Pre-Assessment Data Report
Tank Barge DBL 152 Oil Discharge in Federal Waters, Gulf of Mexico

Cooperatively prepared by the
National Oceanic and Atmospheric Administration and
ENTRIX, Inc. (on behalf of K-Sea Transportation Partners LP)

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ACRONYMS, ABBREVIATIONS & SYMBOLS

API	American Petroleum Institute
Bbls	Barrels (1 barrel equals 42 U.S. Gallons)
CFR	Code of Federal Regulations
GPS	Global Positioning System
ITB	Integrated Tug-Barge
LTM	Long Term Monitoring
NDBC	National Data Buoy Center
nm	Nautical Mile (1 nm equals 6,076 feet)
NOAA	National Oceanic and Atmospheric Administration
NRDA	Natural Resource Damage Assessment
OPA	Oil Pollution Act of 1990
PADR	Pre-Assessment Data Report
PAH	Polycyclic Aromatic Hydrocarbon
ppt	Parts per thousand
ROV	Remotely Operated Vehicle
RP	Responsible Party
TABS	Texas Automated Buoy System
T/B	Tank Barge
USC	United States Code
USCG	United States Coast Guard
V-SORS	Vessel-Submerged Oil Recovery System

PRE-ASSESSMENT DATA REPORT
TANK BARGE DBL 152 OIL DISCHARGE IN FEDERAL WATERS,
GULF OF MEXICO

1.0 INTRODUCTION

This document is the Pre-Assessment Data Report (PADR) for the Tank Barge (T/B) DBL 152 oil discharge (the Incident) that occurred in federal waters of the Gulf of Mexico beginning on November 11, 2005. This report was cooperatively prepared by the National Oceanic and Atmospheric Administration (NOAA) and ENTRIX, Inc. (ENTRIX), the Responsible Party's (RP) environmental consultant. Additional information regarding the contents of this document and its intended uses are outlined below.

1.1 Background

A major goal of the Oil Pollution Act of 1990 (OPA) is to make the environment and public whole for injuries to natural resources and services that occur as a result of incidents involving a discharge or substantial threat of a discharge of oil. This goal is achieved first by returning the injured natural resources and services to the condition in which they would have existed if the incident had not occurred (known as the "baseline" condition). This may occur through natural recovery and/or human intervention. Second, the public is compensated for the interim loss of natural resources and services from the time of the incident until recovery to baseline through restoration, rehabilitation, replacement, or acquisition of the equivalent resources and/or services. The process through which these restoration goals are accomplished is known as a natural resource damage assessment (NRDA).

NOAA is the sole natural resource trustee (hereafter "Trustee") for the T/B DBL 152 Incident, as designated pursuant to 33 U.S.C. §2706(b), Executive Order 12777, and the National Contingency Plan, 40 CFR §300.600 and §300.605. NOAA's trust resources include, but are not limited to, commercial and recreational fish species, anadramous and catadromous fish species, marshes and other coastal habitats, marine mammals, and endangered and threatened marine species.

K-Sea Transportation Partners LP, the owner/operator of the vessel discharging oil, is the RP for this incident, as defined by OPA 33 U.S.C. §2701 *et seq*.

The first phase of the NRDA process is the pre-assessment phase. The pre-assessment phase is a preliminary fact-finding and screening process used by the Trustee to determine whether it has jurisdiction to pursue restoration under OPA, and, if so, whether it is appropriate to do so. The Trustee's decision to pursue a NRDA is based, in part, on consideration of the following factors: the Trustee's legal authority and jurisdiction to pursue a NRDA based on the circumstances of a particular incident; the likelihood that natural resources and/or services under its stewardship have been, or are likely to be, injured; the degree to which response actions are expected to adequately address the injuries; and the existence of feasible restoration actions to address the injuries.

This PADR sets forth the technical and scientific basis upon which the Trustee will make these determinations and consists of the following: a summary of the incident and response efforts; a preliminary identification of the resources potentially at risk; an analysis of potential pathways by which T/B DBL 152 oil could injure natural resources and/or their services; and a summary of the ephemeral and other data collected and analyzed during the pre-assessment phase of the incident. The pre-assessment for the Incident was performed concurrently with the response activities (e.g., oil cleanup and long-term monitoring), which were conducted between November 11, 2005 and February 28, 2007.

This PADR is intended to document activities and information that are relevant for a NRDA. This information will assist the Trustee in evaluating the need for continuing the NRDA process. If, based upon the pre-assessment, the Trustee determines that natural resources and/or their services were injured as a result of the Incident and feasible restoration options exist, the NRDA process will be continued. Information not specifically included in this PADR may be used in subsequent damage assessment activities should the need arise.

This PADR summarizes the environmental data collection efforts conducted between November 11, 2005, and February 28, 2007, during the response phase of this incident. This document is organized into three sections. Section 1 provides an introduction to the document. Section 2 describes the spill response efforts, including submerged oil detection and assessment, clean-up methodology, and long-term monitoring. Section 3 presents a summary of the NRDA pre-assessment efforts, including discussion of the primary resources of concern that were identified, sample collection and survey efforts, and associated analytical results. References are presented in Section 4.

1.2 Incident Summary

On November 11, 2005, while enroute from Houston, Texas to Tampa, Florida, the integrated tug-barge (ITB) unit comprised of the tugboat "Rebel" and the double-hull T/B DBL 152, owned and operated by the RP, allided[1] with the submerged remains of a pipeline service platform, located in West Cameron Block 229, that collapsed during Hurricane Rita. The barge was carrying approximately 119,793 barrels (bbls) (5,031,306 gallons) of a blended mixture of low-API gravity[2] (4.5) slurry oil. The starboard bow cargo and ballast tanks were holed, at which time the barge began taking on water and releasing oil. Initially, a portion of the oil floated forming an oil slick on the surface, but it was later determined that the bulk of the released oil sank to the bottom.

Following the allision, the tug and barge were separated for safety reasons, but remained together in close proximity. The barge was eventually towed by the tug towards shore with the intent of grounding and stabilizing it in shallower water to facilitate salvage and lightering and to minimize risk of striking oil pipelines buried within the seabed. The barge grounded farther from shore than anticipated in about 50 feet of water approximately 35 nautical miles (nm) south-southeast of Sabine Pass, Texas or approximately 13 nm west-northwest of where the allision occurred (Figure 1). Once grounded, the barge continued listing severely and slowly releasing small amounts of oil from unsealed vents and hatches. On November 14, 2005, the

[1] The term "allision" refers to the action of a moving object hitting against a fixed object, whereas "collision" is used when both of the impacting objects are moving.

[2] American Petroleum Institute gravity, or API gravity, is a measure of the relative density of a petroleum liquid compared to water. Oils with API gravity greater than 10 will float in freshwater at 60°F, while oils with API gravity less than 10 will sink. Oils with API gravity less than approximately 6.5 at 60ºF will sink in sea water (35 ppt) (National Research Council 1999).

barge capsized and additional oil was released in a relatively short period of time and was deposited on the seafloor as discrete mats or pools of submerged oil.

Figure 1. Location of T/B DBL 152 Incident

Extensive operations to locate, assess and recover the submerged oil were initiated shortly after the barge capsized. Full-scale submerged oil recovery efforts using diver-directed pumping were initiated by early December 2005. Submerged oil cleanup activities were continued subject to intermittent weather delays until January 12, 2006, at which time recovery operations were suspended by the Unified Command. Long-term monitoring of non-recovered submerged oil was initiated in January 2006 and continued until mid-January 2007. Based on the results of long-term monitoring and on-going feasibility constraints, no additional submerged oil recovery was performed after January 2006.

An estimated 45,846 bbls of oil (1,925,532 gallons) were discharged into federal waters of the Gulf of Mexico as a result of this incident. Of this volume, an estimated 2,355 bbls (98,910 gallons) were recovered by divers. In total, an estimated 43,491 bbls (1,826,622 gallons) of oil remained unrecovered at the time submerged oil cleanup operations were discontinued in January 2006. The fate and transport of unrecovered oil after January 2006 is discussed in Section 2.3.

1.3 Resources at Risk

Because the majority of released oil was denser than sea water, it sank to the seafloor. Injury to benthic invertebrates, demersal fishes, and pelagic fishes may result from the released oil from smothering and coating of benthic resources and ingestion by animals that feed on benthic resources and demersal fishes in the affected area. Additionally, dispersed and dissolved polycyclic aromatic hydrocarbons (PAHs) were detected in the water column, which could result in exposure of aquatic resources to PAHs. Marine mammals and threatened and endangered marine species may be present in low densities in the affected area, since such species are known to traverse the area surrounding the spill. None were observed during the course of the response or during long-term monitoring.

2.0 RESPONSE ACTIVITIES

2.1 Overview

The response phase of this incident can be subdivided into two periods. The initial response period includes the interval from November 11, 2005 to January 12, 2006 during which time recovery of submerged oil was actively pursued, supported by various efforts to detect and assess submerged oil. Salvage and lightering operations to remove the remaining oil and secure the vessel in preparation for towing it to a shore facility were also performed during this period. The long-term monitoring period includes the interval from January 13, 2006 until February 28, 2007. During this time, efforts were implemented to track the movement and dissipation of non-recovered submerged oil; however, no additional submerged oil recovery was required to be performed.

2.2 Submerged Oil Assessment during Initial Response

Throughout the initial response, information about the location, concentration and movement of submerged oil was critically important for supporting oil recovery operations and predicting the fate and transport of oil. Unlike spills of floating oil, where oil can be readily observed using familiar techniques (e.g., overflights, shoreline surveys), submerged oil detection and assessment is considerably more challenging, yet the need for this information still exists.

To fill this need, the Environmental Unit operating under the U.S. Coast Guard's Incident Command System, employed a variety of equipment and techniques to locate, characterize and track submerged oil. These included: divers; chain-weighted snare drags using devices called V-SORS (Vessel-Submerged Oil Recovery System); vertical snare sentinels; acoustic remote sensing; and remotely operated vehicle (ROV). Meteorological and oceanographic data reported by various sources were also compiled during the response to better understand the factors affecting the transport and fate of discharged oil. These efforts are summarized in the sections below.

2.2.1 Divers

Initial reconnaissance of submerged oil was provided by divers surveying the allision site, the various debris fields and the area immediately surrounding the disabled barge. Divers were used in support of salvage, lightering and submerged oil recovery operations, as well as in efforts to obtain source oil samples and calibrate/verify results obtained from other oil identification methods. Conditions dictated the use of surface-supplied divers tethered by air lines to an anchored vessel. Divers were equipped with voice communications to relay information to the surface. Some dive teams also utilized video cameras, which allowed diver observations to be viewed by support personnel topside and recorded. Unrecorded dive observations were communicated via brief written dive reports or verbal debriefings. Dive surveys were constrained by limited bottom-time (due to decompression requirements), restricted mobility, and at certain times, poor visibility.

2.2.2 Vessel-Submerged Oil Recovery Systems (V-SORS)

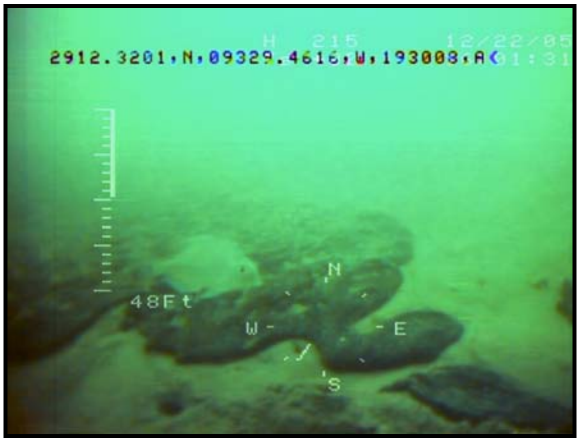
The primary data collection method for submerged oil was chain-weighted snare drags using devices know as V-SORS. Though initially conceived as a submerged oil recovery device during another spill, the V-SORS proved most useful as a means of detecting and assessing submerged oil during this incident.

Two (2) versions of the V-SORS device were used for this incident. The original configuration, later called "V-SORS Heavy," consisted of an 8-foot wide header beam constructed of heavy steel pipe trailing 25 8-foot long heavy-link chains to which six (6) to eight (8) viscous snare pompoms were attached along the length of every other chain (see Figure 2). Deployment and retrieval of V-SORS Heavy devices required a crane or other overhead lifting equipment.

Due to operational constraints, a scaled-down version, known as "V-SORS Light," was developed. The V-SORS Light device consisted of two 8-foot lengths of heavy-link chain each carrying three (3) snare pompoms attached to the end of a single rope. V-SORS Light were deployed and retrieved by hand often with two units simultaneously towed from opposite sides of a vessel.

Both V-SORS Heavy and V-SORS Light were towed across the seafloor along designated transects using GPS for navigation. At specified intervals, the V-SORS device was hoisted to the surface to inspect the pompoms. The amount of oil on the pompoms was visually assessed and a qualitative level of oiling (heavy, medium, light & very light) was assigned to the transect. A pictorial job aid was created to help ensure consistent classification of oiling levels on snares across multiple teams (See Figure 3). In addition, the composition of V-SORS survey teams remained as consistent as possible, also to promote uniformity in the results.

V-SORS provided a spatially integrated assessment of submerged oil along transects at a specific point in time. Survey resolution was dependent upon distance between transects and retrieval frequency.



ROV video image of submerged oil from T/B DBL 152, 22 December 2005

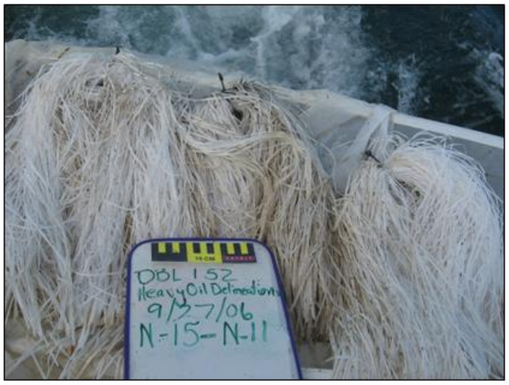
Disabled vessel before capsizing showing discharge of oil, November 2005

V-SORS Heavy chain drag used to detect submerged oil, December 2005

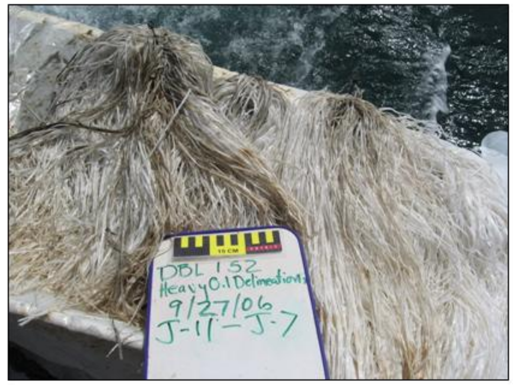
Crab pot sentinels used to detect submerged oil, December 2005

Oiled snares associated with a camera drop, September 2006

Figure 2. Representative Response and Pre-Assessment Phase Photographs



Very Light



Light

Moderate

Heavy

Figure 3. Representative Examples of Qualitative Oiling Levels on V-SORS Light

2.2.3 Vertical Snare Samplers/Snare Sentinels

These devices initially consisted of snare on a rope with an anchor on one end and a buoy float on the other. Later iterations also included snare-filled crab pots positioned to rest on the bottom. These devices were deployed at specific locations for one or more days to detect submerged oil on the seafloor and suspended in the water column. Unlike V-SORS, stationary vertical snare samplers and snare sentinels provided a time-integrated assessment at a single location.

2.2.4 Acoustic Remote Sensing

Two (2) types of acoustic remote sensing were used during the T/B DBL 152 response: RoxAnn™ Seabed Classification System and side scan sonar. RoxAnn was briefly tested for its ability to detect submerged oil. Initial results were mixed due to equipment difficulties and heavy seas. RoxAnn use was discontinued after only a short period based on the inconclusive nature of the results and the narrow assessment swath along the bottom, which was a function of the relatively shallow water depth (50-60 feet).

Side scan sonar was initially used to survey debris around the allision site and secondary debris field, but was later used experimentally for submerged oil detection. Initial trials to detect submerged oil with side scan sonar were promising. However, during a late-November 2005 survey of the area west (down-current) of the barge, only approximately 50 percent of suspected targets were found to actually contain submerged oil. The use of side scan sonar for submerged oil detection was eventually abandoned in this response due to the relatively high rate of false-positives under these conditions, the need to verify results visually and the significant lag time for data processing and interpretation.

2.2.5 Remotely Operated Vehicle

Beginning in early December 2005, submerged oil identification was performed using a tethered ROV. The ROV contained a video camera allowing continuous imagery of the seafloor to be viewed in real-time and recorded. However, the ROV lacked precise positioning, so its exact location over the seafloor could only be estimated relative to the support vessel. The ROV was the primary means of verifying suspected submerged oil patches identified using alternative methods (e.g., side scan sonar). It was also used to systematically survey the bottom in a grid pattern in other areas. Approximately 85 ROV surveys were conducted, mostly west and west-northwest of the barge. ROV use was constrained by limited mobility, and at times, rough seas, poor visibility and oil fouling.

2.2.6 Meteorological and Oceanographic Data Collection

Meteorological and oceanographic data reported by various sources were compiled during the response. Data sources included an ocean buoy deployed near the capsize location, as well as other buoys and National Data Buoy Center (NDBC) assets in the western Gulf of Mexico. Of key importance was the near-bottom and mid-water column current direction and velocity data provided by the Acoustic Doppler Current Profiler aboard the Texas Automated Buoy System (TABS) A2 buoy. Information on sea state (wave height, and dominant and average wave period) was obtained from NDBC Station 42035 located 22 nm east of Galveston, Texas and Station 42019 located 60 nm south of Freeport, Texas. These ancillary data were used to better understand and potentially predict the movement of submerged oil in response to various environmental factors.

2.3 Submerged Oil Assessment during Long-Term Monitoring

Long-term monitoring (LTM) was initiated once active clean up operations were suspended in January 2006. The LTM program was designed to:

- track the movement and fate of non-recovered submerged oil to assess its extent and continued dissipation;
- provide advance warning of potential impacts to Gulf Coast shorelines and other sensitive areas such as the Flower Garden Banks National Marine Sanctuary; and
- document changes in the oil's chemical composition and physical properties through time due to weathering.

The LTM approach was initially designed to track the leading edge/perimeter of the submerged oil field, the term given to the area of seafloor containing scattered deposits of submerged oil at all oiling levels. Later LTM efforts characterized interior portions of the submerged oil field.

2.3.1 Long-Term Monitoring Using Stationary Samplers

LTM was initially performed using stationary samplers similar to the snare sentinels. Each LTM sampler consisted of two crab pots attached one on top of the other, with the bottom pot weighted to maintain an upright position. Each pot was loosely filled with white snare. A snare-filled cylinder approximately three (3) feet high by ten (10) inches in diameter constructed of wire mesh was suspended from the float to monitor for the presence of oil in the mid-water column. The mid-column sampler was positioned at half the water depth. The bottom end was weighted slightly to ensure the device remained vertical.

A total of 34 stationary LTM samplers were deployed beginning in January 2006. They were arranged in four arrays located north, south, east, and west of the capsize location. The stationary LTM samplers were checked approximately every two (2) to four (4) weeks during the LTM cruises. Oiled snare was replaced and samplers were redeployed or moved to new locations as appropriate. Representative samples of oiled snare were also collected. Some of these were analyzed to confirm the oil's origin and characterize any changes due to weathering; the remaining samples were archived and currently remain frozen at TDI Brooks/B&B Labs in College Station, TX.

2.3.2 LTM Using V-SORS

In March 2006, the LTM plan was revised to address the ongoing loss of stationary samplers and data due to theft, weather, etc. The plan was modified to acquire data on the movement and extent of the submerged oil field using V-SORS Light instead of stationary samplers. The pattern of V-SORS chain drags and procedures for modifying the search area remained unchanged through June 2006. Monitoring was also performed at four (4) locations containing higher concentrations of pooled or matted oil that was not cleaned up prior to suspension of recovery operations in January 2006. One or more of these areas was already planned as a set-aside for monitoring the dissipation of higher-concentration submerged oil accumulations. Samples of oiled snare continued to be collected from the V-SORS Light for chemical analyses.

2.3.3 Summary of LTM Results Through July 2006

The results of seven (7) LTM cruises conducted from January to June 2006 indicated the known submerged oil field was generally migrating to the west-northwest. The farthest occurrence of heavy oiling during the first six (6) months of LTM, observed in late-March 2006, was approximately seven (7) nm west-northwest of the capsize location. In mid-June 2006, moderate oiling approximately eight (8) nm to the west-northwest was the heaviest oiling observed, with light and very light oiling observed up to approximately 13 nm to the west-northwest. LTM data indicated that portions of the submerged oil field were decreasing through time as the oil dissipated.

An eighth LTM survey was performed using V-SORS Light in mid-July 2006 to assess the entire submerged oil field, including its interior portions. The most prevalent oiling category along twelve (12) transects in the surveyed area was very light oiling. Portions of the twelve (12) transects also were described as not oiled, lightly oiled, moderately oiled, and heavily oiled. Patches of oil, qualitatively described as heavy and moderate using V-SORS Light, were identified approximately seven (7) nm west-northwest of the capsize location within the submerged oil field in line with the general direction of observed oil movement.

2.3.4 Heavy Oil Patch Monitoring Through January 2007

Two (2) additional surveys were performed in September 2006 to delineate the heavy oil patch identified during the mid-July 2006 LTM survey. These surveys also aimed to determine if the heavy oil was recoverable[3], as well as "calibrate" the results of the V-SORS Light apparatus by visually characterizing submerged oil using divers and an underwater drop camera.

The heavy oil patch surveys resulted in delineation of a patch of submerged oil qualitatively classified as "heavy oiling" concentrated within an area approximately 1,000 feet by 1,000 feet. The heavy oil patch was located approximately 1,475 feet to the west-northwest of the mid-July heavy oiling transect and was determined to be the same heavy oiling observed during the July survey. Divers estimated that the patch of submerged oil had an average oil thickness of approximately one (1) inch, with a range of thickness between approximately one-half (½) to three (3) inches.

The percent cover of oiled seafloor also was calculated within certain sections of the affected area. Percent cover estimates within sampled transects were quantitatively derived from underwater video imagery. Preliminary estimates of percent cover calculated from a subset of video data have been highly variable but may be used in assessing oil concentrations in particular areas or within transects of interest. The percent cover of oil within the patch determined from drop camera imagery along nine (9) transects ranged from 19 percent to less than 1 percent with an average of 7.9 percent in late-September.

In late-October 2006, the Unified Command determined that threats to natural resources at risk did not warrant resuming submerged oil recovery. However, the parties agreed that continued monitoring of the heavy oil patch was prudent. The RP developed a new monitoring plan that tracked the movement and spatial characteristics of the heavy oil patch using V-SORS Light, divers and drop camera imagery, and continued chemical monitoring of weathered oil samples. The plan also included provisions for resuming submerged oil recovery if conditions warranted. The new monitoring plan was implemented in early December 2006.

Three monitoring surveys were completed under this plan: two (2) in December 2006 and one (1) in mid-January 2007. No heavy oiling was located during the December surveys. However, a small area of moderate oiling surrounded by light and very light oiling was delineated slightly west of the September 2006 location of the heavy oil patch. From these results, it was concluded that the small area of moderate oiling was the remains of the heavy oil patch, which had dissipated since the late-September observations. The mid-January 2007 survey revealed only light and very light oiling within the December survey locations, indicating continued dissipation of the oil. In addition, surveys in the area originally containing heavy and very heavy oiling in September 2006 revealed only light and very light oiling.

At the direction of the Unified Command, all LTM activities ceased after the mid-January 2007 monitoring cruise. On February 28, 2007, the response phase was officially concluded and the incident was fully transferred to the damage assessment process under the direction of NOAA.

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[3] "Recoverable" oil for this incident was defined as concentrations of submerged oil sufficient for an estimated recovery rate of 500 bbls or more per diver recovery team per day, as established by the Unified Command before the termination of winter 2005-2006 response operations.

2.4 Source Oil Characterization

The product discharged from the T/B DBL 152 is characterized as "slurry oil," an oil with an unusual combination of properties (high density, low viscosity) compared with oils more commonly encountered in spills. Slurry oil is a type of residual oil comprised of a complex and highly variable combination of hydrocarbons predominantly greater than C20, as well as four (4) to six (6) ring aromatic hydrocarbons and hydrogen sulfide. Slurry oil is the heavy, residual fraction of catalytic cracking, a refining process used to produce high-quality gasoline components from heavier crude oil distillation fractions such as heavy gas oil and lubricating oil. Slurry oil is often clarified by filtration to reduce its solids content, which is derived from the catalyst. It is frequently necessary to dilute slurry oil with No. 6 oil to make it marketable as industrial boiler fuel, which was the intended use of the slurry oil carried aboard the T/B DBL 152.

The slurry oil loaded onto the T/B DBL 152 was a blend of 5 different oils mixed together to meet the desired product specification. The barge tanks were first filled with a mixture of all five (5) oils that were "line blended" from each shore tanks during loading. An additional quantity of one of the lighter API gravity oils was then loaded into the bottom of each tank as a last step to promote mixing, which occurs through upward mixing with the other oils by buoyancy forces and also by the rocking motion of the vessel during the voyage (pers. comm., J. Michel, Research Planning, Inc, 2005). The API gravity of the final mixture was 4.5.

2.4.1 Mass Balance

A mass balance/oil budget was prepared by the RP and submitted to the USCG to account for the volume of oil discharged during the incident, the volume recovered and the volume remaining in the environment (ENTRIX, 2007). Information sources included various gauging reports, waste manifests, invoices, analytical reports and personal accounts.

2.4.1.1 Amount of Oil Discharged

The T/B DBL 152 was carrying 119,793 bbls (5,031,306 gallons) of oil at the time of the incident. It is estimated that 45,846 bbls of oil (1,925,532 gallons) or approximately 38 percent of the barge's cargo was discharged into the Gulf of Mexico as a result of this incident. This estimate is based on the initial volume of oil on board the barge and the amount of oil removed from the barge that never entered the environment.

2.4.1.2 Amount of Oil Recovered

It is estimated that at least 2,355 bbls (98,910 gallons) of submerged oil, or about five (5) percent of the total volume released, were recovered from the seafloor by divers. An additional 74,947 bbls (3,147,774 gallons) of oil remaining on the barge after the incident were removed during lightering and salvage operations. These figures do not reflect the volume of oil recovered as oily solid waste, tank bottoms (oily sludge), or adhered to V-SORS snares used for submerged oil detection, long-term monitoring, and cleanup at Theodore Industrial Port. The amount of recovered oil associated with each of these categories was considered negligible in comparison to the other oil volumes reported herein and was not quantified.

2.4.1.3 Amount of Unrecovered Oil

Based on the amounts of oil discharged and subsequently recovered, it is estimated that 43,491 bbls (1,826,622 gallons) of oil remained in the environment following termination of submerged oil recovery efforts. Loss of oil volume due to dissolution of soluble oil constituents into the water column was not quantified.

3.0 NRDA ACTIVITIES

3.1 Overview

As the incident occurred in Federal waters and no wildlife impacts were observed, NOAA is the only natural resource Trustee participating in the NRDA pre-assessment phase of this incident. The other Federal, Texas, and Louisiana state trustees have been periodically informed of incident progress.

The RP and Trustee representatives have been fully cooperative in the response and pre-assessment phases of this incident. As required by OPA, NOAA invited the RP to participate in a cooperative damage assessment in a letter dated December 7, 2006. The RP accepted the Trustee's offer in a letter dated January 22, 2007. Subsequently, NOAA and the RP developed a set of mutually agreeable Guiding Principles for conducting the cooperative NRDA in lieu of a detailed Memorandum of Agreement/Understanding. These Guiding Principles were set forth as an attachment to a letter from the RP to NOAA dated May 10, 2007.

A considerable amount of effort has been expended to assess the nature and extent of oil on the seafloor including its distribution, thickness, fate and transport and chemical properties. These efforts generally indicate that the discharged oil is mobile and the level of oiling on the seafloor is neither uniform nor static. In general, an unknown portion of the discharged oil (or specific fractions of the discharged oil since it was a mixture) is moving in a generally west-northwest direction. Although these field efforts have been largely response-focused, the resulting data can be applied to a NRDA. In addition, a pre-assessment data collection event was conducted in late-December 2005 specifically to collect data for NRDA purposes.

Monitoring efforts with the V-SORS indicated that, in some locations, discharged oil from the T/B DBL 152 remained on the seafloor more than one year after the incident. Field observations generally indicated a pattern of discontinuous, light and very light oiling within the submerged oil field. In September of 2006, a patch of moderate and heavy oiling covering approximately 1,000 feet by 1,000 feet (22.96 acres or >0.03 nm^2) was also observed. No other patches of accumulated heavy or moderate oiling were known to exist. LTM data indicated that this accumulation of moderate and heavy oiling had dispersed to light and very light oiling by January 2007.

Overall, oil has not been detected more than approximately 13 nm from the capsize location. The extent of the submerged oil field determined in mid-July 2006 was approximately 26 nm^2. Based on combined V-SORS results from the response and LTM, approximately 53 nm^2, cumulatively, were exposed to some degree of oiling from the time of the incident through mid-January 2007 (Figure 4). However, submerged oil did not occupy this entire area simultaneously. The size and location of the submerged oil field is subject to change pending further review of LTM data and estimation of future oil movement.

3.1.1 Oil & Environmental Samples

As of November 30, 2006, 184 samples have been collected to support response, LTM activities, and/or pre-assessment. Samples were collected for oil fingerprinting, evaluating toxicity of the discharged oil to biota in the water column or sediments, and to support modeling of fate and transport of the unrecovered oil.

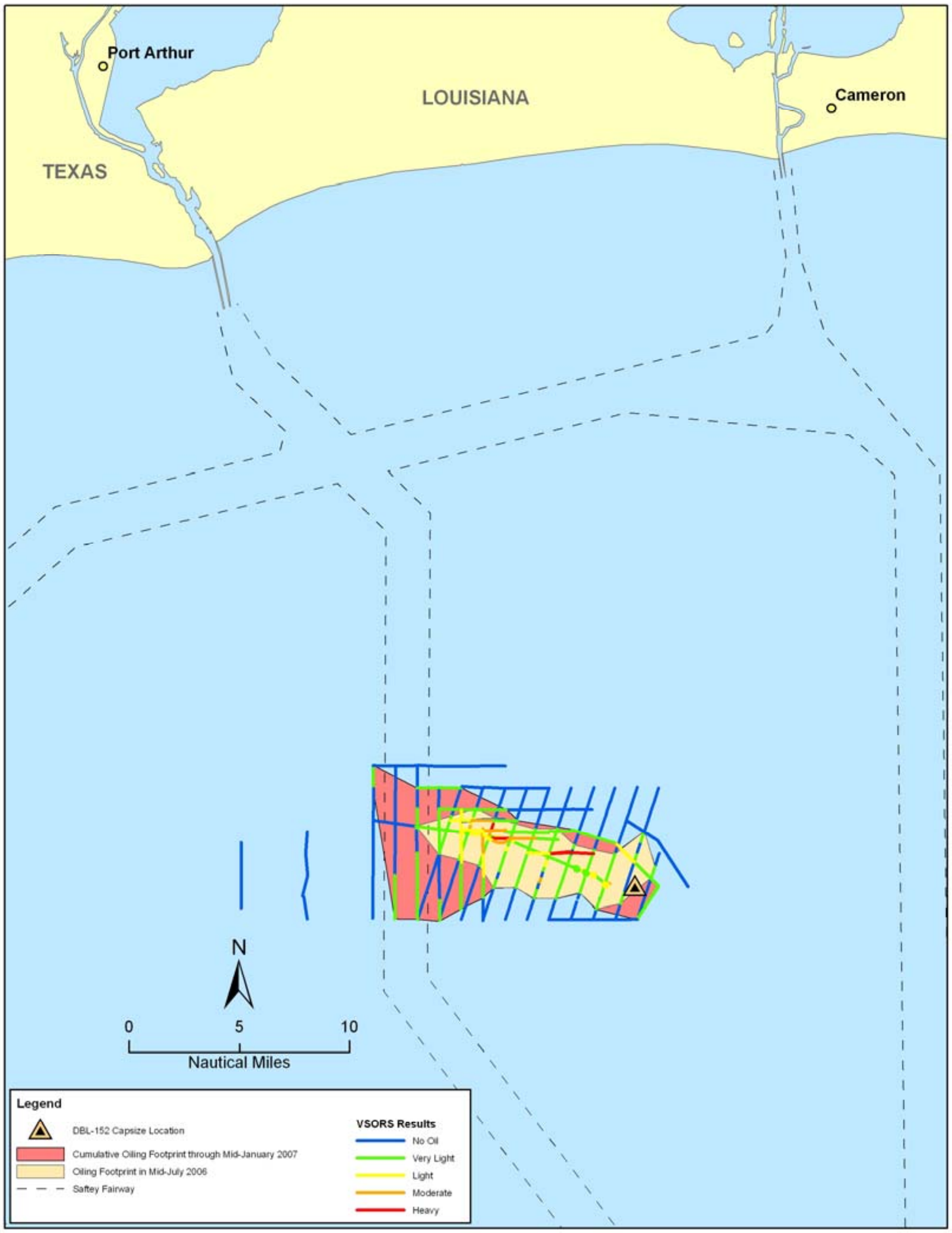

Figure 4. Cumulative Extent of Submerged Oil Based on V-SORS Results during Response and Long-Term Monitoring

3.1.2 Neat Oil Samples

The RP collected samples of neat oil from each shore tank from which the barge was loaded and each tank on the barge prior to its departure from the loading facility (Houston Fuel Oil Terminal). These samples were collected and retained by Intertek Caleb Brett, a consultant for the RP.

Following the incident, Intertek Caleb Brett provided ENTRIX and USCG representatives with split samples of the oil retained from each of the barge tanks. Intertek Caleb Brett also provided these entities with a split sample of an oil mixture created in the laboratory by blending oil from each shore tank in the same relative proportions as loaded onto the barge. In addition, the RP collected additional oil from one of the barge's tanks immediately after the allision.

Physical and chemical analyses of neat oil samples were performed separately by NOAA (via Louisiana State University) and the RP.

3.1.3 Weathered Oil Samples

The RP also collected numerous weathered oil samples throughout the initial response and long-term monitoring periods. As used here, the term *weathered oil* refers to oil collected from the environment after being released from the barge. The actual degree of weathering depends on factors such as elapsed time since release and specific environmental conditions to which the oil was exposed. Weathered oil samples consisted of whole oil collected by divers and oiled pompoms from V-SORS or snare sentinels.

The RP collected 12 weathered oil samples during the response phase of the incident. Most of these samples were taken during long-term monitoring events. These samples were analyzed for PAHs, alkanes, and biomarkers by TDI Brooks/B&B Laboratory.

3.1.4 Benthic Samples

Thirty-four surficial sediment samples consisting of the top two (2) to four (4) inches of sediment were collected during pre-assessment activities to evaluate the benthic invertebrate community in the affected area. These sediment samples were collected with Van Veen and ponar dredge-type samplers. Sample locations are shown in Figure 5.

3.1.5 Trawl Samples

Trawl sampling was performed in December 2005 to qualitatively evaluate macro benthic fauna (crabs, etc.), demersal fish, and shrimp in the vicinity of the spill site. A total of four (4) trawls were conducted using a 16-foot wide commercial otter trawl with 7/16th inch mesh size at the cod end. Two (2) trawls were located west of the barge in areas potentially exposed to submerged oil. The other two (2) trawls were located in unaffected areas east of the barge (Figure 5). Information and results of this effort are provided in Table 1.

Table 1. Results of Pre-Assessment Trawl Sampling Performed December 22, 2005

Trawl	Duration (minutes)	Speed (knots)	Length (nm)	Coordinates Deployment	Coordinates Retrieval	Catch
1 (R)	29	1.5 → 3.5	0.82	N 29.18992º W 93.45193º	N 29.19204º W 93.43652	3 perch (~3 inches long)
2 (R)	25	3.5	0.81	N 29.18954º W 93.43764º	N 29.18954º W 93.45084º	No catch
3	18	3.5	0.90	N 29.17426º W 93.53025º	N 29.15923º W 93.53094º	No catch
4	21	3.5	1.11	N 29.21210º W 93.55288º	N 29.21210º W 93.54764º	No catch

(R) denotes trawls in reference areas unaffected by the submerged oil located 1.5 & 1.7 nm southeast of the barge capsize site.

3.1.6 Sediment Samples

Twelve (12) surficial sediment samples were taken during the response to evaluate whether submerged oil resulted in residual sediment contamination and, if so, did such contamination pose a long-term toxicological risk to benthic biota and demersal fishes. An additional 31 sediment samples were taken during pre-assessment activities (Figure 5) and long-term monitoring events. These samples were collected with Van Veen and ponar dredge-type samplers. The sediment samples have not been analyzed and are archived at TDI Brooks/B&B Laboratory in the event future analyses are necessary.

3.1.7 Water Column Samples

Thirty-seven (37) water column samples were taken during the response phase of the incident and 43 water column samples were collected during the pre-assessment activities (Figure 5). Samples were collected at the surface, mid-depth, and within one (1) meter of the seafloor. These 80 samples were analyzed by TDI Brooks/B&B Laboratory for total PAHs to be utilized in the assessment of risk to water column organisms.

3.2 Summary of Potential Aquatic Resource Impacts

Benthic and demersal invertebrate and vertebrate resources have the highest potential for exposure from the discharged oil, especially those organisms that are immobile. Contact with oil or ingestion of oil or oiled prey may have acute or chronic effects on these organisms. Additionally, the presence of discharged oil in the environment may have caused decreased habitat utilization of the area, altered migration patterns, altered food availability, and disrupted life cycles. Natural resource services that may have been affected by the oil discharge include, but are not limited to, chemical exchange across the sediment-water interface, decomposition and use of organic matter by benthic microalgae and other fauna, primary production, and habitat utilization by benthic and demersal fauna. Various fishes were observed by divers and the ROV in oiled areas, but oiled fishes were not observed or recovered in the field.

Water samples collected in the submerged oil field after the vessel capsized indicated that, to the extent present, aquatic organisms at some locations may have been exposed to elevated levels of dissolved PAHs that exceeded ecological risk benchmarks. NOAA’s Screening Quick Reference Tables (2004) were used to compare laboratory results for individual water samples to the acute ambient water quality screening value in marine waters for 17 individual parent PAHs as well as total PAH. Screening results are shown in Table 2 and summarized below.

Of the 80 water samples analyzed:

- Nine (9) samples exceeded NOAA's acute ambient water quality screening value in marine waters for total PAH (300 parts per billion). Water samples that exceeded NOAA's total PAH screening value were collected from November 23, 2005 to January 11, 2006.
- Five (5) samples exceeded NOAA's acute ambient water quality screening value in marine waters for both total PAH and phenanthrene (7.7 parts per billion). Water samples that exceeded NOAA's phenanthrene screening value were collected from December 26, 2005 to January 11, 2006.
- One (1) sample exceeded NOAA's acute ambient water quality screening value in marine waters for total PAH, phenanthrene and 2-methylnaphthalene (300 parts per billion). This sample was collected on January 11, 2006.
- Seven (7) of 39 samples collected within 1 meter of the sea floor directly above large patches of submerged oil exceeded one or more screening values. Concentrations of dissolved PAHs are expected to be highest in close proximity to submerged oil deposits. In addition, all but two of the bottom samples with exceedances were collected proximal to locations where submerged oil recovery operations were taking place, which is expected to have increased localized mixing. At one location where submerged oil recovery was not being performed, fish were observed congregating around structure (e.g., debris from the collapsed platform) in close proximity to submerged oil patches; however, no obvious adverse impacts were recorded.
- Two (2) of 28 samples collected from the mid-water column an estimated 15 to 25 feet above areas containing submerged oil exceeded one or more screening values. Both of these samples were collected by divers at locations where submerged oil recovery operations were taking place.
- None of the thirteen (13) samples collected from just below the water surface exceeded any of the screening values.

Table 2. Location and description of water samples where total and/or individual PAHs exceeded NOAA's acute ambient water quality screening value in marine waters (2004).

Lab ID	Collection Date	Latitude	Longitude	Sample Description	Exceedance
ETX4846	12/26/2005	29.207197º	93.474046º	Mid water column sample taken by diver at approximately. 8 meters above oil patch. Location coordinates are approximate (lat/long are related to the location of the barge from which the sampling was staged)	Total PAHs and Phenanthrene
ETX4914	1/11/2006	29.12406º	93.28134º	Water column sample taken by diver at approximately 1 meter above oil patch; Location coordinates are approximate (lat/long are related to the location of the barge from which the sampling was staged)	Total PAHs, Phenanthrene & 2-methyl-naphthalene
ETX4915	1/11/2006	29. 12406º	93.28134º	Water column sample taken by diver at approximately 1 meter above oil patch; Location coordinates are approximate (lat/long are related to the location of the barge from which the sampling was staged)	Total PAHs and Phenanthrene
ETX4895	12/31/2005	29.20643º	93.49119º	Water sample taken by diver approximately 1 meter above oil patch	Total PAHs and Phenanthrene
ETX4892	12/31/2005	29.20643º	93.49119º	Water sample taken by diver at approximately 11 meters below water surface	Total PAHs and Phenanthrene
ETX4894	12/31/2005	29.20643º	93.49119º	Water sample taken by diver approximately 1 meter above oil patch	Total PAHs
ETX4896	12/31/2005	29.20643º	93.49119º	Water sample taken by diver approximately 1 meter above oil patch	Total PAHs
ETX4616	12/26/2005	29.137º	93.29122º	Mid water column sample taken by diver at approximately 8 meters above oil patch. Location coordinates are approximate (lat/long are related to the location of the barge from which the sampling was staged)	Total PAHs
ETX4613	11/23/2005	29.20491º	93.47913º	Water column sample taken by diver approximately 1 meter above oil patch west of T/B DBL 152 wreck site.	Total PAHs

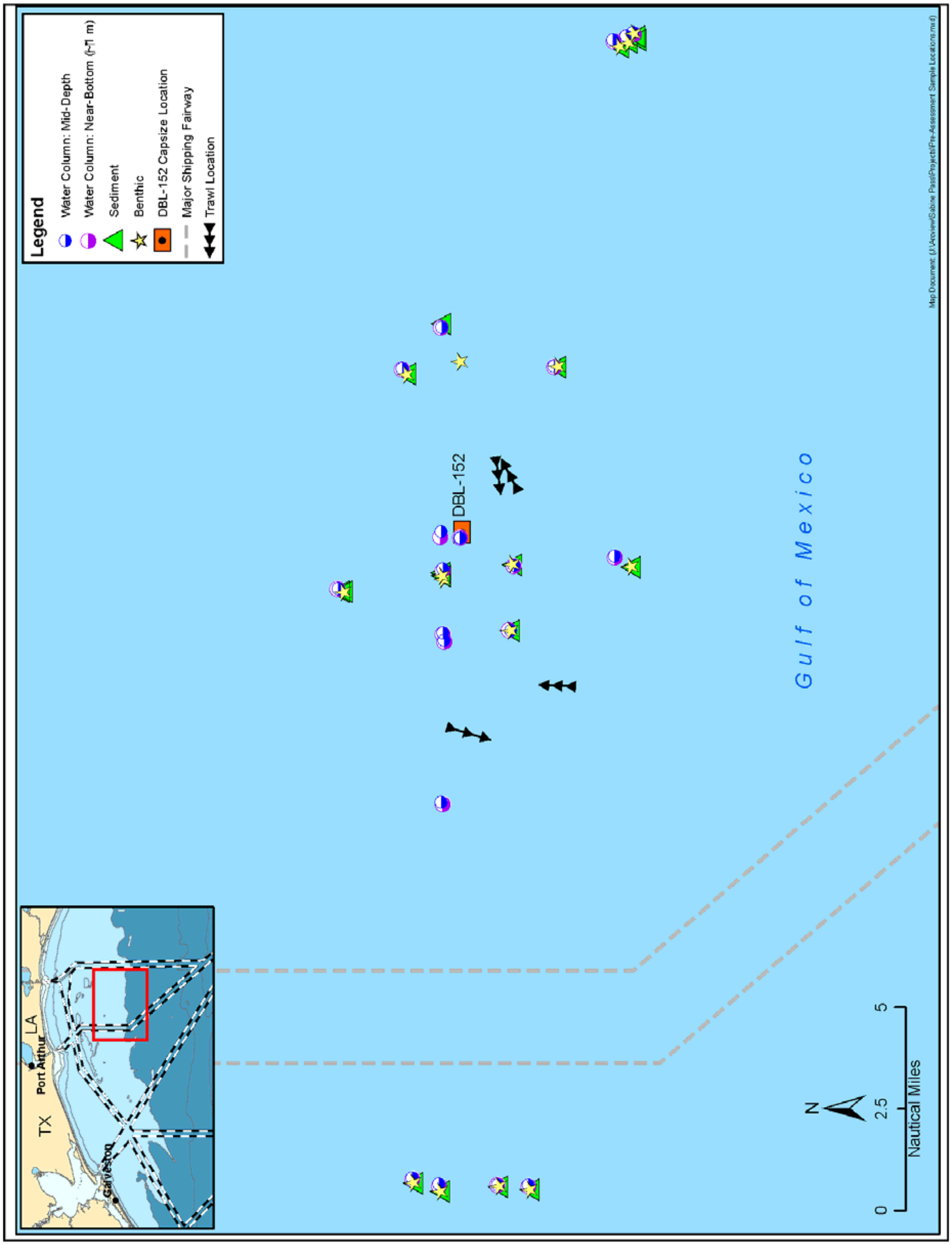

Figure 5. Pre-Assessment Water Column, Sediment, Benthic and Trawl Sample Collection Locations

3.3 Summary of Potential Lost Human Use Impacts

No reports of lost human use were recorded. No recreational or commercial fishing vessels were observed in the vicinity of the spill.

4.0 REFERENCES

ENTRIX, Inc. 2007. T/B DBL 152 Incident; Oil Budget / Mass Balance – Version 1.2. July 10, 2007. Prepared on behalf of K-Sea Transportation LP for submission to the U.S. Coast Guard. 8 pp.

National Oceanic and Atmospheric Administration. 2004. Screening Quick Reference Table for Organics. National Ocean Service. Seattle, Washington.

National Research Council. 1999. Spills of Nonfloating Oils: Risk and Response. National Academy Press, Washington, DC, 75 pp.