Analysis:	Not enough information on oil type available to analyze this spill.
Populated Area Analysis:	Not enough information on oil type available to analyze this spill.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Neches River

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information on oil type to analyze this spill.

APPENDIX C

No Name

GENERAL INFORMATION:

Spill Name:	No Name
Date:	10/16/75
Spill Time (local):	
Spill Size (bbls):	60,000
Oil Type:	

LOCATION:

City/State/ Country:	Gulf of Mexico, LA
Water Body:	Gulf of Mexico
Latitude:	
Longitude:	

WEATHER DATA:

Wind Speed:	
Wind Direction:	
Water Temperature:	
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	N/A
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **N/A**

Oil Weathering Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

Logistics Analysis: Not enough information available on oil type or latitude and longitude to analyze this spill.

Populated Area Analysis: Smith Pt. Is approximately ten miles away.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

No Name

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available on oil type or latitude and longitude to analyze this spill.

APPENDIX C

Nord Pacific

GENERAL INFORMATION:

Spill Name:	Nord Pacific
Date:	7/13/88
Spill Time (local):	22:50
Spill Size (bbls):	15,350
Oil Type:	Beatrice (North Sea) crude oil

LOCATION:

City/State/ Country:	South side of inner harbor, Corpus Christi, TX
Water Body:	Corpus Christi Bay
Latitude:	27 49 N
Longitude:	097 25 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	SE (day 1)
Water Temperature:	30 °C (day 1)
Air Temperature:	25 °C (day 1)

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	ADIOS predicts water content reaches 75% within first 12 hours; disperses and evaporates oil reaches 60% by day 5.
Logistics Analysis:	Spill requires a 5 hour response time; window of opportunity is approximately 12 hours.
Populated Area Analysis:	Within 3 miles of Corpus Christi, Viola, and Gardendale.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Nord Pacific

OCCURENCE SCENARIO:

The Nord Pacific damaged its hull and tore a cargo tank when it collided with a dock on the night of July 13, 1988, in Corpus Christi, Texas. Before the level in the tank could be pumped down, 15,350 barrels of Beatrice crude oil spilled into Galveston Bay. Weather conditions at the time of the incident were favorable to a rapid and succesful response. The oil was contained in a 2.6-mile long section of the inner harbor, with most oil impacts on the north bank. The vessel suffered hull damage while docking at the Southwestern Oil and Refinery Dock #3, on the south side of the inner harbor. The cleanup went well because of favorable weather conditions, no fire at the time of the collision, rapid response, minimum resources at risk, direct access to all impacted areas, and small tidal range in a dead-end harbor.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

North Cape

GENERAL INFORMATION:

Spill Name:	North Cape
Date:	1/19/96
Spill Time (local):	
Spill Size (bbls):	19,643
Oil Type:	No. 2 fuel oil, Home heating oil

LOCATION:

City/State/ Country:	Narragansett, RI
Water Body:	Block Island Sound
Latitude:	42 21 N
Longitude:	071 35 W

WEATHER DATA:

Wind Speed:	
Wind Direction:	
Water Temperature:	1 °C (day 1)
Air Temperature:	0 °C (day 1)

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Dispersed and evaporated oil nears 100% within 6 hours.

Logistics Analysis: Spill requires 12 hour response time; window of opportunity is 6 hours.

Populated Area Analysis: Six miles from Port Judith, RI.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

North Cape

OCCURENCE SCENARIO:

On January 19, 1996, the barge North Cape grounded off the U.S. coast of Rhode Island, off Mantunuck State Park, on Moonstone Beach, near Point Judith, RI and Block Island Sound. The barge stopped leaking oil on January 21. The weather conditions at the time of the grounding were 15 to 20 foot seas and 60 mile-per-hour winds. At first light, the USCG confirmed that the oil was leaking from the vessel in at least two place, and the vessel continued to leak throughout the day. Of the total amount discharged, NOAA used its oil fate model to estimate the fate of the discharged oil. The model estimated that 80 percent of the oil physically dispersed and 12 percent evaporated within the first 8 hours after discharge. Only 10 percent of the oil was estimated to remain on the water surface in the form of sheens after the first 24 hours. The vessel was located on the surf, and the waves had calmed down considerably from the night before according to some USCG officials. The USCG carried out nighttime skimming operation late on January 20 in an attempt to skim oil leaking from the barge. USCG officials reported some protective booming of estuaries leading to salt ponds. However, they reported difficulty in booming some of these areas due to strong currents. A map based on an overflight showed three major oil slicks: (1) a 1.5 mile by 220 yard slick of brown streamers emanating from the barge and flowing east-southeast; (2) a 1.25 miles by 0.75 mile slick of rainbow sheen and brown streamers beginning at the estuary that leads to Point Judith Pond and flowing southeast toward Point Judith; and (3) a 0.75 mile by 250 yard slick of brown streamer located half a mile south-southeast of the second slick. Northwest winds kept these slicks offshore.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Ocean 250

GENERAL INFORMATION:

Spill Name:	Ocean 250
Date:	3/16/78
Spill Time (local):	
Spill Size (bbls):	16,249
Oil Type:	Aviation gasoline

LOCATION:

City/State/ Country:	Block Island, RI
Water Body:	Block Island Sound
Latitude:	41 17 N
Longitude:	071 51 W

WEATHER DATA:

Wind Speed:	5 m/sec (day 1)
Wind Direction:	
Water Temperature:	5-6 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	ADIOS used to model; approximately 100% evaporates and disperses within 6 hours; model predicts no emulsification.
Logistics Analysis:	Spill requires 12 hour response time; window of opportunity is 6 hours.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Ocean 250

OCCURENCE SCENARIO:

The cause of the Ocean 250 oil spill was due to grounding. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Ocean Eagle

GENERAL INFORMATION:

Spill Name:	Ocean Eagle
Date:	3/3/68
Spill Time (local):	
Spill Size (bbls):	83,400
Oil Type:	Leona

LOCATION:

City/State/ Country:	San Juan, PR
Water Body:	Caribbean Sea
Latitude:	18 29 N
Longitude:	066 10 W

WEATHER DATA:

Wind Speed:	5 m/sec (day 1)
Wind Direction:	
Water Temperature:	25 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Twenty-five percent evaporates and close to 5% disperses by day 5; water content reaches 45% by day 5.

Logistics Analysis: Spill requires 8 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: Within 3 miles of San Juan.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Ocean Eagle

OCCURENCE SCENARIO:

On the morning of March 3, 1968, the tanker Ocean Eagle grounded in the harbor of San Juan, Puerto Rico. The vessel broke in two several hours after the grounding, spilling oil into the harbor. Three days later, tugs tried to tow the forward section out of the harbor, but adverse weather drove the forward section farther into the harbor. On March 10, the forward section broke open in heavy seas and released more oil. The spill response included the use of sorbents, dispersants, and mechanical and manual removal of the oil from beaches.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Oil Recovery

GENERAL INFORMATION:

Spill Name:	Oil Recovery
Date:	5/19/73
Spill Time (local):	7:00
Spill Size (bbls):	142,857
Oil Type:	Wilmington

LOCATION:

City/State/ Country:	California
Water Body:	Pacific Ocean
Latitude:	33 44 N
Longitude:	118 16 W

WEATHER DATA:

Wind Speed:	3-4 m/sec (day 1)
Wind Direction:	
Water Temperature:	16 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Fifteen percent evaporates and below 1% disperses by day 5; water content reaches 4% by day 5.
Logistics Analysis:	Spill requires 15 hour response time; window of opportunity is greater than five days.
Populated Area Analysis:	Within 3 miles of Long Beach, CA.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Oil Recovery

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Olympic Alliance

GENERAL INFORMATION:

Spill Name:	Olympic Alliance
Date:	11/12/75
Spill Time (local):	
Spill Size (bbls):	87,000
Oil Type:	Iranian light crude oil

LOCATION:

City/State/ Country:	Dover Strait, Pas de Calais, England
Water Body:	English Channel
Latitude:	50 59 N
Longitude:	001 35 W

WEATHER DATA:

Wind Speed:	8-10 m/sec (day 1)
Wind Direction:	
Water Temperature:	12-13 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Evaporation reaches 35% in five days; dispersion reaches 40% in five days; water content reaches 75% in nine hours.

Logistics Analysis: Spill requires 11 hour response time; window of opportunity is 9 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Olympic Alliance

OCCURENCE SCENARIO:

Shortly after midnight on the morning of November 12, 1975, the tank vessel Olympic Alliance and the Royal Navy Frigate, HMS Achilles, collided in Dover Strait, about 13 miles southeast of Dover, England. One of the cargo tanks was ruptured and released 14,000 barrels of oil. Response equipment and personnel were mobilized immediately and dispersants were applied. Initially, the vessel operations were hampered by fog. By dusk on November 12, the main slick was still at sea, approximately 7.5 miles southeast of Dover. By November 14, oil had entered Folkestone Harbor and several beaches were oiled. The vessel spilled an additional 73,000 barrels between the site of the collision and Wilhelmshaven, West Germany.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

Although the spill passes Phase I, it occurred in a vessel traffic lane of Dover Strait about 13 miles from the city of Dover. Visibility, both at the time of the spill and just after the spill, was restricted by fog. The incident occurred in light winds increasing to Beaufort Force 4-5 and culminating in a gale. Water content of the spilled oil reached 75 percent in 9 hours, and the spill required 11 hours response time. For these reasons, in Phase II the spill fails as an ISB candidate.

APPENDIX C

Olympic Glory

GENERAL INFORMATION:

Spill Name:	Olympic Glory
Date:	1/28/81
Spill Time (local):	9:40
Spill Size (bbls):	23,809
Oil Type:	Galeota crude

LOCATION:

City/State/ Country:	Morgan's Point, TX
Water Body:	Houston Ship Channel
Latitude:	29 41 N
Longitude:	095 00 W

WEATHER DATA:

Wind Speed:	11 m/sec (day 1)
Wind Direction:	
Water Temperature:	16 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Evaporation reaches 30% after five days; dispersion reaches 60% after five days; water content reaches 50% in 45 minutes and 75% in 2 hours.
Logistics Analysis:	Spill requires 4 hour response time; window of opportunity is 2 hours
Populated Area Analysis:	Within 3 miles of Houston and Pasadena.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Olympic Glory

OCCURENCE SCENARIO:

The chemical tanker Lucor Wickliffe struck the tank vessel Olympic Glory approximately two miles south of Morgan's Point on the Houston Ship Channel, TX. Heavy concentrations of oil spread along the shoreline. Frequent shifts in wind direction hampered cleanup efforts. A nearby barge fleeting area was crowded with active barges and interfered with cleanup efforts.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Oregon Standard

GENERAL INFORMATION:

Spill Name:	Oregon Standard
Date:	1/18/71
Spill Time (local):	
Spill Size (bbls):	20,400
Oil Type:	Bunker C

LOCATION:

City/State/ Country:	San Francisco, CA
Water Body:	Pacific Ocean
Latitude:	37 40 N
Longitude:	122 20 W

WEATHER DATA:

Wind Speed:	7-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	15 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Three percent evaporates and close to 10% disperses by day 5; water content reaches 30% by day 5.

Logistics Analysis: Spill requires 12 hour response time; window of opportunity is greater than five days.

Populated Area Analysis: Within 3 miles of San Francisco.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Oregon Standard

OCCURENCE SCENARIO:

No additional information available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Oswego Tarmac

GENERAL INFORMATION:

Spill Name:	Oswego Tarmac
Date:	7/29/77
Spill Time (local):	
Spill Size (bbls):	73,300
Oil Type:	No. 6 fuel oil

LOCATION:

City/State/ Country:	Netherlands Antilles
Water Body:	Caribbean Sea
Latitude:	12 00 N
Longitude:	069 00 W

WEATHER DATA:

Wind Speed:	10-12 m/sec (day 1) 10-12 m/sec (day 2) 10-12 m/sec (day 3) 10-12 m/sec (day 4) 10-12 m/sec (day 5)
Wind Direction:	
Water Temperature:	27 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Fail
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Three percent evaporates and 55% disperses by day 5; water content reaches over 40% by day 5.
Logistics Analysis:	Spill requires 10 hour response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Oswego Tarmac

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Othello

GENERAL INFORMATION:

Spill Name:	Othello
Date:	3/20/70
Spill Time (local):	
Spill Size (bbls):	400,000
Oil Type:	Fuel oil No. 6

LOCATION:

City/State/ Country:	Sweden
Water Body:	
Latitude:	59 20 N
Longitude:	018 20 E

WEATHER DATA:

Wind Speed:

Wind Direction:

Water Temperature: 6 °C (day 1)

Air Temperature:

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	N/A
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	N/A

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **N/A**

Oil Weathering Analysis: Not enough information available to analyze this spill.

Logistics Analysis: Not enough information available to analyze this spill.

Populated Area Analysis: Not enough information available to analyze this spill.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Othello

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available on latitude/longitude to analyze this spill; the latitude/longitude is taken from the MMS database, which appears to be only a rough estimate of the location.

APPENDIX C

Panglobal Friendship

GENERAL INFORMATION:

Spill Name:	Panglobal Friendship
Date:	2/11/75
Spill Time (local):	
Spill Size (bbls):	14,660
Oil Type:	Fuel oil

LOCATION:

City/State/ Country:	20 Mi. off Trinidad
Water Body:	Caribbean Sea
Latitude:	11 04 N
Longitude:	061 34 W

WEATHER DATA:

Wind Speed:	9 m/sec (day 1)
Wind Direction:	
Water Temperature:	25 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Evaporation reaches 23% in 6 hours; dispersion reaches 77% in 6 hours; no oil remains on surface of water; water content reaches 18% in 6 hours.
Logistics Analysis:	Spill requires 31 hour response time; window of opportunity is less than 6 hours.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Panglobal Friendship

OCCURENCE SCENARIO:

The Liberian motor tanker Panglobal Friendship was en route from Curacao to Paramaribo when it sank about 20 miles off Trinidad. The tanker developed a leak and subsequently caught on fire and flooded.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Passenger Vessel

GENERAL INFORMATION:

Spill Name:	Passenger Vessel
Date:	11/26/84
Spill Time (local):	9:00
Spill Size (bbls):	142,857
Oil Type:	No. 1 diesel

LOCATION:

City/State/ Country:	Huntington, NY
Water Body:	Huntington Harbor
Latitude:	40 54 N
Longitude:	73 26 W

WEATHER DATA:

Wind Speed:	9 m/sec (day 1)
Wind Direction:	
Water Temperature:	14 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS used to model; predicts 100% evaporation and dispersion by end of day 2; predicts no emulsification.

Logistics Analysis: Spill requires 7 hour response time; window of opportunity is 48 hours.

Populated Area Analysis: Halesite and Huntington are within 3 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Passenger Vessel

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Peck Slip

GENERAL INFORMATION:

Spill Name:	Peck Slip
Date:	12/19/78
Spill Time (local):	
Spill Size (bbls):	11,000
Oil Type:	Bunker C

LOCATION:

City/State/ Country:	Cape San Juan, PR
Water Body:	Caribbean Sea
Latitude:	18 15 N
Longitude:	065 34 W

WEATHER DATA:

Wind Speed:	5 m/sec (day 1)
Wind Direction:	
Water Temperature:	27 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Less than 5% disperses by day 5; less than 3% evaporation by day 5; close to 30% water content by day 1 increasing to around 40% by day 5.

Logistics Analysis: Spill requires 8 hour response time; window of opportunity is 5 days.

Populated Area Analysis: Within 5 to 10 miles of Fajardo.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Peck Slip

OCCURENCE SCENARIO:

On the morning of December 19, 1978, in unusually heavy seas, the tank barge struck the bottom near Cabo San Juan off the northeast corner of Puerto Rico. The barge suffered structural damage and immediately began to spill oil. The barge was towed back to Yabucoa Harbor. Heavy concentrations of oil were seen in the water and came ashore at several locations. Increased wave action from December 30 to 31 dispersed much of the oil that remained after cleanup operations.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

PEMEX

GENERAL INFORMATION:

Spill Name:	PEMEX
Date:	10/23/86
Spill Time (local):	
Spill Size (bbls):	247,000
Oil Type:	Isthmus

LOCATION:

City/State/ Country:	40 m NW of Cuidad del Carmen, Mexico
Water Body:	Bay of Campeche
Latitude:	18 48 N
Longitude:	092 35 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	27-28 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Forty percent evaporates and 10% disperses by day 5; water content reaches 50% in five hours and 75% by day 1.

Logistics Analysis: Spill requires 31 hour response time; window of opportunity is 24 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

PEMEX

OCCURENCE SCENARIO:

The cause of this spill was a blow-out and a fire ensued. Forty-six thousand barrels of oil were recovered. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, and based on the limited information available for the spill, it passes Phase II as a successful ISB candidate.

APPENDIX C

PEMEX/YUM II

GENERAL INFORMATION:

Spill Name:	PEMEX/YUM II
Date:	10/10/87
Spill Time (local):	
Spill Size (bbls):	56,000
Oil Type:	Light crude oil

LOCATION:

City/State/ Country:	40 Mi. NW of Ciudad de Carmen, Mexico
Water Body:	Gulf of Mexico
Latitude:	18 48 N
Longitude:	092 35 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	29 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 10% disperses by day 5; 40% evaporates by day 5; water content reaches 50% in 6 hours and 75% within 18 hours.

Logistics Analysis: Spill requires 23 hour response time.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

PEMEX/YUM II

OCCURENCE SCENARIO:

On October 10, 1987, the Mexican exploratory well located approximately 20 miles northwest of Ciudad del Carmen in the Bay of Campeche under the Zapoteca rig, experienced a blowout and fire. The initial fire was extinguished by October 17, and Mexican authorities conducted a controlled burn-off operation from October 18-24 in an attempt to keep water pollution to a minimum. By October 28, oil had impacted approximately 20 miles of Mexican shoreline southwest of the rig. The well was finally capped on November 30.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

Although the window of opportunity for the original spill was 18 hours, the spill was ongoing for several weeks. The spill passes Phase I, and ISB was used. The spill passes Phase II as a successful ISB candidate.

APPENDIX C

Petrola

GENERAL INFORMATION:

Spill Name:	Petrola
Date:	6/3/73
Spill Time (local):	
Spill Size (bbls):	20,000
Oil Type:	No. 6 fuel

LOCATION:

City/State/ Country:	Off New York
Water Body:	Atlantic Ocean
Latitude:	41 00 N
Longitude:	72 00 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	
Water Temperature:	15 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Less than 15% disperses by day 5; less than 3% evaporation by day 5; close to 30% water content by day 1 remaining steady through day 5.
Logistics Analysis:	Spill requires 6 hour response time; window of opportunity is 5 days.
Populated Area Analysis:	Within 5 miles of Montauk, which is on the other side of the peninsula.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Petrola

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Polycommander

GENERAL INFORMATION:

Spill Name:	Polycommander
Date:	5/5/70
Spill Time (local):	
Spill Size (bbls):	400,000
Oil Type:	Souedie

LOCATION:

City/State/ Country:	Spain
Water Body:	Atlantic Ocean
Latitude:	42 15 N
Longitude:	008 50 W

WEATHER DATA:

Wind Speed:	4-5 m/sec (day 1)
Wind Direction:	
Water Temperature:	13 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Twenty-five percent evaporates and 3% disperses; water content reaches 25% by day 5.

Logistics Analysis: Spill requires 14 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: Within 10 miles of Vigo.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Polycommander

OCCURENCE SCENARIO:

On May 5, 1970, Polycommander, a Norwegian motor tanker, ran aground on a reef and burst into flames at Muxieriro Point, Cies Islands, Vigo Bay. The grounding occurred about 10 miles from port. Oil, leaking heavily into the sea, was reportedly set on fire by sparks from the exhaust pipe of a passing fishing vessel. The wreck was refloated on July 26 and was towed to Piraeus in September for extensive repairs.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Unsuccessful

The spill passes the Phase I analysis, and although it was not within six miles of a city, it was within ten miles, and oil covered local beaches. The spilled oil was ignited accidentally and the vessel burst into flames. Under these circumstances, it is doubtful that ISB would be used as a response technique. For Phase II, the spill fails as an ISB candidate.

APPENDIX C

Princess Anne-Marie

GENERAL INFORMATION:

Spill Name:	Princess Anne-Marie
Date:	1/28/80
Spill Time (local):	
Spill Size (bbls):	28,571
Oil Type:	Bachaquero heavy crude

LOCATION:

City/State/ Country:	Cabo San Antonio, Cuba
Water Body:	Caribbean Sea
Latitude:	21 50 N
Longitude:	084 40 W

WEATHER DATA:

Wind Speed:	5-6 m/sec (day 1)
Wind Direction:	
Water Temperature:	24-26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Ten percent evaporates and less than 1% disperses by day 5; water content reaches 1% by day 5.

Logistics Analysis: Spill requires 14 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Princess Anne-Marie

OCCURENCE SCENARIO:

The cause of the Princess Anne-Marie oil spill was due to grounding. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, and based on the limited amount of information available for the spill, it passes Phase II as a successful ISB candidate.

APPENDIX C

Puerto Rican

GENERAL INFORMATION:

Spill Name:	Puerto Rican
Date:	10/31/84
Spill Time (local):	
Spill Size (bbls):	38,500
Oil Type:	Bunker fuel, Lubricating

LOCATION:

City/State/ Country:	San Francisco, CA
Water Body:	San Francisco Bay
Latitude:	37 30 N
Longitude:	123 02 W

WEATHER DATA:

Wind Speed:	9 m/sec (day 1)
Wind Direction:	
Water Temperature:	19-20 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS model predicts 1.5% dispersion in five days; 4% evaporation; water content reaches 50% in two hours and 80 percent in six hours.

Logistics Analysis: Spill requires 18 hour response time; window of opportunity is less than 6 hours.

Populated Area Analysis: Within 3 miles of San Francisco.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Puerto Rican

OCCURENCE SCENARIO:

On October 31, 1984, at 03:24, an explosion on board the tank vessel outside the San Francisco Bay Entrance Channel caused a relatively minor release of oil. Fires on board the vessel were extinguished by late afternoon on November 1. The vessel was towed to the vicinity of a nearby ocean dumping site 10 miles southeast of the Farallon Islands. The weather worsened on November 2, with seas as high as 16 feet and wind speeds up to 35 knots. At midnight, the vessel broke in two, releasing 25,000-35,000 barrels of its cargo and 8,500 barrels of bunker fuel approximately 25 miles west of the coast. At 06:00 on November 3, a request for dispersant application was approved, but there was some delay because wind and wave conditions prevented a vessel from reaching the scene to take samples. Dispersant was applied by aircraft at 15:04, but the results were inconclusive.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

San Jacinto River

GENERAL INFORMATION:

Spill Name:	San Jacinto River
Date:	10/20/94
Spill Time (local):	
Spill Size (bbls):	406,000
Oil Type:	Gasoline, Arabian crude, Diesel, Natural gas

LOCATION:

City/State/ Country:	Channelview, TX
Water Body:	San Jacinto River
Latitude:	29 48 N
Longitude:	095 04 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	
Water Temperature:	25 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	ADIOS used to model; evaporation and dispersion reaches approximately 100% within 30 hours; model predicts no emulsification.
Logistics Analysis:	Spill requires 4 hour response time; window of opportunity is 30 hours.
Populated Area Analysis:	Too close to New Caney and within 3 to 5 miles of Porter and Roman Forest.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

San Jacinto River

OCCURENCE SCENARIO:

The San Jacinto River oil spill ignited and the fire spread to local houses. Currents and heavy winds impeded cleanup. Responders boomed the river using a V configuration.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Sansinena

GENERAL INFORMATION:

Spill Name:	Sansinena
Date:	12/17/76
Spill Time (local):	19:38
Spill Size (bbls):	30,000
Oil Type:	Bunker C (Group V) fuel oil, Indonesian light

LOCATION:

City/State/ Country:	Los Angeles, CA
Water Body:	Los Angeles Harbor
Latitude:	33 43 N
Longitude:	118 16 W

WEATHER DATA:

Wind Speed:	3 m/sec (day 1)
Wind Direction:	NE (day 1)
Water Temperature:	18 °C (day 1)
Air Temperature:	13 °C (day 1)

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Water content reaches 40% in five days; less than 2% evaporates in five days, and less than 0.5% disperses.

Logistics Analysis: Spill requires 17 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: Within 3 miles of Los Angeles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Sansinena

OCCURENCE SCENARIO:

On December 17, 1976 the vessel Sansinena exploded, caught fire, and sank during refueling in Los Angeles Harbor, CA. The explosion was the result of a still-air situation that had developed between the mid-ship house and the afterdeck house. Vapors emitting from the cargo tank vents created a vapor cloud that was ignited in the mid-ship house and flashed back through the vent piping system. The largest explosion occurred in the number 10 center cargo tank, which propelled the main deck over the cargo tanks into the air. When the deck landed, it severed a 36-inch cargo line. This line fed fuel to the fire in the harbor until it was discovered and capped on December 21. The force of the explosion flattened street signs for several blocks near the harbor, and flames leapt 1,000 feet into the air.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: N/A

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Santa Barbara Well Blowout

GENERAL INFORMATION:

Spill Name:	Santa Barbara Well Blowout
Date:	1/28/69
Spill Time (local):	
Spill Size (bbls):	100,000
Oil Type:	Willmington crude oil

LOCATION:

City/State/ Country:	Santa Barbara, CA
Water Body:	Pacific Ocean
Latitude:	34 10 N
Longitude:	119 45 W

WEATHER DATA:

Wind Speed:	5 m/sec (day 1)
Wind Direction:	
Water Temperature:	15 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Fifteen percent evaporates and 3% disperses by day 5; water content reached 10% by day 5.
Logistics Analysis:	Spill requires 15 hour response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	Populated area is within 5 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Santa Barbara Well Blowout

OCCURENCE SCENARIO:

On January 28, 1969, the Union Oil Company well number 21 under Platform A, located 5.5 miles southeast of Santa Barbara, California, experienced a blowout. The well was capped on February 7, but oil continued to vent from natural faults, releasing a total of 100,000 barrels until December 1969. Weather during the cleanup was moderate except for a storm on February 4 and 5 that temporarily halted cleanup by damaging booms that were protecting harbors and marinas. The oil initially stayed offshore until the wind pushed a relatively small amount of oil onto the shoreline on February 1, and winds, high tides, and surges on February 4 pushed oil onto beaches directly east and west of Santa Barbara.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Schuylkill River

GENERAL INFORMATION:

Spill Name:	Schuylkill River
Date:	6/22/72
Spill Time (local):	
Spill Size (bbls):	170,000
Oil Type:	No. 6 cargo residue

LOCATION:

City/State/ Country:	Douglassville, PA
Water Body:	Schuylkill River
Latitude:	40 15 N
Longitude:	075 38 W

WEATHER DATA:

Wind Speed:	5-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	20 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Three percent evaporates and 10% disperses by day 5; water content reaches 35% by day 3.

Logistics Analysis: Spill requires 8 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: Too close to Douglasville and Unionville, and within 3 miles of Pottstown.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Schuylkill River

OCCURENCE SCENARIO:

Waste oil and sludge from Berks Associates oil reclamation plant lagoons escaped into the Schuylkill River at Douglasville, PA, because of heavy rains and flooding from Hurricane Agnes. Much of the sludge oil spread over 15 miles of downstream area and coated buildings, trees, and farmland in the flood area. Warm weather accelerated evaporation of the oil and created an explosion and fire hazard. The sludge oil contained high concentrations of lead and other metals, and the burning of collected debris mixed with sludge oil was deemed inappropriate. Other needed rescue and restoration activities created a shortage of response resources.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Sea Empress

GENERAL INFORMATION:

Spill Name:	Sea Empress
Date:	2/15/96
Spill Time (local):	20:07
Spill Size (bbls):	547,619
Oil Type:	Forties Blend crude

LOCATION:

City/State/ Country:	Milford Haven, Wales, United Kingdom
Water Body:	Milford Haven Harbor
Latitude:	51 40 N
Longitude:	005 10 W

WEATHER DATA:

Wind Speed:	7-10 m/sec (day 1)
Wind Direction:	W (day 1)
Water Temperature:	10 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Water content exceeded 50% within 6 hours.

Logistics Analysis: Spill requires 11 hour response time; window of opportunity is less than 6 hours.

Populated Area Analysis: 3 miles from populated area.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Sea Empress

OCCURENCE SCENARIO:

On the night of February 15, 1996, a single-hulled vessel, the Sea Empress, carrying light crude oil for Texaco, struck the mid-Channel Rock in Milford Haven Harbor, Wales, at the entrance of the Milford Haven estuary. Nearly half of the ship's cargo, 547,619 barrels of light North Sea Forties crude oil spilled into the Irish Sea. The Sea Empress spilled only about 40,000 metric tons of oil during the initial grounding, but it sustained additional damage during the following six days and continued leaking oil as salvage crews struggled to maintain control of the tanker in the strong tidal currents, heavy seas, and gale-force winds of Milford Haven. Apart from the oil which affected Milford Haven, the main pattern of surface oil movement was eastwards, running roughly parallel with the south coast of Pembrokeshire to Caldey Island and then turning north into Carmarthen Bay, reaching as far east as the Pendine Sands. In addtion to the mechanical recovery of oil from the surface of the sae, chemical dispersants were used to break the oil up to reduce its potential impact on the shoreline.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Sea Spirit

GENERAL INFORMATION:

Spill Name:	Sea Spirit
Date:	4/15/74
Spill Time (local):	
Spill Size (bbls):	50,028
Oil Type:	Heavy fuel oil

LOCATION:

City/State/ Country:	Los Angeles, CA
Water Body:	Los Angeles Harbor
Latitude:	34 00 N
Longitude:	118 15 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	15-16 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Approximately 2% evaporation within 5 days; 7% dispersion within 5 days; water content reaches 30% in two days and remains constant through 5 days.
Logistics Analysis:	Spill requires 15 hour response time; window of opportunity is 5 days.
Populated Area Analysis:	Within 3 miles of Los Angeles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Sea Spirit

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

SF1 71/SF1 72

GENERAL INFORMATION:

Spill Name:	SF1 71/SF1 72
Date:	6/9/83
Spill Time (local):	
Spill Size (bbls):	14,047
Oil Type:	No. 6 fuel

LOCATION:

City/State/ Country:	Vicksburg, MS
Water Body:	Mississippi River
Latitude:	32 21 N
Longitude:	090 51 W

WEATHER DATA:

Wind Speed:	9 m/sec (day 1)
Wind Direction:	
Water Temperature:	23 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Approximately 3% evaporates and 3% disperses within five days; water content reaches 40% on day 5.
Logistics Analysis:	Spill requires 10 hour response time; window of opportunity is greater than five days.
Populated Area Analysis:	Within 3 miles of Vicksburg (population above 25,000).

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

SF1 71/SF1 72

OCCURENCE SCENARIO:

No additional information available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

SFI 41

GENERAL INFORMATION:

Spill Name:	SFI 41
Date:	11/24/85
Spill Time (local):	
Spill Size (bbls):	16,300
Oil Type:	No. 6 fuel oil

LOCATION:

City/State/ Country:	Mississippi River, MO
Water Body:	Mississippi River
Latitude:	37 20 N
Longitude:	089 30 W

WEATHER DATA:

Wind Speed:	10 m/sec (day 1)
Wind Direction:	
Water Temperature:	23-24 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Evaporation reaches approximately 5% after 5 days; dispersion reaches 15% after 5 days; and water content reaches just over 20% after five days.

Logistics Analysis: Spill requires 17 hour response time; window of opportunity is greater than five days.

Populated Area Analysis: Within 8 miles of Cape Girardeou.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

SFI 41

OCCURENCE SCENARIO:

The M/V Jimmie L and its tow, the SFI 41, struck the Thebes Railroad Bridge at mile 43.7 on the Mississippi River. The barge struck a bridge span pier, rupturing two cargo tanks. The oil impacted the riverbank in isolated areas. Most of the oil dissipated rapidly because of the high energy turbulence of the river. Attempts to boom the barge failed because of high-velocity river currents.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes the Phase I analysis, and although it did not occur within 6 miles of a city, it was an inland spill of heavy fuel oil on the Mississippi River in MO. River turbulence dissipated the oil and made boom deployment difficult. In Phase II, the spill fails as an ISB candidate.

APPENDIX C

Shell Platform 26

GENERAL INFORMATION:

Spill Name:	Shell Platform 26
Date:	12/1/70
Spill Time (local):	
Spill Size (bbls):	58,640
Oil Type:	Grand Isle

LOCATION:

City/State/ Country:	Gulf of Mexico, off Louisiana
Water Body:	Gulf of Mexico
Latitude:	28 46 N
Longitude:	090 10 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	21 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Over 30% evaporates and close to 5% disperses by day 5; water content reaches 80% in 12 hours.

Logistics Analysis: Spill requires 11 hour response time; window of opportunity is 12 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Shell Platform 26

OCCURENCE SCENARIO:

On December 1, 1970, Shell Oil Co. Platform 26 exploded and caught fire. By December 3, burning oil covered the surface of the water within 50 feet of the platform. Shifting winds, fog, and rough seas slowed response efforts at times. Some beach oiling occurred after December 21.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes the Phase I analysis, but water content of the spilled oil was expected to reach 80% in 12 hours. The spill was seven miles from shore. Fire at the platform continued to burn for several weeks, and ISB would not seem to be an appropriate response technique. In Phase II, the spill fails as an ISB candidate.

APPENDIX C

Ship Shoals Block 281

GENERAL INFORMATION:

Spill Name:	Ship Shoals Block 281
Date:	1/24/90
Spill Time (local):	
Spill Size (bbls):	14,423
Oil Type:	South Louisiana crude

LOCATION:

City/State/ Country:	Gulf of Mexico, TX
Water Body:	Gulf of Mexico
Latitude:	28 18 N
Longitude:	90 52 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	17 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS used to model; less than 10% disperses within 5 days; approaching 30% evaporation within 5 days; water content exceeds 65% within 6 hours reaching 76% within 9 hours and reaching 80% by day 1.

Logistics Analysis: Spill requires 33 hour response time; window of opportunity is 9 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Ship Shoals Block 281

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Simonburn

GENERAL INFORMATION:

Spill Name:	Simonburn
Date:	3/15/79
Spill Time (local):	
Spill Size (bbls):	79,990
Oil Type:	No. 6 fuel

LOCATION:

City/State/ Country:	65 Km NE of Sydney, Nova Scotia
Water Body:	Atlantic Ocean
Latitude:	46 56 N
Longitude:	059 40 W

WEATHER DATA:

Wind Speed:	6-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	0-2 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 3% disperses by days; less than 3% evaporation by day 5; water content reaches 18% by day 5.

Logistics Analysis: Spill requires 26 hour response time; window of opportunity is greater than five days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Simonburn

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, and based on the limited amount of information available for the spill, it passes Phase II as a successful ISB candidate.

APPENDIX C

Spartan Lady

GENERAL INFORMATION:

Spill Name:	Spartan Lady
Date:	4/4/75
Spill Time (local):	
Spill Size (bbls):	142,857
Oil Type:	No. 6 fuel

LOCATION:

City/State/ Country:	Off New Jersey
Water Body:	Atlantic Ocean
Latitude:	39 02 N
Longitude:	0'71 00 W

WEATHER DATA:

Wind Speed:	8 m/sec (day 1)
Wind Direction:	
Water Temperature:	10 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 3% evaporation by day 5; less than 15% disperses by day 5; reaching 25% water content day 1 and approximately 27% by day 5.

Logistics Analysis: Spill requires 44 hour response time; window of opportunity is 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Spartan Lady

OCCURENCE SCENARIO:

En route from Okrika, Nigeria, to New York, the Liberian steam tanker Spartan Lady broke in two due to a rupture in the tank during hurricane-force winds about 165 miles southeast of New York. Both sections of the tanker drifted.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes Phase I, although there were high winds and heavy seas at the time of the incident. Based on the limited amount of information available for the spill, it passes Phase II as a successful ISB candidate.

APPENDIX C

St. Peter

GENERAL INFORMATION:

Spill Name:	St. Peter
Date:	2/5/76
Spill Time (local):	
Spill Size (bbls):	279,000
Oil Type:	Oriente crude

LOCATION:

City/State/ Country:	Cabo Manglares, Colombia
Water Body:	Pacific Ocean
Latitude:	01 30 N
Longitude:	079 30 W

WEATHER DATA:

Wind Speed:	4 m/sec (day 1)
Wind Direction:	
Water Temperature:	26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Thirty percent evaporates and close to 2% disperses by day 5; water content reaches 70% by day 2 and remains so through day 5.

Logistics Analysis: Spill requires 37 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

St. Peter

OCCURENCE SCENARIO:

On the evening of February 4, 1976, fire broke out in the engine room of St. Peter. There were subsequent explosions on board and the fire continued to burn until February 5 or 6, when the vessel sank approximately 18 miles off Cabo Manglares, Colombia. Oil moved in a northeasterly direction and came ashore in Tumaco, Colombia, Esmaraldas and Isla Gallo, Ecuador. Little or no oil spill control and cleanup equipment was available in the area, and freight costs to bring such equipment into the area were high. No known response activities were undertaken.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes Phase I, but a fire burned on the vessel for nearly two days. Our logistics analysis estimated that response time would exceed a day and a half, and our oil weathering analysis indicated that the water content of the spilled oil would reach 70 percent by day 2. In Phase II, the spill fails as an ISB candidate.

APPENDIX C

Stuyvesant (I)

GENERAL INFORMATION:

Spill Name:	Stuyvesant (I)
Date:	1/6/87
Spill Time (local):	
Spill Size (bbls):	14,285
Oil Type:	North Slope crude

LOCATION:

City/State/ Country:	Valdez, Gulf of Alaska, AK
Water Body:	Gulf of Alaska
Latitude:	51 29 N
Longitude:	136 16 W

WEATHER DATA:

Wind Speed:	10-11 m/sec (day 1) 13 m/sec (day 2) 13 m/sec (day 3) 13 m/sec (day 4) 13 m/sec (day 5)
Wind Direction:	
Water Temperature:	7 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Fail
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Approximately 28% evaporation within 6 hours; approximately 5% dispersion within 6 hours; water content is approximately 35% within 6 hours.
Logistics Analysis:	Spill requires 58 hours response time; window of opportunity is greater than 5 days.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Stuyvesant (I)

OCCURENCE SCENARIO:

Weather was a contributing factor. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Stuyvesant (II)

GENERAL INFORMATION:

Spill Name:	Stuyvesant (II)
Date:	10/4/87
Spill Time (local):	
Spill Size (bbls):	14,285
Oil Type:	North Slope crude

LOCATION:

City/State/ Country:	Gulf of Alaska, AK (100 to 200 Miles Off B.C.)
Water Body:	Gulf of Alaska
Latitude:	54 05 N
Longitude:	138 00 W

WEATHER DATA:

Wind Speed:	9-10 m/sec (day 1)
Wind Direction:	
Water Temperature:	11-12 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Approximately 25% of the oil evaporates by day 5; 50% disperses by day 5; and water content approaches 70% by day 2, remaining constant through day 5.

Logistics Analysis: Spill requires 46 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Stuyvesant (II)

OCCURENCE SCENARIO:

Weather was a contributing factor. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes Phase I, but there was rough weather at the time of the incident. Our analysis shows that the water content of the spilled oil approaches 70 percent by the time that response resources arrive. Based on the limited amount of information available for the spill, in Phase II it fails as an ISB candidate.

APPENDIX C

Tanio

GENERAL INFORMATION:

Spill Name:	Tanio
Date:	3/7/80
Spill Time (local):	
Spill Size (bbls):	98,955
Oil Type:	No. 6 fuel oil

LOCATION:

City/State/ Country:	Brittany, France
Water Body:	English Channel
Latitude:	49 10 N
Longitude:	004 16 W

WEATHER DATA:

Wind Speed:	10 m/sec (day 1)
Wind Direction:	
Water Temperature:	10-11 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Two and a half percent evaporates and 25% disperses after 5 days; water content reaches 25% on day 1 and remains at that level through day 5.

Logistics Analysis: Spill requires 14 hour response time; window of opportunity is greater than five days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Tanio

OCCURENCE SCENARIO:

The tanker broke in two off the coast of Brittany, France, during a violent storm. Strong northwest winds moved the oil towards the Breton coast, and because of the high viscosity of the oil and severe weather conditions, containment or dispersal at sea was impossible. About 125 miles of shoreline with a large tidal range of 26 feet was oiled.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Marginal Call**

The spill passes Phase I, but the spill occurred during a violent storm. Severe weather and changing wind direction hampered response efforts. The tidal range in the region is large, so many areas along the coast could not be boomed effectively. In Phase II, the spill is a marginal call as an ISB candidate.

APPENDIX C

Tarik Ibn Ziyad

GENERAL INFORMATION:

Spill Name:	Tarik Ibn Ziyad
Date:	3/26/75
Spill Time (local):	
Spill Size (bbls):	109,950
Oil Type:	Iranian light crude

LOCATION:

City/State/ Country:	Rio de Janeiro, Brazil
Water Body:	Atlantic Ocean
Latitude:	22 54 S
Longitude:	043 10 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	22 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Thirty-five percent evaporates and 10% disperses by day 5; water content reaches 75% by day 3.

Logistics Analysis: Spill requires 36 hour response time; window of opportunity is three days.

Populated Area Analysis: Within 3 miles of Rio de Janeiro, Brazil.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Tarik Ibn Ziyad

OCCURENCE SCENARIO:

The tank vessel grounded while entering the Sao Sebastiao terminal at Santos, Brazil. Tanks ruptured and the vessel leaked oil for approximately 15 hours. The two principal cleanup techniques were the application of dispersants and the use of straw as an absorbent. The oil impacted several beaches and a biological preserve on the Jequia River. The oil in the preserve caught fire and destroyed mangrove trees.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Texaco North Dakota

GENERAL INFORMATION:

Spill Name:	Texaco North Dakota
Date:	8/21/80
Spill Time (local):	
Spill Size (bbls):	18,000
Oil Type:	Raffinate

LOCATION:

City/State/ Country:	100 m. S of Morgan City,Gulf of Mexico, LA
Water Body:	Gulf of Mexico
Latitude:	28 04 N
Longitude:	091 39 W

WEATHER DATA:

Wind Speed:	5 m/sec (day 1)
Wind Direction:	
Water Temperature:	29-30 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS used as model; less than 1% disperses within 12 hours; approximately 100% evaporation within 10 hours; insufficient distillation emulsification data -- model predicts no emulsification.

Logistics Analysis: Spill requires 27 hour response time; window of opportunity is approximately 10 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Texaco North Dakota

OCCURENCE SCENARIO:

The cause of the Texaco North Dakota was due to ramming. An explosion and fire ensued. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Texaco Oklahoma

GENERAL INFORMATION:

Spill Name:	Texaco Oklahoma
Date:	3/27/71
Spill Time (local):	15:30
Spill Size (bbls):	250,000
Oil Type:	West Texas Sour

LOCATION:

City/State/ Country:	Off the coast of North Carolina
Water Body:	Atlantic Ocean
Latitude:	36 00 N
Longitude:	073 00 W

WEATHER DATA:

Wind Speed:	9-11 m/sec (day 1)
Wind Direction:	
Water Temperature:	16-20 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Ten percent disperses within 8 hours; 30% evaporates within 8 hours; water content reaches 50% within 8 hours and 75% within 24 hours.
Logistics Analysis:	Spill requires 45 hour response time.
Populated Area Analysis:	No population of 10,000 witihn 10 miles

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Texaco Oklahoma

OCCURENCE SCENARIO:

The American steam tanker Texaco Oklahoma broke in two aft of the amidships house in heavy seas and high winds off the coast of North Carolina. The tanker had been en route from Port Arthur, Texas, to Boston when it ran into very severe weather, with winds of 80 miles per hour. The tanker suddently broke apart, apparently by the impacted by a large wave.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Texaco Storage Tank

GENERAL INFORMATION:

Spill Name:	Texaco Storage Tank
Date:	4/27/86
Spill Time (local):	
Spill Size (bbls):	240,000
Oil Type:	Venezuelan crude, Mexican Isthmanian crude, Medium

LOCATION:

City/State/ Country:	Bahia Las Minas, Panama
Water Body:	Caribbean Sea
Latitude:	09 40 N
Longitude:	079 05 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	27 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 10% disperses by day 5; less than 40% evaporates by day 5; 50% water content at 6 hours and greater than 75% water content by day 1.

Logistics Analysis: Spill requires 11 hour response time; window of opportunity is 1 day.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Texaco Storage Tank

OCCURENCE SCENARIO:

A storage tank at the Texaco refinery near Isla Payardi, Panama, occurred on April 27, 1986. Approximately 240,000 barrels of oil were relased in this incident, with nearly 100,000 contained in dikes at the facility. The remaining 140,000 barrels flooded through the dikes and flowed into Bahia Cativa. Onshore winds kept the oil confined to the bay for the initial days of the spill, but on May 3 winds and rain runoff pushed the oil out to sea. By May 15, oil was contaminating fringing reefs, sand beaches, mangroves, and estuaries within 6 miles of the refinery. Dispersants and skimmers were used in response efforts to this spill, but shallow waters and mangroves made many traditional response techniques impractical. Oil slicks were observed in Bahia Las Minas for four year following the spills. The oil was believed to have originated in the fringing mangroves.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes Phase I, but the incident occurred at a facility on shore. Our weathering analysis shows that the water content of the spilled oil was 50 percent within 6 hours and greater than 75 percent within 24 hours. In Phase II, the spill fails as an ISB candidate.

APPENDIX C

Texas

GENERAL INFORMATION:

Spill Name:	Texas
Date:	3/7/86
Spill Time (local):	
Spill Size (bbls):	17,055
Oil Type:	East Texas crude

LOCATION:

City/State/ Country:	Mississippi River, MO
Water Body:	Mississippi River
Latitude:	37 10 N
Longitude:	089 30 W

WEATHER DATA:

Wind Speed:	10 m/sec (day 1)
Wind Direction:	
Water Temperature:	18 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Forty-five percent evaporates and over 30% disperses by day 5; water content reached 80% within 3 hours.

Logistics Analysis: Spill requires 21 hour response time; window of opportunity is less than 3 hours.

Populated Area Analysis: Towns of Fayville and Scott City are within 5 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Texas

OCCURENCE SCENARIO:

The tank barges Kansas and Texas, under tow from the M/V Edwin L. Kennedy, ran aground on the Grand Chain Rocks at Upper Mississippi River mile 42.4. Early attempts to rig boom around the Texas failed because of rapid currents and river conditions. Extensive oiling was observed on the day of the incident. Product in the river appeared to weather and dissipate rapidly under the influence of river currents.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: N/A

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Titipor

GENERAL INFORMATION:

Spill Name:	Titipor
Date:	10/15/79
Spill Time (local):	
Spill Size (bbls):	158,004
Oil Type:	Diesel fuel

LOCATION:

City/State/ Country:	Tomanaus Rds, Brazil
Water Body:	Amazon River
Latitude:	03 06 S
Longitude:	060 00 W

WEATHER DATA:

Wind Speed:	5-6 m/sec (day 1)
Wind Direction:	
Water Temperature:	18-19 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Evaporation reaches 35% in 12 hours; dispersion reaches 75% in 12 hours; total evaporates and disperses equals 100% in 12 hours; water content less than 1% in five days.

Logistics Analysis: Spill requires 19 hour response time; window of opportunity is 12 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Titipor

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Torrey Canyon

GENERAL INFORMATION:

Spill Name:	Torrey Canyon
Date:	3/18/67
Spill Time (local):	
Spill Size (bbls):	860,000
Oil Type:	Kuwait crude oil

LOCATION:

City/State/ Country:	Lands End, England
Water Body:	English Channel
Latitude:	50 03 N
Longitude:	004 44 W

WEATHER DATA:

Wind Speed:	8-10 m/sec (day 1)
Wind Direction:	
Water Temperature:	9-11 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Evaporation reaches 30% in 5 days; dispersion reaches 35% in 5 days; water content levels at 70% in 9 hours, remaining constant for 5 days.

Logistics Analysis: Spill requires 15 hour response time; window of opportunity is five days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Torrey Canyon

OCCURENCE SCENARIO:

On the morning of March 18, 1967, the tank vessel Torrey Canyon ran aground on Seven Stones Reef off Lands End in England, and oil was released into the sea or burned during the next 12 days. Ships of the Royal Navy carrying detergents were en route to the scene within four hours of the grounding. Detergent was sprayed on much of the floating oil. The vessel lost structural integrity on March 26, releasing more oil into the water. Government authorities decided to bomb the vessel on March 28-30 to burn the remaining oil. From the original spill and later releases, the oil formed three distinct slicks. One slick drifted up the English Channel and oiled the coasts of France and Guernsey, one stranded on the coast of West Cornwall, and one drifted south into the Bay of Biscay and remained at sea for two months, during which time as much as 50 percent of the lighter fractions of the oil evaporated. The formation of water-in-oil emulsions greatly increased the volume of material and its resistance to dispersants. Approximately half of the cargo did not reach shore because it weathered, evaporated, or was dispersed by natural mechanisms. For several months, many shorelines were recoated with oil-dispersant mixtures.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Marginal Call

The spill passes the Phase I analysis, but the water content of the spilled oil was high, reaching 70 percent in nine hours, well before the response time of 15 hours. Although the spill site was not within six miles of a city, it was close to shore off Lands End in England and a large segment of the English and French coasts eventually were oiled. In the response itself, government authorities bombed the vessel ten days after the original spill to burn the oil that had not been released. Napalm, sodium chlorite, and aviation fuel were dropped to fuel the fire. For these reasons, in Phase II the spill is a marginal call as an ISB candidate for the spilled oil.

APPENDIX C

Trader

GENERAL INFORMATION:

Spill Name:	Trader
Date:	6/11/72
Spill Time (local):	
Spill Size (bbls):	260,000
Oil Type:	Soviet export blend

LOCATION:

City/State/ Country:	Greece
Water Body:	Mediterranean Sea
Latitude:	36 20 N
Longitude:	019 43 E

WEATHER DATA:

Wind Speed:	4-7 m/sec (day 1)
Wind Direction:	
Water Temperature:	21-22 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: Pass

Oil Weathering Analysis: Close to 30% evaporates and 7% disperses by day 5; water content reached 75% by day 2.

Logistics Analysis: Spill requires 41 hour response time; window of opportunity is 48 hours.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Trader

OCCURENCE SCENARIO:

After severe engine room leakage, Trader, the Greek steam tanker, sank off the southwest coast of Greece on June 11, 1972. No additional information is available on this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Unsuccessful**

The spill passes the Phase I analysis, but our analysis indicates that the response time would be nearly two days, by which time the water content would reach 75 percent. Based on the limited information available, in Phase II, the spill fails as an ISB candidate.

APPENDIX C

TTT-103 Chevron USA

GENERAL INFORMATION:

Spill Name:	TTT-103 Chevron USA
Date:	7/31/86
Spill Time (local):	22:30
Spill Size (bbls):	14,000
Oil Type:	Auto Gas, LPG, No. 2 fuel, Resin

LOCATION:

City/State/ Country:	Pascagoula, MS
Water Body:	Intercoastal Waterway
Latitude:	30 26 N
Longitude:	088 33 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	N (day 1)
Water Temperature:	28 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Less than 1% disperses in 12 hours; 50% evaporates in 1 hour reaching 90% evaporation within 12 hours.

Logistics Analysis: Spill requires a 9 hour response time.

Populated Area Analysis: Within 3 miles of Pascagoula.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

TTT-103 Chevron USA

OCCURENCE SCENARIO:

An offloading explosion occurred, fire ensued, and the hull ruptured. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

TWE 23 De Agosto

GENERAL INFORMATION:

Spill Name:	TWE 23 De Agosto
Date:	6/27/89
Spill Time (local):	
Spill Size (bbls):	14,660
Oil Type:	Gasoline

LOCATION:

City/State/ Country:	Caribbean Sea, Port in Cuba
Water Body:	Caribbean Sea
Latitude:	N/A
Longitude:	N/A

WEATHER DATA:

Wind Speed:

Wind Direction:

Water Temperature:

Air Temperature:

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	N/A
Oil Weathering:	N/A
Logistics:	N/A
Populated Area:	N/A

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **N/A**

Oil Weathering Analysis: Not enough information available on latitude/longitude to analyze this spill.

Logistics Analysis: Not enough information available on latitude/longitude to analyze this spill.

Populated Area Analysis: Not enough information available on latitude/longitude to analyze this spill.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

TWE 23 De Agosto

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

Not enough information available on oil type of latitude/longitude to analyze this spill.

APPENDIX C

U.S. Strategic Petroleum Reserve

GENERAL INFORMATION:

Spill Name:	U.S. Strategic Petroleum Reserve
Date:	9/21/78
Spill Time (local):	
Spill Size (bbls):	32,520
Oil Type:	Light Arabian crude

LOCATION:

City/State/ Country:	West Hackberry, LA
Water Body:	Black Lake
Latitude:	29 59 N
Longitude:	093 22 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	28 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Greater than 5% disperses by day 5; greater than 30% evaporates by day 5; water content exceeds 65% within 3 hours, reaches around 75% within 6 hours and remains around 75%.

Logistics Analysis: Spill requires 8 hour response time; window of opportunity is 6 hours (1.5 X Window = 9 hours).

Populated Area Analysis: Town of Hackberry is within 5 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

U.S. Strategic Petroleum Reserve

OCCURENCE SCENARIO:

A major oil spill and fire occurred at the storage site in West Hackberry, LA, and the fire burned for five days. The oil was initially contained within a dike, but a breach of the dike the next day spilled 32,000 barrels into nearby Black Lake. Consistent winds helped to hold the floating oil against the shoreline and within booms. Most of the oil that spilled was recovered and returned to storage.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

UMTB 283

GENERAL INFORMATION:

Spill Name:	UMTB 283
Date:	1/15/89
Spill Time (local):	
Spill Size (bbls):	48,619
Oil Type:	Diesel

LOCATION:

City/State/ Country:	South of Semidi Islands, AK
Water Body:	Pacific Ocean
Latitude:	54 46 N
Longitude:	158 18 W

WEATHER DATA:

Wind Speed:	12-15 m/sec (day 1) 13-15 m/sec (day 2) 13-15 m/sec (day 3) 13-15 m/sec (day 4) 13-14 m/sec (day 5)
Wind Direction:	
Water Temperature:	3-4 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Fail
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	ADIOS used to model; total evaporation and dispersion reaches approximately 100% in 18 hours; ADIOS predicts that the product will not emulsify.
Logistics Analysis:	Spill requires 22 hour reponse time; window of opportunity is 18 hours.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

UMTB 283

OCCURENCE SCENARIO:

On December 26, 1988, the barge, towed by the tug Marine Explorer, began sinking approximately 35 miles southeast of Simeonof Island, on the western side of the Gulf of Alaska in extremely rough weather. Throughout early January, the barge continued to leak as the area experienced severe weather with 50-60 knot winds, Beaufort Force 9 with icy conditions, and 20-25 foot seas. On January 13, at the owner's request, the USCG sunk the barge approximately 11 miles southwest of the Semidi Islands. Because of the location of the spill, on-scene weather conditions, and the rate of oil leakage, no cleanup action was performed.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Union Oil Co. of California

GENERAL INFORMATION:

Spill Name:	Union Oil Co. of California
Date:	2/8/78
Spill Time (local):	
Spill Size (bbls):	35,714
Oil Type:	Automotive gasoline

LOCATION:

City/State/ Country:	Revere, MA
Water Body:	Massachusetts Bay
Latitude:	42 24 N
Longitude:	071 01 W

WEATHER DATA:

Wind Speed:	10 m/sec (day 1)
Wind Direction:	
Water Temperature:	6 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: ADIOS predicts approximately 100% evaporation within 12 hours; less than 5% dispersion within 12 hours; insufficient distillation emulsification data - model predicts no emulsification.

Logistics Analysis: Spill requires 13 hour reponse time; window of opportunity is approximately 12 hours.

Populated Area Analysis: Within 3 miles of Revere (population above 25,000).

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Union Oil Co. of California

OCCURENCE SCENARIO:

The cause of the Union Oil Co. of California oil spill was due to a tank fracture. No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Urquiola

GENERAL INFORMATION:

Spill Name:	Urquiola
Date:	5/12/76
Spill Time (local):	
Spill Size (bbls):	733,000
Oil Type:	Light Arabian crude oil, Bunker fuel

LOCATION:

City/State/ Country:	La Coruna, Spain
Water Body:	Atlantic Ocean
Latitude:	43 22 N
Longitude:	008 23 W

WEATHER DATA:

Wind Speed:	7 m/sec (day 1)
Wind Direction:	
Water Temperature:	13-14 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	Approximately 35% evaporation in five days; 12% dispersion; water content reaches 75% in six hours.
Logistics Analysis:	Spill requires 15 hour response time; window of opportunity is 6 hours.
Populated Area Analysis:	Within 5 to 10 miles of La Coruna.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Urquiola

OCCURENCE SCENARIO:

On May 12, 1976, the tank vessel struck a submerged object while approaching the Coruna Oil Terminal at La Coruna, Spain, and began to leak cargo. While being assisted out of the harbor by two tugs, the leaking vessel grounded again, further rupturing the bow tanks. Two hours later the vessel exploded and over 500,000 barrels of oil burned in the subsequent 16-hour fire. There was a second explosion and fire on the morning of May 14. Northwest winds blew the oil onshore, and about 200,000 barrels of oil polluted the Spanish coast. Booming equipment was not available locally. On May 21, lightering operations began but they were halted by rough seas on May 25. Ten- to fifteen-foot seas detached a large section of the bow.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

URSS 1

GENERAL INFORMATION:

Spill Name:	URSS 1
Date:	8/10/77
Spill Time (local):	
Spill Size (bbls):	146,000
Oil Type:	Soviet export blend crude

LOCATION:

City/State/ Country:	Turkey
Water Body:	Bosporous
Latitude:	41 02 N
Longitude:	28 57 E

WEATHER DATA:

Wind Speed:	4 m/sec (day 1)
Wind Direction:	
Water Temperature:	23-24 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Over 30% evaporates and 1% disperses by day 5; water content reaches 75% by day 3.

Logistics Analysis: Spill requires 26 hour response time; window of opportunity is 3 days.

Populated Area Analysis: Within 3 miles of Istanbul.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

URSS 1

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

US 218

GENERAL INFORMATION:

Spill Name:	US 218
Date:	12/25/83
Spill Time (local):	
Spill Size (bbls):	25,000
Oil Type:	Light diesel No. 1-D

LOCATION:

City/State/ Country:	Lower Mississippi River (Mi. 180.8), Donaldson, LA
Water Body:	Mississippi River
Latitude:	30 05 N
Longitude:	091 00 W

WEATHER DATA:

Wind Speed:	7-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	22-23 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis:	ADIOS used to model; total dispersed and evaporated oil reaches approximately 100% by day 2; ADIOS predicts that this product will not emulsify.
Logistics Analysis:	Spill requires 5 hour response time; window of opportunity is 2 days.
Populated Area Analysis:	Within 3 miles of Donaldson, Central Union, and Welcome.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

US 218

OCCURENCE SCENARIO:

No additional information is available for this spill.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

V882/V883/V884/V885

GENERAL INFORMATION:

Spill Name:	V882/V883/V884/V885
Date:	4/2/83
Spill Time (local):	
Spill Size (bbls):	13,212
Oil Type:	Rainbow crude

LOCATION:

City/State/ Country:	St. Louis, MO
Water Body:	Mississippi River
Latitude:	38 40 N
Longitude:	090 15 W

WEATHER DATA:

Wind Speed:	8-9 m/sec (day 1)
Wind Direction:	
Water Temperature:	13 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Fail
Logistics:	Fail
Populated Area:	Fail

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Unsuccessful**

Oil Weathering Analysis: Evaporation reaches 42% and dispersion reaches 10% within five days; water content exceeds 75% in 2.5 hours.

Logistics Analysis: Spill requires 14 hour response time; window of opportunity is 2.5 hours.

Populated Area Analysis: Within 3 miles of St. Louis (population above 250,000).

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

V882/V883/V884/V885

OCCURENCE SCENARIO:

The M/V City of Greenville with a tow of four barges struck the Illinois pier of the Poplar Street Bridge near downtown St. Louis, MO. The weather was cloudy and overcast with light rain and winds gusting from the northwest to 25 miles per hour. One of the barges exploded on impact and burst into flames. The fire spread, and three burning barges were set adrift down the river, causing extensive damage to facilities and other barges. Barge V884 suffered the most damage; both the barge and its discharged cargo on the river's surface were in flames. Wind changes, high water, and swift currents were a continuous problem throughout the response.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **N/A**

This spill was determined an unsuccessful ISB candidate in the Phase I analysis; see Phase I Evaluation.

APPENDIX C

Vesta Bella

GENERAL INFORMATION:

Spill Name:	Vesta Bella
Date:	3/6/91
Spill Time (local):	
Spill Size (bbls):	13,300
Oil Type:	No. 6 fuel oil

LOCATION:

City/State/ Country:	Nevis Is. (U.K.)
Water Body:	Caribbean Sea
Latitude:	17 17 N
Longitude:	062 18 W

WEATHER DATA:

Wind Speed:	6-8 m/sec (day 1)
Wind Direction:	
Water Temperature:	25-26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 3% evaporates and 11% disperses within five days; water content reaches 40% on day 2 and remains constant through day 5.

Logistics Analysis: Spill requires 11 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Vesta Bella

OCCURENCE SCENARIO:

On March 6, 1991, the tank barge sank in the Atlantic Ocean approximately 12 miles northeast of Nevis Island. By March 12, beached oil was confirmed on St. Maarten and St. Barthelemy. Dispersant was applied during March 9-15 within a two-mile area of the source, but was ineffective. Commercial response equipment was not available on Antigua, St. Kitts, or Nevis; the nearest such equipment was located in San Juan and Venezuela.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Marginal Call

The spill passes Phase I, and although it was not within six miles of a city, it was within 12 miles of shore in the eastern Caribbean. Water content was relatively high, reaching 40 percent by day 2. Some of the spilled oil became mixed with sand and submerged below the water surface. In Phase II, the spill is a marginal call as an ISB candidate.

APPENDIX C

Witwater

GENERAL INFORMATION:

Spill Name:	Witwater
Date:	12/13/68
Spill Time (local):	
Spill Size (bbls):	14,000
Oil Type:	Marine diesel (API 31.3) and Bunker C (API 7-14)

LOCATION:

City/State/ Country:	Galeta Island, Canal Zone, Panama
Water Body:	Atlantic Ocean
Latitude:	09 35 N
Longitude:	080 40 W

WEATHER DATA:

Wind Speed:	6 m/sec (day 1)
Wind Direction:	
Water Temperature:	27 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis: Less than 5% evaporates by day 5; 5% disperses; slightly over 40% water content by day 2, remaining fairly constant through day 5.

Logistics Analysis: Spill requires 18 hour response time; window of opportunity is greater than 5 days.

Populated Area Analysis: No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C
Witwater

OCCURENCE SCENARIO:

The oil tanker Witwater broke up in heavy seas off the Atlantic coast of Panama, spilling oil into the water five miles from Galeta Island. Strong winds pushed the slick toward the island, and oil collected in a small bay. Several thousand barrels were pumped from the waters surrounding the island, and approximately 5,000 barrels were ignited and burned in the bay.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: **Successful**

The spill passes the Phase I analysis. ISB was used to remove some of the spilled oil in this incident. For Phase II, the spill is a successful ISB candidate.

APPENDIX C

Zoe Colocotronis

GENERAL INFORMATION:

Spill Name:	Zoe Colocotronis
Date:	3/18/73
Spill Time (local):	2:55
Spill Size (bbls):	37,579
Oil Type:	Tia Juana light

LOCATION:

City/State/ Country:	Cabo Rojo, PR
Water Body:	Caribbean Sea
Latitude:	18 00 N
Longitude:	067 15 W

WEATHER DATA:

Wind Speed:	
Wind Direction:	
Water Temperature:	26 °C (day 1)
Air Temperature:	

ANALYSIS CRITERIA (Phase I):

Weather/Technology:	Pass
Oil Weathering:	Pass
Logistics:	Pass
Populated Area:	Pass

PHASE I EVALUATION:

Pass/Unsuccessful Evaluation: **Pass**

Oil Weathering Analysis:	Close to 40% dispersed and evaporated by day 5; water content came close to 70% by day 5.
Logistics Analysis:	Spill requires 15 hour response; window of opportunity is greater than five days.
Populated Area Analysis:	No population over 10,000 within 10 miles.

(See **Results Summary and Phase II Evaluation** for more information)

APPENDIX C

Zoe Colocotronis

OCCURENCE SCENARIO:

At approximately 3 a.m. on March 18, 1975, the vessel Zoe Colocotronis ran aground on a reef 3.5 miles off the La Parguera tourist area on the southwest coast of Puerto Rico. In order to get the vessel off the reef, water and cargo from the forward tank were jettisoned, including 37,579 barrels of crude oil. Oil began coming ashore by the evening following the grounding, and continued to come ashore along three miles of shoreline. Approximately 2.5 acres of mangrove forest died due to oiling.

RESULTS SUMMARY and PHASE II EVALUATION:

Successful/Marginal Call/Unsuccessful Evaluation: Unsuccessful

The spill passes the Phase I analysis, but the water content of the spilled oil was high, coming close to 70% by day 5. Initially, winds were nearly 10 m/s and seas were 1-1.5 feet. Although there was no city within 10 miles, the spill occurred only 3.5 miles from a tourist area on the coast of Puerto Rico. Oil started coming ashore on the beaches by the evening of the grounding, which is the earliest that response resources could arrive, according to the logistics analysis. Shifting winds hindered the spill response. For these reasons, in Phase II the spill fails as an ISB candidate.