

Gulf Coast Incident Management Team

**Summary Technical Report for
Submerged Oil Mat Tactical Plan
Phase I Execution**

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Summary Technical Report for
**Submerged Oil Mat Tactical Plan:
Phase I Execution**

Prepared by
**Gulf Coast IMT
Operations Section
Deepwater Horizon MC252**

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Deepwater Horizon Submerged Oil Mat Tactical Plan – Phase I

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Introduction

The purpose of this report is to provide the Federal On-Scene Coordinator (FOSC) for the Deepwater Horizon MC252 Spill of National Significance with sufficient information to determine the presence or absence of Submerged Oil Mats (SOMs) based on the operational results of the *Deepwater Horizon Submerged Oil Mats (SOMs) Tactical Plan – Phase I*. The Tactical Plan was developed to provide general and tactical guidance for attempting to locate, delineate and, where practical, attempt the removal of SOMs in coastal zones of the GCIMT area of responsibility. The Tactical Plan was developed and executed by the GCIMT Operations Section with input from the GCIMT Environmental Section, the GCIMT Planning Section, U.S. Coast Guard, the National Oceanographic and Atmospheric Administration, the State on Scene Coordinators, and the responsible party.

The Plan was authorized by the FOSC on April 21, 2011. It represented a phased, adaptive approach to responding to SOMs that were thought to create chronic shoreline impacts. Phase I was anticipated to be a proof of concept process to populate the next phase which would, in turn, incorporate the results as lessons learned to improve effectiveness of SOMs activities.

Specifically with regard to the use of best available technology within the program, these Objectives were set forth in the Plan:

- Test emerging technologies; apply most effective to ongoing operations
- Provide the information required to develop a systematic, tactical approach for longer term location, delineation and removal operations, leaving operators the latitude to make informed decisions as to which “tools” to use where, and when
- Describe a process to continue current location, delineation and removal operations simultaneously with additional shoreline recovery throughout the operating area

During the period May – July 2011 survey activities were conducted in targeted offshore areas in Florida and Alabama, chosen because of chronic shoreline oiling. The technologies used included several forms of sonar, ROV-deployed video, sediment sampling and coring. As further detailed within this technical report, these techniques performed as intended and no evidence of SOMs was found in the areas of investigation¹. The report also includes interpretation regarding the most probable causes of continuing shoreline impact in light of the Phase I findings².

1 See “Summary of Activities” section of this report for discussion.

2 See “Implications of the Conclusions” discussion in Conclusion section of this report.

Executive Summary

The recurrence of oiling on beaches can represent aesthetic and economic issues for communities impacted, and Submerged Oil Mats (SOMs) have been purported to be a potential source of such recurrent oiling. Yet finding, identifying, and safely recovering nearshore SOMs has presented significant challenges because of the high energy marine environment and the continually changing seabed. The GCIMT has been responding to submerged oil mats (SOMs) and other sunken oil residues in the nearshore and onshore areas since July 2010. Field responders have been surveying and identifying SOM locations in the intertidal zone, and removing them where environmentally appropriate and when removal operations can be conducted practically and safely.

Phase I of the SOM Tactical Plan³ utilized acoustic (sonar) technologies and methods that have demonstrated their effectiveness in finding submerged and sub-bottom oil and other anomalies in marine environments⁴.

The focus of Phase I was specifically on finding and delineating SOMs in the high energy Wave Base area seaward of areas surveyed by the Snorkel SCAT program. Snorkel SCAT targets the intertidal and wave breaker zone in water depths up to four to five feet, often encompassing the first sand bar. Areas surveyed in Phase I were seaward of this intertidal zone and generally between the first and second sandbar of Gulf facing beaches. In some situations where a second sand bar was not clearly evident, survey lines extended to the seaward edge of the wave base, the first of either thirty feet water depth or one thousand feet from shore. In particular, Phase I was undertaken to locate and delineate SOMs, for potential removal where practical and safe, that:

- Had potential for reoiling the shoreline
- Were not reachable from the shoreline
- Were located in the zone between Snorkel SCAT and earlier investigations⁵ on delineating sunken oil in deeper water by the MC252 Mobile Incident Command Post (ICP)

Areas of potential SOMs were designated for sonar surveys, based on historical or repeated anecdotal reports of onshore reoiling by surface residue balls (SRBs) and patties (SRPs), reports from Branch field operations, observations by SCAT teams and reports from the public. Areas surveyed are listed below:

3 Reference: GCIMT SOM Tactical Plan, Deepwater Horizon Unified Command, April 2011

4 As discussed in the "Technology Screening" section of this report.

5 Reference: Deepwater Horizon Sunken Oil Delineation and Sampling Plan

Alabama:

- Fort Morgan Peninsula – segments ALBA1_035, 036 and 037
- Bon Secour National Wildlife Refuge – segments ALBA1_038 thru 042
- Fort Morgan State Park – segment ALBA1_135

Florida:

- Perdido Key – segments FLES1_001 thru 009
- Pensacola Beach – segments FLES2_012 thru 016 and 018

Outcomes⁶

1. The acoustic systems detected thirty-three anomalies where sediment characteristics differed from local, clean “reference” sandy sediments.
2. Sixteen anomaly sites were surveyed by ROV-conveyed camera; there were no visual indications of SOMs.
3. Twenty-one surface sediment samples and eight core samples were taken of anomalies with no indications of oily residue.
4. No deposits of sediment entrained oil (i.e., SOMs) were identified in, on or under the sediments in the segments surveyed.
5. No deposits of liquid-phase oil were identified in, on or under the sediments in the segments surveyed.

⁶ See discussion of these Outcomes in “Summary of Activities” section of this report.

Conclusions

1. The acoustic technologies used in the surveys worked as intended⁷ – based on previous USCG R&D tests, early 2011 GCIMT field tests, Phase I field experience as reported by the technology providers, and the numerous types of anomalies detected.
2. The surveying and sampling was adequate to determine the absence or presence of submerged oil mats, based on an analysis of data collected in the nearshore zone between the first and second sandbars, analysis of historical reoiling trends in the surveyed segments⁸, and data from OSAT-2⁹.
3. Observations from the Phase I SOM surveys do not support the hypothesis of submerged oil being present in the area between the first and second sandbars in the surveyed areas.
4. SOMs identified to date have typically been found between the first sandbar and the upper intertidal zone. As these closer in/shallower water SOMs are removed there is a corresponding decline in reoiling concentrations for the adjacent shoreline⁷.

Implications of the Conclusions:

During the execution of the SOM Phase I program, a total of four potential hypotheses were postulated to explain observed shoreline impacts by Surface Residue Balls (SRBs) or Surface Residue Patties (SRPs):

1. SRBs and SRPs migrating from offshore or along the shoreline
2. SOMs between the 1st and 2nd sandbars (the subject of the Phase I program investigation)
3. SOMs, SRBs and SRPs in the intertidal and immediate subtidal zones – from high tide out to the first sandbar
4. Ubiquitous SRBs and SRPs in the nearshore zones

7 See "Technology Screening & Field Tests" section of this report.

8 See "Historical Reoiling Trend Analysis" in Appendix to this report.

9 See Reference: Summary Report for Fate and Effects of Remnant Oil in the Beach Environment

The first hypothesis, that SRBs and SRPs are migrating from farther offshore or more than one segment along the shoreline, is not supported by review of water¹⁰ and sediment sample¹¹ data from OSAT and OSAT-2, a recent University of South Florida coring survey¹², Subsurface Oil Assessment Projects conducted by Mobile ICP during 2010¹³ and shoreline cleanup records¹⁴.

The current SOM Tactical Plan Phase I activities have not provided any credible support for the second hypothesis. Therefore the observed, ongoing shoreline impacts are most likely from the 3rd and 4th hypotheses above.

Since numerous SOMs have in fact been identified by SCAT in the intertidal and immediate subtidal zones, hypothesis #3 is proven. Such SOMs were formed in the nearshore high wave energy zone. Formation was by oil-soaked shoreline being eroded away by wave action and re-deposited nearby and/or by mixing of floating oil approaching the shoreline with sediment suspended by wave action.

Furthermore the 4th hypothesis, that SRBs and SRPs are ubiquitous in the nearshore zone, is plausible based on the formation mechanism for SOMs described above, a decline in reoiling concentrations corresponding with the removal of identified SOMs in the intertidal zone¹⁵, and a sustained overall decrease in reoiling observed across the subject shoreline in the past three to four months. Such SRBs and SRPs are not uncommon at the current stage of shoreline recovery and typically exist at low enough concentrations that shoreline recovery is the safest and only practical mitigation method.

¹⁰ See Reference: Summary Report for Sub-Sea and Sub-Surface Oil and Dispersant Detection

¹¹ See Reference: Summary Report for Fate and Effects of Remnant Oil in the Beach Environment

¹² See "Summary of USF Survey" in Appendix to this report.

¹³ See Reference: Deepwater Horizon Sunken Oil Delineation and Sampling Plan

¹⁴ See "Historical Reoiling Trend Analysis" in Appendix to this report.

¹⁵ See "Historical Reoiling Trend Analysis" in Appendix to this report.

Overview - SOM Strategic Plan & Tactical Plan

Intent of the Strategic Plan

The response objectives for the Deepwater Horizon MC252 Spill have been characterized as:

- 1) Securing the Source,
- 2) On-water Recovery and Shoreline Protection, and
- 3) Shoreline Cleanup.

The Submerged Oil Mat (SOM) Strategic Plan outlines the approach for addressing SOMs as part of ongoing Shoreline cleanup.

The Strategic Plan was authorized by the Federal On-Scene Coordinator on March 19, 2011. The focus of the Plan is specifically on SOMs that are beyond the current shore-based operations capabilities. The Plan proposes a strategy for attempting to locate and delineate and, where practical, attempting to recover such SOMs.

The Strategic Plan specifically describes:

- The origin and nature of submerged oil
- Actions which have been in place since SOMs were first located (July 2010)
- Actions which are currently ongoing
- Actions to be targeted in the near term
- The subsequent development of a tactical plan to execute the SOM strategy

Potential impacts to amenity beaches in the affected areas, and their critical importance to the communities, is a primary driver for our efforts. This objective has come into clearer focus of late following the completion of the Operational Science Advisory Team-2 (OSAT-2) report which concludes that the oil in these residues is highly weathered and poses little threat to human health or organisms and ecosystems.

Intent of the Tactical Plan

The intent of the Tactical Plan is to describe the logistical steps to address submerged oil mats. It anticipates a phased, adaptive approach to responding to SOMs. Phase I is a proof of concept process designed to populate the next phase, which will incorporate the results of Phase I as lessons learned to improve effectiveness of SOMs activities. Shoreline monitoring and cleanup as described in current or future STR's will continue.

The objectives of the Tactical Plan are to:

- Describe the origin and nature of sunken oil, so that Planners and Operators can

have a common understanding of SOMs and their potential impacts to human health, the environment and the economy.

- Review and present available information on location, delineation, and removal efforts of SOM's to date.
- Present tactical options for locating, delineation and removal.
- Provide a range of existing and emerging technologies which may be utilized to enhance GCIMT capabilities.
- Test emerging technologies; apply most effective to ongoing operations.
- Provide the information required to develop a systematic, tactical approach for longer term location, delineation and removal operations, leaving operators the latitude to make informed decisions as to which tools to use where, and when.
- Describe a process to continue current location, delineation and removal operations simultaneously with additional shoreline recovery throughout the operating area.
- Describe consistent performance measures and recordkeeping protocol.
- Inform Stakeholders

SOM Formation, Deposition and Physical Characteristics

In the summary of the July 2007 industry & research workshop sponsored by the University of New Hampshire Coastal Response Research Center and NOAA on *Submerged Oil – State of the Practice and Research Needs*, the following summary is given for potential creation of submerged oil mats where the source oil is a floating oil:

"It is important to note that for half of the cases discussed....the oil initially floated then became submerged, mostly after picking up sand. Thus, a floating oil can become heavier than the receiving water by either of two processes: 1) stranding on a sedimentary shoreline, picking up sand, then being eroded from the shoreline; or 2) by mixing with sand suspended in the water column by wave action. In either case, depending on the amount of sediment mixed into the oil, the oil-sediment mixture can become slightly negatively buoyant and become suspended in the water column by currents, or it can be dense enough to sink to the bottom."

The September 2010 Unified Area Command communication via RestoreTheGulf.com confirmed these phenomena in its ***"Things You Should Know About Submerged Oil"***:

1. Submerged oil is relatively uncommon: DWH oil is a light crude oil that floats. In some cases, weathered oil encounters sand or other types of sediment and organic debris that weigh it down and it sinks to the bottom in the very near shore and surf zone.
2. Submerged oil can be difficult to find: it can be covered by sediments; it can be in deeper or cloudy water and there are many things that look like submerged oil which are not, for example, sea grasses or organic matter.
3. Submerged oil can be difficult to recover; it requires significant skill to remove without risking response personnel and additional environmental impact.

Submerged oil is mostly in very nearshore areas and the sampling to date confirms that the DWH oil has been submerged only after being mixed with sand or other types of sediment or organic matter heavier than seawater.

Similarly, the SOM Strategy and the Tactical Plan summarized these mechanisms by which SOMs can potentially be formed as floating oil approaches the intertidal and supra-tidal zones:

1. **Wave Base Zone** - Sunken oil results from the interaction of oil with shore-zone or nearshore sediments. [*Ed. Note - This can happen in water*]

depths in which the wave eddies extend all the way to the seabed – which can include depths up to 30 feet if strong wave action is present (for instance, when driven by storms).] Some of the oil that approaches the shore becomes mixed with sediment suspended by wave action in the nearshore area and sinks as the oil and sediment mixture is denser than sea water. This sunken oil can be on the surface of the sea floor or buried below the surface at various depths.

The Wave Base zone can start several hundreds of yards from the beach, and typically extends inshore as far as the first sand bar. The Wave Base zone is well below the intertidal area so does not become dry at low tides, and SOMs in this zone are typically beyond the first sand bar closest to the beach.

These SOMs, when they exist, typically will not come ashore and strand on the beaches except during storm events. The Tactical Plan – Phase I focused on an attempt to locate, delineate and where practical to attempt recovery of such sunken oil residues.

2. **Near Subtidal & Intertidal** - This part of the nearshore area is just seaward of the dry beach. SOMs in this zone can result from either or both of two mechanisms:

- a. Floating oil reached the intertidal zone and was deposited on sand, then washed back into the surf and was re-deposited in up to a few feet of water depth. It then experienced burial and re-exposure cycles.
- b. Sunken oil residues formed in the Wave Base zone and then sank to the bottom. Some of them experienced burial under sand, or continually become buried and re-exposed during the dynamic sediment movement processes in this zone.

Many near-Subtidal and Intertidal residues, in the form of SOMs, have been located and treated by the combined efforts of the Shoreline Cleanup Assessment Technique (SCAT) program and the GCIMT Operations Section.

The Tactical Plan also described “In Transit” residues - those sunken oil residues (SRBs and SRPs) which can be in transit from outer zones toward the shoreline. Absent any evidence of SOMs in the Wave Base Zone, such “In Transit” material can only be from farther out in deeper water (referred to within the SOM Tactical Plan as “outer wave base region”), or from moving longitudinally along the shoreline, or from near-Subtidal and Intertidal SOMs that have been degraded and broken up by wave action. As documented elsewhere in this report, there is no evidence that SRBs or SRPs are migrating from deeper water or moving

appreciable distances along the shoreline. Therefore such material most likely originates from SOMs nearest the shore that have been degraded at some time in the near or distant past; this is consistent with an observation that shoreline recovery volumes are declining with time as this material “sticks” in the intertidal zone and is picked up by shoreline response crews.

The sunken oils analyzed as part of the Operational Science Advisory Team (OSAT-2) studies were found to be composed of 83 to 91 percent sand (9 to 17 percent weathered oil) by mass, with the highest percentage of oil stranded in mats at beaches closest to the source of the oil spill. Potential SOMs in the Wave Base zone were expected to have this composition, but this was not confirmed because none were found.

OSAT-2 also documented the threat from any of the remaining weathered oil residues for birds and sea turtles as being low, as was the case for small mammals, although ingestion was a potential concern.

Summary of Operational Activities

Two contractors were engaged to conduct the SOM survey work for Phase I:

1. A composite group of T&T Marine, KBKM Associates and Braveheart Shipping B.V. (T&T)
2. Fairweather Science, LLC

T&T's survey equipment consisted of an Acoustic Doppler Current Profiler (ADCP), a sonar Sub-Bottom Profiler (SBP) and a video equipped remotely operated underwater vehicle (ROV). In addition to the imaging capabilities, T&T was equipped to capture samples with a Ponar sediment sampler and a two finger manipulator gripper on the ROV. Fairweather's survey equipment consisted of a sonar Sub-Bottom Profiler and a towed side scan sonar. Fairweather's imaging equipment was augmented by a Ponar device and a Vibracore deep soil sampler.

Collectively this equipment was capable of detecting:

- a. oil potentially in the water column (ADCP) ,
- b. oil or sediment entrained oil potentially on the seafloor (side scan sonar), and
- c. potentially buried oil entrained sediment (SBP)

Depth of investigation below the seafloor during the SOM survey, using the SBPs, was typically one meter although the tools are capable of seeing deeper when desired. A burial depth of one meter was generally correlative to the deepest burial depths for MC252 oil onshore.

Standard Operating Practice included having both BP and USCG representatives on the survey vessels at all times during survey or sampling operations to provide direction and oversight. During all sampling operations a Cardno Entrix sample custodian and a marine archaeologist were also aboard the vessel.

Due to the close proximity of the survey areas to sensitive marine habitat and recreational shoreline, there were several operational constraints for the contractors:

- All operations were to be conducted in such a manner so as not to endanger people, marine life, the survey vessels or equipment.
- Sea Turtles were to be reported by the Coast Guard in accordance with MC252 Section 7 Best Management Practices. Additionally survey work was required to be stopped until observed turtles were no closer than two hundred yards from the vessel.
- Right of Way was given to the general public.

Areas surveyed in Phase I were seaward of the intertidal zone and generally between the first and second sandbar of Gulf facing beaches. In some situations where a second sand bar was not clearly evident, survey lines extended to approximately the seaward edge of the Wave Base (the first of either thirty feet water depth or one thousand feet from shore).

Often during survey operations the first survey lines are made perpendicular to anticipated bottom contour (i.e., transects), in order to maximize bottom contour detail. However, during the SOM survey program the first contractor deployed (T&T) determined that transects perpendicular to the shoreline presented safety and practical operational concerns. Running toward the beach and turning around in the surf zone posed a potential safety risk for the crew and vessel. Furthermore, due to the relatively short length of the transects (usually one thousand feet or less) the vessel was spending more time turning and repositioning than surveying. Longshore survey lines (parallel to the shoreline) were expected to yield the same results for SOM detection as transect lines so after weighing the tradeoffs in bottom contour detail versus safety and survey productivity, the tactical work plan was modified to run transects only when needed to enhance the survey data in areas of particular interest.

Field operations commenced with T&T on May 27, 2011, when they began surveying Florida segments FLES1_001 to 007 off Perdido Key. T&T's survey operations continued in Florida through June 9. Other Florida areas surveyed during early June include Pensacola Beach segments FLES2_012 to 016 plus FLES2_018. Segments FLES1_008 and 009 were added, at the direction of the Florida Branch, during the course of work in Florida. T&T completed their Florida survey work on June 9 and commenced Alabama survey operations on June 11 with Fort Morgan Peninsula segments ALBA1_035 to 038. Other Alabama segments surveyed were ALBA1_038 to 042 and ALBA1_135. In addition to SOM surveying, T&T ran a magnetometer survey over segments ALBA1_035 and 036 at the request of the Alabama Branch to determine if there were any historical artifacts submerged in the wave base zone of these segments. T&T completed their survey work and were demobilized on June 16.

During survey operations T&T detected sixteen sea bottom or sub-bottom "anomalies", where tool readings indicated a difference in sediment characteristics when compared to local reference (clean) sandy sediments¹⁶. All of the anomaly sites detected by T&T were visually inspected for signs of oil or oil entrained sediments. Additionally, at seven of the sites, sea bottom sediments were sampled for the presence of oil or oil entrained sediment. None of the ROV visual inspections or sediment samples found oil or oil entrained sediment.

¹⁶ Acoustic detection tools analyze acoustic backscattering from a known, emitted signal. Backscatter is a result of acoustic "impedance" changes between sediment layers, which in turn depend on the layers' densities, viscosities and the speed of sound in the materials.

Fairweather began their survey campaign on June 13 over Fort Morgan Peninsula segments ALBA1_035 to 037. Their survey work continued over ALBA1_038 to 042 and ALBA1_135 until all survey work in Alabama was completed on June 27. Fairweather began survey operations in Florida on June 29 over Perdido Key segments FLES1_001 to 009. Florida survey operations by Fairweather also included Pensacola Beach segments FLES2_012 to 016 and FLES2_018. By July 3 Fairweather had completed all acoustic survey operations in both Florida and Alabama. Due to some equipment problems and weather related down time, Fairweather remained on hire until July 20 to conduct Vibracore sediment sampling operations at anomaly sites in Alabama.

Fairweather detected a total of seventeen sea bottom or sub-bottom anomalies. They did not have ROV capability so none of their anomaly sites were visually surveyed. To supplement their acoustic survey work Fairweather collected thirteen bottom sediment samples at anomalies in Alabama (5) and Florida (8). Additionally, eight sites in segments ALBA 1_036, 037 and 042 were cored to investigate sub-bottom anomalies. None of the bottom sediment or core samples found oil or oil entrained sediment.

During the survey operations by T&T and Fairweather, the anomalies detected were described variously as organic material (sometimes with a decaying odor), black detritus-type material, sargassum, silt-clay mixture, material leaving no sheen, shell bed, and/or unknown buried acoustic anomaly (sampled and determined not to be oil). None contained oil. These descriptions, combined with confirming laboratory analyses for a portion of the retained sediment and core samples, do not support the hypothesis that submerged oil or oil entrained sediment exists between the first sand bar and the seaward edge of the Wave Base in the areas surveyed. Additionally, the ADCP tool used by T&T did not indicate the presence of oil or mobile oil entrained sediments in the water column.

Technology Screening & Field Trials

There has been a nonfloating oil focus by the spill industry and R&D organizations for most of the past decade. Not coincidentally, nine major spills have occurred globally with submerged or sunken oil since 1991, with varying degrees of success on recovery. Nonfloating oils are difficult to locate, they sometimes migrate, and recovery methods are complex. Every situation is unique.

Submerged Oil Mat location methods in the past have primarily relied on visual observation, the use of snares & sorbents, deployment of underwater divers & video, various designs of trawls, and sediment sampling. Many of these methods have been used in the Deepwater Horizon response but the point of diminishing effectiveness has been reached.

In recent years acoustic tools (especially sonar) have been adapted for the detection of submerged oil. In a 2006 workshop to evaluate the state of the practice for responding to submerged oil, hosted by The Coastal Response Research Center (a partnership between the NOAA Office of Response and Restoration and the University of New Hampshire)¹⁷, such tools were identified and highly ranked as promising remote surveillance technologies. In 2008 Michel¹⁸, in a study sponsored by the USCG, reported that the use of side scan sonar during the 2004 *M/T Athos 1* (Delaware River) spill response was of marginal benefit but its use during the response to the 2005 Gulf of Mexico tank barge *DBL-152* spill was more effective. She recommended a systematic assessment of acoustic systems for submerged oil detection. From November 2007 through January 2009 the United States Coast Guard led tests of the most viable heavy (submerged) oil detection systems as part of its research & development program¹⁹; these included sonar, laser fluorometry, real-time mass spectrometry, and in-situ fluorometry. The conclusion reached was that the multi-beam and imaging sonars appeared to be the best sensors to conduct wide area detection surveys, with the RESON SeaBat 7125 system positively identifying the control targets 87% of the time. It was noted that further development was needed, particularly regarding post survey data processing time requirements.

While such acoustic technologies are still in refining phases of development, they are sufficiently ready for in-theater testing and use at the current time. As such, a number of providers came forward to the GCIMT with proposed programs and systems. Therefore in late 2010 and early 2011 the GCIMT undertook an

¹⁷ See References: Submerged Oil – State of the Practice and Research Needs

¹⁸ See References: Spills of Nonfloating Oil: Evaluation of Response Technologies

¹⁹ See References: Heavy Oil Detection (Prototypes) - Final Report

updated review of available methods, tools and equipment for identifying SOMs. Three were tested and all demonstrated an ability to find submerged oil in areas where it was known (by other methods) to exist:

- CodaOctopus 3-D sonar
- KBKM/T&T Marine Acoustic Doppler sonar
- Fairweather Side-Scan sonar

These technology tests are further described in the following pages.

In addition to acoustic methods, other technologies and tools are suitable for delineation once SOMs are located: fluorometric probes, sampling (Ponar, cores, etc.), laser fluorometer, divers, and sub-bottom profiling. These can be used to delineate SOM depth of burial, thickness, areal extent, and other properties.

CodaOctopus 3-D Sonar

A field test was conducted to verify the capabilities and usefulness of the CodaOctopus sonar system which has been used by the U.S. Coast Guard for detection of divers and underwater intruders under Homeland Security operations and for other underwater searches. The system was informally evaluated by the USCG R&D Center at the OHMSETT (New Jersey) facility in 2009 and successfully detected oil in clear water conditions. The GCIMT field test was conducted to verify the system's utility in finding SOMs on the Gulf of Mexico seabed floor, and it was paired with EIC's new laser fluorometer to provide ground-truthing of any material detected.

Tests were conducted beginning in October 2010 and the result was that the system was able to detect oil where it was known to exist. A limitation of the system, per its design, is that it cannot see anything buried within the sediment. Nonetheless it is a valid response tool for situations where burial is not a factor. The complete field test evaluation is included in the Appendix to this report.

KBKM / T&T Marine / Braveheart Consortium Acoustic Doppler Current Profiler (ADCP) & Sub Bottom Profiler

This test was conducted off of the Fort Morgan / Bon Secour beaches on the seaward side. Its objective was to test the SOM-finding capability of Acoustic Doppler and Sub Bottom Profiler technology with specific success criteria including:

- Demonstrating the ability to detect oil both on the seabed floor as well as subsurface.
- Delineating tar mats real-time in a readily understandable format.
- Providing the final product from the field work within a short amount of time (12 hours).

The test area was selected by SCAT as an area most likely to have tar mats due to continuous re-oiling conditions. All testing was conducted within Division ALBA_001.

Based on findings during the calibration of the equipment on day one, the team proceeded to the subject site. It was noted that a long stick excavator was recovering a near shore tar mat indicating the potential presence of further mats. The survey was conducted an average of 500 ft from shore in 10-20 ft of water. The vessel and equipment were capable of working in shallower water (as little as 2 ft) but building seas prevented them from doing so.

Approximately 0.5 miles east of the starting point, the presence of hydrocarbon was detected on the bottom. Due to the poor visibility in the water the team was unable to verify that detection with the ROV. The team continued the survey, detecting another hydrocarbon presence further north that was visually confirmed via ROV as pictured herein. The team continued to delineate the mat prior to ending the test.



The complete field test evaluation is included in the Appendix to this report.

Fairweather Science Side-Scan Sonar & Sub Bottom Profiler

This is a system that had been used in Alaska to locate deep-water, naturally occurring seeps. The system uses Side-Scan Sonar for surface identification, and a Sub-Bottom Profiler to detect Submerged Oil Mats (SOMs) using an acoustic drop out method. The technology was established and recognized within the industry as a standard for underwater surveying and was described as able to be adapted to identify SOMs.

The following criteria were specified for a successful test:

- Demonstrating the ability to detect oil both on the seabed floor as well as subsurface.
- Delineating tar mats real-time in a readily understandable format.
- Providing the final product from the field work within a short amount of time (12 hours).

The test was conducted off of the Fort Morgan beaches on the bay side. This selection was based on historical re-oiling during the MC252 incident as well as data provided by Snorkel SCAT. The area was scanned in a typical search grid ranging from the beach to approximately 1,000 meters offshore. The depth of the water surveyed ranged from 2 feet to 50 feet. Over the course of the survey, a SOM was located and later confirmed.

The test was concluded as a success, with the caveat that improvements needed to be made for real-time interpretability and turnaround time for final results. The complete field test evaluation is included in the Appendix to this report.

While conducting the test, Fairweather also set up a small scale bench test to demonstrate the equipment's ability to detect SOMs. This test was conducted in a container with a known sand/SOM configuration. The system properly detected the SOM beneath clean sand, including its specific depth and thickness.

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Appendix A

Maps



GCIMT SOM Tactical Plan Phase 1
Florida SOM Survey Areas
 Wed Aug 17 2011 05:06:20 PM
 This map is only for informational purposes and may not have been prepared for or the suitable for use in any other way. It is not to be used for any other purpose and does not represent an official survey and only represents the approximate relative location of management boundaries.



Appendix B
Daily Operations Reports

T&T Marine Group
Daily Situation Reports
May 27 – June 16, 2011

Friday May 27 - Day 1

AOR: - Perdido Key - FLES1 001-007

Weather on scene: - Sea conditions 1-3'

Winds light to moderate

Calms seas yielded to afternoon choppy conditions

HSE: - No incidents or Accidents

Percentage of AOR scanned: %

**Today's survey was limited due to morning calibration
time 0842 – 0930**

Began survey 0930

Operation hours portal to portal – 0715 - 1605

Vessel: - Skipper T

POB: - 6

**BP Rep: Steve Turner, Captain: Don Draper, USCG: MK2 Jonathan Davis,
Bravehart: Tjeerd deBoer, Wilhelm Roth, KBKM: Kelly Wilson,**

Target Identification – Pending outcome of data interpretation

Operational Plan for Saturday May 28 – Day 2:

Return to Perdido Key - FLES1 001-007 for Target Identification

Key Issues – Begin Survey

Bravehart team leader will join operation

POB on board - 7

Friday May 28 - Day 2

AOR: - Perdido Key - FLES1 001-007

Weather on scene: - Sea conditions 1-3'

Winds light to moderate

Choppy sea conditions throughout the day

HSE: - No incidents or Accidents

Percentage of AOR scanned: %

Began survey 0830 – Ended survey 1235

Braveheart techs reviewed data until 1700

**Skipper T berth repositioned to Sportsman Marina
Orange Beach Alabama to allow for shorter transit
time to survey area**

Operation hours portal to portal – 0600 - 1700

Vessel: - Skipper T

POB: - 8

**BP Rep: Steve Turner, Captain: Don Draper, USCG: MK2 Jonathan Davis,
MST3 Jeff Nagel, Braveheart: Jelle Hakvoort, Tjeerd deBoer, Wilhelm Roth,
KBKM: Kelly Wilson,**

Target Identification – Pending outcome of data interpretation

Operational Plan for Saturday May 29 – Day 3:

Return to Perdido Key - FLES1 001-007 for Target Identification

**Key Issues – MST3 Nagel takes over FOSCR role. Crew and Team will meet
dockside at 0700 on 29May11**

Friday May 29 - Day 3

AOR: - Perdido Key - FLES1 001-007

Weather on scene: - Sea conditions 2-3' occasional 4'

Winds S 15knts

Choppy sea conditions building throughout the day

HSE: - No incidents or Accidents

Operations Summary: - Sub-bottom profiler deployed

Began survey 0904 – Ended survey 1240

Survey was halted due to sea conditions

Operations Conference call at 1900-2000

**BP Technical Team
KBKM**

Braveheart Technical Team

SOM/SUP

Target Identification – Pending outcome of data interpretation

Operation hours portal to portal – 0830 - 1330

Vessel: - Skipper T

POB: - 8

**BP Rep: Steve Turner, Captain: Don Draper, USCG: MST3 Jeff Nagel,
Braveheart: Jelle Hakvoort, Tjeerd deBoer, Wilhelm Roth, KBKM: Kelly
Wilson T&T Marine – Joseph Decker**

Operational Plan for Saturday May 30 – Day 4:

Return to Perdido Key - FLES1 001-007 for Target Identification

Key Issues –Skipper T will depart dockside at 0600 on 30May11

May 30, 2011 - Day 4

AOR: - Perdido Key - FLES1 001-007

Weather on scene: - Sea conditions 2-3'

Winds SE 10-15knts

Choppy sea conditions throughout the day

HSE: - No incidents or Accidents

Operational Summary: - Multi-beam sonar deployed

Began survey 0730 – Ended survey 1215

Dockside at 1240 for data interpretation

Operations Conference call at 1900-2000

**BP Technical Team Braveheart Technical Team SOM/SUP
KBKM**

T&T Marine

Target Identification – Pending outcome of data interpretation

Operation hours portal to portal – 0640 - 1240

Vessel: - Skipper T

POB: - 8

**BP Rep: Steve Turner, Captain: Don Draper, USCG: MST3 Jeff Nagel,
Braveheart: Jelle Hakvoort, Tjeerd deBoer, Wilhelm Roth, KBKM: Kelly
Wilson T&T Marine – Joseph Decker**

Operational Plan for May 31, 2011 – Day 5:

Return to Perdido Key - FLES1 001-007 for Target Identification

**Key Issues –Skipper T will depart dock at 0600 on 31May11, Steve Turner
will brief and hand over BP OPS position to relief to Lauren Glushik.**

June 1-2, 2011

No sitrep as all survey operations were stood down.

June 3, 2011 - Day 8

AOR: - Perdido Key - FLES1 001-007

Weather on scene: - Sea conditions 1 - 2'

Winds South 10knts

HSE: - No incidents or Accidents

Operational Summary: - Began survey 0700 – Ended survey 1100

Began sampling 1130 Ended sampling 1345

Four sites sampled. 2 bottom dredge/ponar samples of seabed surface and 2 core samples to approx 8" were taken at each site. No visible oil was seen in any samples. One control background sample was taken at three sites by Entrix for lab analysis (total 3 background samples). Two sites were checked with the ROV. One where an anomaly was noted and one where a possible large object was detected on the sea floor. The small black flecks on the sand in the video are likely organic material as none of the samples in that area showed any oil, only organics. Visibility was approx 6". The object detected by the survey was not seen in the ROV video due to the limited visibility.

Operations Conference call at 1900-2000

No conference call this evening.

Target Identification – No specific targets were identified.

Operation hours portal to portal – 0630 - 1430

Vessel: - Skipper T

POB: - 8

**BP Rep: Lauren Glushik Captain: Don Draper, USCG: MST3 Jeff Nagel,
Braveheart: Tjeerd deBoer, Wilhelm Roth, T&T Marine – Joseph Decker,
Entrix – Darcie Odum, Southeast Archaeological – Shawn Arnold**

Operational Plan for June 4, 2011 – Day 9:

Pensacola Beach, FLES2-012 to -016

Key Issues –Skipper T scheduled to depart dock at 0600 on 04June11.

June 4, 2011 - Day 9

AOR: - Pensacola Beach – FLES2 012-016 and -018

Weather on scene: - Sea conditions 1 - 2'

Winds SW 5-10knts

HSE: - No incidents or Accidents

Operational Summary: - Began survey 0755 – Ended survey 1230

Ran baseline survey transects in Segment FLES2-018.

Analysis of baseline survey transect data.

Operations/Technical Conference call at 1900-2000

N/A

Target Identification –

Target identification not conducted today.

Operation hours portal to portal – 0630 - 1400

Vessel: - Skipper T

POB: - 8

BP Rep: Lauren Glushik Captain: Don Draper, USCG: MST3 Jeff Nagel, Braveheart: Jelle Hakvoort, Tjeerd deBoer, Wilhelm Roth, T&T Marine – Joseph Decker, KBKM – Kelly Wilson

Operational Plan for June 5, 2011 – Day 10:

Pensacola Beach - Address any gaps in baseline data for FLES2-018. Run baseline transects in FLES2-012 to -016.

Key Issues –Skipper T scheduled to depart dock at 0600 on 05June11.

June 5, 2011 - Day 10

AOR: - Pensacola Beach – FLES2 012-016 and 018

Weather on scene: - Sea conditions 1 - 2'

Winds SE 5-10knts

HSE: - No incidents or Accidents

Operational Summary: - Began survey 0730 – Ended survey 1300

Ran baseline survey transects in Segment FLES2-012 to -016 up to west side of pier. Unable to complete data collection in the zone from shore to 100-200ft out due to high beach user activity. Survey activity was moved away from the high public use area.

Analysis of baseline survey transect data.

Operations/Technical Conference call at 1900-2000

N/A

Target Identification –

Target identification not conducted today.

Operation hours portal to portal – 0630 - 1415

Vessel: - Skipper T

POB: - 8

BP Rep: Lauren Glushik Captain: Don Draper, USCG: MST3 Jeff Nagel, Braveheart: Jelle Hakvoort, Tjeerd deBoer, Wilhelm Roth, T&T Marine – Joseph Decker, KBKM – Kelly Wilson

Operational Plan for June 6, 2011 – Day 11:

Pensacola Beach – Run ID survey in FLES2 012-016 and 018. Archaeologist and Entrix sampler will be on board for sampling if any suspect targets are identified.

Key Issues –Skipper T scheduled to depart dock at 0600 on 06June11.

June 6, 2011 - Day 11

AOR: - Pensacola Beach – FLES2 012-016 west of pier

Weather on scene: - Sea conditions 1 - 2', light chop

Winds W 5-10knts

HSE: - No incidents or Accidents

Operational Summary: - Began survey 0730 – Ended survey 1330

Investigated four anomalies in AOR FLES2-012 to 016.

Site 1: 30.32878, 87.14362

Site 2: 30.32535, 87.17020

Site 3: 30.32262, 87.17551

ROV video was taken at each site. Only a portion of the video was viewed but what was seen showed some black detritus-type material and sargassum on the sandy seafloor. No visible oil was seen on the video or in the single grab samples taken at each site, however given the continual shoreline impact it is likely there are some sporadic tarballs in the area.

Site 4: 30.32059, 87.16975

ROV video showed sandy bottom with some algal growth. There were clumps of dark material on the sandy bottom. The ROV obtained a small sample and Entrix determined it was not oil. It appeared to be a silt-clay type mixture. A grab sample was taken although there was difficulty in obtaining an intact clump. Entrix took a sample of the sand and silt mixture that was captured in the bottom dredge sampler.

Operation hours portal to portal – 0630 - 1500

Vessel: - Skipper T

POB: - 8

BP Rep: Lauren Glushik Captain: Don Draper, USCG: MST3 Jeff Nagel, Braveheart: Tjeerd deBoer, Wilhelm Roth, T&T Marine – Joseph Decker, Entrix – Darcie Odum, Southeastern Archaeological – Shawn Arnold

Operational Plan for June 7, 2011 – Day 12:

Pensacola Beach – Run ID survey in FLES2 016 east of pier and 018. Archaeologist and Entrix sampler will be on board for sampling if any suspect targets are identified.

Key Issues –Skipper T scheduled to depart dock at 0600 on 07June11.

June 7, 2011 - Day 12

AOR: - Perdido Key – FLES1-008 & -009

Weather on scene: - Sea conditions 1 - 2', light chop

Winds SE 5-10knts

HSE: - No incidents or Accidents

Operational Summary: - Began survey 0815 – Ended survey 1300

Ran survey transects in FLES2-016 east of the pier and FLES2-018. No sites within these areas were investigated with the ROV or by sampling.

One site in FLES-012 to -016 west of the pier was checked by the ROV.

30.32155, 87.16840 – water depth 30ft

ROV video was taken at the site. Sandy bottom with sporadic clumps of black/brown material. A sample of material was obtained by the ROV. Entrix sampler confirmed the material was not oil.

Today the USCG FOSCR and BP Rep were allowed to view the ROV video.

Operation hours portal to portal – 0630 - 1415

Vessel: - Skipper T

POB: - 9

BP Rep: Lauren Glushik Captain: Don Draper, USCG: MST3 Jeff Nagel, Braveheart: Tjeerd deBoer, Jelle Hakvoort T&T Marine deckhand – Don, Entrix – Darcie Odum, Southeastern Archaeological – Shawn Arnold, KBKM – Kelly Wilson

Operational Plan for June 8, 2011 – Day 13:

Stand down survey operations until addendum to Operations Work Plan for Perdido Key FLES1-008 and -009 is authorized.

Key Issues – Skipper T to remain at Pelican Perch Dock on 08June11.

June 9, 2011 - Day 14

AOR: - Perdido Key – FLES1-008 & -009

Weather on scene: - Sea conditions 2'

Winds SE 5-10knts

HSE: - No incidents or Accidents

Operational Summary: - Began survey 0740 – Ended survey 1210

Ran survey transects in FLES1-008 and FLES1-009. Two sites were investigated with the ROV (30 17.4463, 87 27.2266 and 30 17.3571, 87 27.5964). Strong current and turbidity hampered effectiveness of ROV video clarity. There was no positive ID by means of the video on site, however it should be further analyzed together with the survey sonar data.

Survey is complete in Florida AOR.

Operation hours portal to portal – 0620 - 1330

Vessel: - Skipper T

POB: - 8

BP Rep: Lauren Glushik Captain: Don Draper, USCG: MST3 Jeff Nagel, Braveheart: Tjeerd deBoer, Jelle Hakvoort, Wilhelm Roth T&T Marine deckhand – Don, KBKM – Kelly Wilson

Operational Plan for June 10, 2011 – Day 15:

Vessel Skipper T to transit to Gulf Shores Marina in the morning. Kickoff meeting for Alabama AOR at 1400.

Key Issues – Awaiting approval of Alabama work plan amendment.

June 10, 2011 - Day 15

AOR: - Alabama

Weather on scene: - Sea conditions 2-3'

Winds SE 5-10knts

HSE: - No incidents or Accidents

Operational Summary: - Skipper T transited to Gulf Shores Marine, 1400 safety/inspection meeting with AL branch safety, Nola safety and AL branch NRAs

Operation hours portal to portal – 0745 - 1100

Vessel: - Skipper T

POB: 2

Captain: Don Draper, T&T Marine deckhand – Don

Operational Plan for June 11, 2011 – Day 16:

Vessel Skipper T on standby at Gulf Shores Marina

Key Issues – Awaiting approval of Alabama work plan amendment.

June 11, 2011 - Day 16

AOR: - Alabama – ALBA1-035-037

Weather on scene: - Sea conditions calm

Winds NW 5knts

HSE: - No incidents or Accidents

Operational Summary: - Began survey 0740 – Ended survey 1245

Ran survey transects in ALBA1-035, -036, -037. Two sites were investigated with the ROV. There was no positive ID by means of the video on site, however it should be further analyzed together with the survey sonar data. Video should also be reviewed for the second ROV site for decision on possible physical material sampling.

Operation hours portal to portal – 0620 - 1330

Vessel: - Skipper T

POB: - 8

BP Rep: Lauren Glushik Captain: Don Draper, USCG: MST3 Jeff Nagel, Braveheart: Tjeerd deBoer, Jelle Hakvoort, Wilhelm Roth T&T Marine deckhand – Don, KBKM – Kelly Wilson

Operational Plan for June 12, 2011 – Day 17:

Survey ALBA1-038 to -042

Key Issues –

June 12, 2011 - Day 17

AOR: - Alabama – ALBA1-038-042

Weather on scene: - Sea conditions calm

Winds W 5knts

HSE: - No incidents or Accidents

Operational Summary: - Began survey 0700 – Ended survey 1245

Ran survey transects in ALBA1-038 to -042. Three sites were investigated with the ROV. There was no positive ID by means of the video on site, however it should be further analyzed together with the survey sonar data. The second ROV site had material similar to the brown-black material at the second ROV site on 11 June.

Sheen was spotted in the area of segments 041 and 042. Reported to NRC by USCG MST3 Nagel. NRC 979419.

Operation hours portal to portal – 0615 - 1345

Vessel: - Skipper T

POB: - 7

BP Rep: Lauren Glushik Captain: Don Draper, USCG: MST3 Jeff Nagel, Braveheart: Jelle Hakvoort, Wilhelm Roth T&T Marine deckhand – Don, KBKM – Kelly Wilson

Operational Plan for June 13, 2011 – Day 18:

Continue survey at ALBA1-038 to -042

Key Issues –

June 13, 2011 - Day 18

AOR: - Alabama – ALBA1-038-042

Weather on scene: - Sea conditions 1-2'

Winds W 10-15knts

HSE: - No incidents or Accidents

Operational Summary: - Began survey 0715 – Ended survey 1455

Completed survey in ALBA1 -038 to -042.

Today three sites were investigated with the ROV.

Site 1: 30 13.4618; 87 49.5830

Site 2: 30 13.5697; 87 49.5642

Site 3: 30 13.6175; 87 49.3157

**ROV sites 2 & 3 had similar black/brown material as previous days videos.
Can be viewed on ROV video from Site 3 timestamp 13 June 11 15:40:00.**

Operation hours portal to portal – 0615 - 1620

Vessel: - Skipper T

POB: - 7

**BP Rep: Lauren Glushik Captain: Don Draper, USCG: MST3 Jeff Nagel,
Braveheart:Jelle Hakvoort, Wilhelm Roth T&T Marine deckhand – Don,
KBKM – Kelly Wilson**

Operational Plan for June 14, 2011 – Day 19:

Continue survey at ALBA1-135

Key Issues – Expected completion of Alabama survey area on 14Jun

**Magnetometer runs of ALBA1-35, 36 and 135 will begin on
15Jun-16Jun**

June 14, 2011 - Day 19

AOR: - Alabama – ALBA1-135

Weather on scene: - Sea conditions 2-4'

Winds NW 10-20knts

HSE: - No incidents or Accidents

Operational Summary: - Began survey 0700 – Ended survey 0900

Completed survey in ALBA1-135.

Underwater obstructions, shallow water and high winds, sea state and currents interfered with the survey coverage. T&T stated they are unable to run magnetometer surveys in ALBA1-135 due to the shallow water and obstructions.

Operation hours portal to portal – 0630 - 0900

Vessel: - Skipper T

POB: - 7

BP Rep: Lauren Glushik Captain: Don Draper, USCG: MST3 Jeff Nagel, Braveheart: Jelle Hakvoort, Wilhelm Roth T&T Marine deckhand – Don, KBKM – Kelly Wilson

Operational Plan for June 15, 2011 – Day 20:

Data processing day. Remain in port for data download to BP Technical team.

Key Issues –

June 16, 2011 - Day 21

AOR: Alabama – ALBA1-035 & -036

Weather on scene: - Sea conditions 2-4'

Winds W 10-20knts

Delay this morning due to lightening

HSE: No incidents or accidents

Operational Summary: Magnetometer survey 0830 – 1115

Completed magnetometer survey of ALBA1-035
and -036

Vessel Skipper T returned to Pelican Perch
Marina, Pensacola FL for inspection and demob.

Operation hours portal to portal – 0640 - 1400

Vessel: Skipper T

POB: 4

BP Rep: Lauren Glushik

Captain: Don Draper

USCG: MST3 Jeff Nagel

T&T Marine deckhand: Don

Appendix B
Daily Operations Reports

Fairweather Science
Daily Situation Reports
June 13 – July 19, 2011

June 13, 2011 - Day 1

AOR: Alabama – ALBA1-035-037

Weather on scene: Sea conditions calm

Winds NW 5knts

HSE: No incidents or accidents

Operational Summary: Began survey 1048 – Ended survey 1530

Tool box discussion on heat stress and sun protection, boating safety and reviewed the JSA.

Surveyed/Calibrated in ALBA1-035, -036, -037

Three possible anomalies pending data interpretation

Operation hours portal to portal – 0620 - 1430

Vessels: - Research 1 and 2

Research 1 POB: - 5

Captain: Steve Fogg. BP Rep: Johnny Burrencia. USCG: E-06 Dallas Jamal, Fairweather Supervisor: Dave Alridge, Fairweather tech: Jesse McNich

Research 2 POB: - 3

Captain: Jeff Ladage, BP Safety: Alex Campbell, NRA: Cody Bishop,

Operational Plan for June 14, 2011 – Day 2:

Continue survey of ALBA1-035, 036 and 037

Key Issues – No Issues

June 14, 2011 - Day 2

AOR: Alabama – ALBA1-035-037

Weather on scene: Sea conditions choppy and rough in the morning
calming by afternoon

Winds NW 10 to 15knts this morning subsiding as
day progressed

HSE: No incidents or accidents

Operational Summary: Research 1 did not depart dock till 1200 due to
weather.

Began survey 1300 – Ended survey 1600

Tool box discussion on slips, trips and falls and
reviewed the JSA.

Completed initial survey of segments ALBA1 -035,
-036, -037.

One possible anomaly (036) pending data
interpretation

Operation hours portal to portal – 1202 - 1700

Vessels: - Research 1

Research 1 POB: - 5

Captain: Steve Fogg. **BP Rep:** Johnny Burrencia. **USCG:** E-06 Dallas Jamal,
Fairweather Supervisor: Dave Alridge, **Fairweather tech:** Jesse McNich, Jeff
Ladage

Research 2 vessel: - Did not deploy

Operational Plan for June 15, 2011 – Day 3:

ALBA1- 036 cross check today's anomaly for verification

Continue survey in ALBA1 038 through 042

Key Issues – No Issues

June 15, 2011 - Day 3

AOR: Alabama – ALBA1-038-042

Weather on scene: Sea conditions choppy to rough, calming by afternoon

Winds NW 10 to 15knt subsiding as day progressed

HSE: No incidents or accidents

Operational Summary: Research 1 departed dock at 0900 hrs

Survey 1000 hrs – 1500 hrs

Tool box discussion Heat Stress and reviewed the JSA.

Completed initial survey of segments ALBA1 038 through 042.

Possible anomaly ALBA1-042 pending data interpretation

Operation hours portal to portal – 0900-1600 hrs

Vessels: Research 1

POB: 6

Captain: Steve Fogg, **BP Rep:** Johnny Burescia, **USCG:** E-06 Dallas Jamal, **Fairweather Supervisor:** Dave Alridge, **Fairweather Tech:** Jeff Ladage, **BP Safety:** Alex Campbell

Research 2 - Did not deploy

Operational Plan for June 16, 2011 – Day 4:

Survey ALBA1- 135

Key Issues – No Issues

June 16, 2011 - Day 4

AOR: Alabama – ALBA1-038-042

Weather on scene: Sea conditions choppy to rough, calming by mid morning

Winds NW 10 to 15kts subsiding as day progressed

Delay this morning due to lightening

HSE: No incidents or accidents

Operational Summary: Research 1 departed dock at 1100 hrs

Survey 1130hrs – 1330hrs

Tool box discussion entanglement (power cables for equipment) and reviewed the JSA.

Completed initial survey of segment ALBA1-135. Side scan sonar only (due to mammals around the boat no sub-surface profiler was used).

Operation hours portal to portal – 1100-1420 hrs

Vessels: Research 1

POB: 5

Captain: Steve Fogg, **BP Rep:** Johnny Burrencia, **USCG:** E-06 Dallas Jamal, **Fairweather Supervisor:** Dave Alridge, **Fairweather Tech:** Jeff Ladage,

Research 2 - Did not deploy

Operational Plan for June 16, 2011 – Day 5:

Resurvey four anomalies in ALBA1- 035-042

Key Issues – No Issues

June 17, 2011 - Day 5

AOR: Alabama – ALBA1- 035-042, 135

Weather on scene: Sea conditions:

ALBA1- 135 slightly choppy

ALBA1- 35-42 Choppy to rough

Winds WNW 10 to 15kts

HSE: No incidents or accidents

Operational Summary: Research 1 departed dock at 0900

Tool box discussion power lines and tripping hazards and reviewed the JSA.

Survey 1000hrs – 1130hrs (ALBA1-135)

Transited to ALBA1 035-042, did not deploy gear due to sea conditions

Completed initial survey of segment ALBA1-135 with sub-surface profiler

Operation hours portal to portal – 0900-1400 hrs

Vessels: Research 1

POB: 6

Captain: Steve Fogg, BP Rep: Johnny Burescia, USCG: E-06 Dallas Jamal, Fairweather Supervisor: Dave Aldrich, Fairweather Tech: Jeff Ladage, BP Safety: Alex Cambell

Research 2 - Did not deploy

Operational Plan for June 18, 2011 – Day 6:

Delineate four anomalies in ALBA1-035-042

Key Issues – No Issues

June 18, 2011 - Day 6

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions choppy to rough - Winds NW 10 to 15kt, thunderstorms in the AOR creating 3' swell

HSE: No incidents or accidents

Operational Summary: Stand down due to bad weather - FWS utilized AL branch office to transfer of data files to Houston - Moved the vibro-core sampler to Gulf Shores Marina - Rescheduled Archeologist and Entrix personal for 20Jun cruise.

Operations/Technical Conference call at 1700-1730

Houston Technical Group – Fairweather Science – Som/Sup

Operation hours portal to portal – N/A

Vessels: Research 1 - Did not deploy (Wx)

POB: 0

Captain: Steve Fogg, **BP Rep:** Johnny Burescia, **USCG:** E-06 Dallas Jamal, **Fairweather Supervisor:** Dave Aldrich, **Fairweather Tech:** Jeff Ladage,

Vessel: Research 2 - Did not deploy

Operational Plan for June 19, 2011 – Day 7:

Delineate ALBA1- 035-042 in the areas of the four anomalies, approximate locale as follows:

- 1, 30.22701835 N, 87.83571834 W
- 2, 30.22710166 N, 87.82898499 W
- 3, 30.22701334 N, 87.83687665 W
- 4, 30.22897191 N, 87.80323342 W

Key Issues – No Issues

June 19, 2011 - Day 7

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions choppy to rough - Winds SW 10 to 15knt gusting to 20kts - 3' to 4' swells

HSE: No incidents or accidents

Operational Summary: Deployed from Gulf Shores Marina 0715 hrs operations suspended at 0815 due to high winds and rough surf. Rescheduled Archeologist and Entrix personal for 21Jun, Tool box safety: High winds.

Operations/Technical Conference call at 1700-1730

No call tonight

Operation hours portal to portal – 0715 hrs returned 0900 hrs.

Vessels: Research 1 – deployed from Gulf Shores Marina

POB: 6

Captain: Steve Fogg, **BP Rep:** Johnny Burescia, **USCG:** E-06 Dallas Jamal, **Fairweather Supervisor:** Dave Aldrich, **Fairweather Tech:** Jeff Ladage, **BP Safety:** Alex Campbell

Vessel: Research 2 - Did not deploy

Operational Plan for June 20, 2011 – Day 8:

Delineate four anomalies - ALBA1- 035-042, approximate anomalies locale as follows:

- 1, 30.22701835 N, 87.83571834 W
- 2, 30.22710166 N, 87.82898499 W
- 3, 30.22701334 N, 87.83687665 W
- 4, 30.22897191 N, 87.80323342 W

Key Issues – No Issues

June 20, 2011 – Day 8

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions choppy to rough winds sustained 20kts - SCA

HSE: No incidents or accidents

Operational Summary: Unsafe sea conditions operational status will remain on stand-by until winds subside.

Toolbox Safety discussion centered on proper lifting technique pertaining to sampling equipment

Operation hours portal to portal - N/A

Vessels: Research 1 - Did not deploy

POB: 0

Vessel: Research 2 - Did not deploy

POB: 0

Operational Plan for June 21, 2011 – Day 9:

When weather allows begin delineating four anomalies - ALBA1- 035-042, approximate anomalies locale as follows:

- 1, 30.22701835 N, 87.83571834 W
- 2, 30.22710166 N, 87.82898499 W
- 3, 30.22701334 N, 87.83687665 W
- 4, 30.22897191 N, 87.80323342 W

Key Issues – Weather delays, marine forecast are not favorable through the mid-week, possible thunderstorms late week.

June 21, 2011 – Day 9

Alabama – ALBA1-035-042

AOR Weather on scene: Sea conditions - 3 to 5 ft. seas choppy to rough

Winds – south 15 to 20kts

HSE: No incidents or accidents

Operational Summary: Unsafe sea conditions operational status will remain on stand-by until winds and surf subside.

Toolbox Safety discussion centered on pinch-points on the vessel

Operations/Technical Conference call at 1700-1730

Houston Technical Group – Fairweather Science – Som/Sup

Operation hours portal to portal - N/A

Vessels: Research 1 - Did not deploy

POB: 0

Vessel: Research 2 - Did not deploy

POB: 0

Operational Plan for June 22, 2011 – Day 10:

Due to heavy winds and rough surf in the Gulf of Mexico FWS/OPS will remove the sub-bottom profiler equipment and add the ponar grab sample equipment to the vessel Research 1. ALBA1-135 segment allows protection from strong south winds, sampling operations with ponar will take place in order to complete survey in this area. After sampling ALBA1-135, contractor will remove the sample equipment and reinstate the profiler equipment on Research 1 for delineation operations in the Gulf once weather subsides.

Key Issues:

Weather delays, marine forecast are not favorable through the week, possible thunderstorms late week.

June 22, 2011 – Day 10

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions - 3 to 5 ft. seas, Winds SW 15-20kts

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion - vessel ergonomics and review JSA for the ponar Grab Sampler

ALBA1-135 – Completed ponar grab sample:

GPS – N-30.23436 W-88.02367

Operations/Technical Conference call at 1700-1730

Houston Technical Group – Fairweather Science – Som/Sup

Operation hours portal to portal - 1100 hrs - 1250 hrs.

Vessels: Research 1

POB: 7

Vessel: Research 2 - Did not deploy

POB: 0

Captain: Steve Fogg, BP Rep: Johnny Burescia, USCG: E-06 – Jamel Dallas Fairweather Supervisor: Dave Aldrich, Fairweather Tech: Jeff Ladage, Archaeology: Chris Morris, Entrix: Amy Bergeron

Operational Plan for June 23, 2011 – Day 11:

When weather allows begin delineating four possible anomalies in ALBA1- 035-042, approximate anomalies locale is as follows:

- | | |
|---------------------------------|---------------------------------|
| 1) 30.22701835 N, 87.83571834 W | 2) 30.22710166 N, 87.82898499 W |
| 3) 30.22701334 N, 87.83687665 W | 4) 30.22897191 N, 87.80323342 W |

Key Issues: Weather continues to be an issue for delineation operations in ALBA1-036, 037 and 042. Forecast shows possible thunderstorms throughout the week, winds from the south and 3 to 5 ft. swells.

June 23, 2011 – Day 11

AOR: Alabama – ALBA1-035-042
Weather on scene: Sea conditions 3' to 5' swells, Winds SW 15-20kts
HSE: No incidents or accidents
OPERATIONAL SUMMARY: Toolbox Safety discussion – Strains

Operations/Technical Conference call at 1700-1730: N/A

Operation hours portal to portal: N/A

Vessels: Research 1- Did not deploy

POB: 0

Vessel: Research 2 - Did not deploy

POB: 0

Operational Plan for June 24, 2011 – Day 12:

When weather allows begin delineating four possible anomalies in ALBA1- 035-042, approximate anomalies locale is as follows:

- | | |
|---------------------------------|---------------------------------|
| 1) 30.22701835 N, 87.83571834 W | 2) 30.22710166 N, 87.82898499 W |
| 3) 30.22701334 N, 87.83687665 W | 4) 30.22897191 N, 87.80323342 W |

If bad weather persists, BP rep & contractor plan a trip to Florida for an overview of the survey areas.

Key Issues: Weather continues to be an issue for delineation operations in ALBA1-036, 037 and 042. Marine forecast indicates strong winds SSW 15-20 and seas rough.

June 24, 2011 – Day 12

AOR: Alabama – ALBA1-035-042
Weather on scene: Sea conditions 3' to 5' swell, Winds SW 5 to 10 kts
HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Unsafe Conditions

Team resurveyed anomalies (ALBA1 036, 037 and 042) with sub-bottom profiler. Due to rough surf data collected today was inconclusive.

Operations/Technical Conference call at 1700-1800:

Houston Technical Team - Fairweather Science - SOM/SUP

Operation hours portal to portal: Deployed 0645 (0720 hrs. Sub-bottom profiler in the water – 1025hrs out of the water) Arrived back at Gulf Shores Marina 1130hrs.

Vessels: Research 1- deployed

POB: 4

Captain: Steve Fogg, **BP Rep:** Johnny Burescia, **USCG:** E-06 – Jamel Dallas **Fairweather Supervisor:** Jeff Ladage

Vessel: Research 2 - Did not deploy

Operational Plan for June 25, 2011 – Day 13:

Delineation of four anomalies in ALBA1- 035-042, approximate anomalies locale is as follows:

- | | |
|---------------------------------|---------------------------------|
| 1) 30.22701835 N, 87.83571834 W | 2) 30.22710166 N, 87.8289849 |
| 3) 30.22701334 N, 87.83687665 W | 4) 30.22897191 N, 87.80323342 W |

Key Issues: Marine forecast show weather pattern changing, forecast is subsiding winds and seas tonight through 25Jun

June 25, 2011 – Day 13

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions 2 swell, Winds SW 5 to 10 kts

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Marine
Recreation and Commercial boating traffic

Team completed the trans-sectional resurvey of anomalies (ALBA1 036, 037 and 042) using the sub-bottom profiler. Today's data offered a much better profile of the anomalies.

Operations/Technical Conference call at 1700-1800:

Houston Technical Team - Fairweather Science - SOM/SUP- AL SOM
POC

Operation hours portal to portal: Deployed 0700 hrs (0800 hrs. Sub-bottom profiler in the water – 1118hrs out of the water) Arrived back at Gulf Shores Marina 1200hrs.

Vessels: Research 1- deployed

POB: 4

Captain: Steve Fogg, BP Rep: Johnny Burescia, USCG: E-06 – Jamel Dallas Fairweather Supervisor: Jeff Ladage

Vessel: Research 2 - Did not deploy

Operational Plan for June 26, 2011 – Day 14:

Ponar and Vibra-core sampling of anomalies

Key Issues:

June 26, 2011 – Day 14

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions 2 swell, Winds SW 5 to 10 kts

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Fatigue

Data indicated five anomalies to sample;

- 1) N-30 °13.51 – W-87 °49.64
- 2) N-30 °13.55 – W-87 °49.71
- 3) N-30 °13.56 – W-87 °50.11
- 4) N-30 °13.55 – W-87 °50.11
- 5) N-30 °13.55 – W-87 °50.16

Attempted to vibra-core these anomalies with no success (the vibra-core sleeve/tube became lodged in the iron casing, sand compacting). Ponar sample of three anomalies showed no visible hydrocarbons.

Ponar samples coordinates:

- 1) N-30.22708 – W-87.82747 – ALBA1-037 – Taken 1310hrs.
- 2) N-30.22598 – W-87.82864 – ALBA1-037 – Taken 1339hrs.
- 3) N-30.22624 – W-87.83526 - ALBA1-036 – Taken 1405hrs.

Operation hours portal to portal: Deployed 0855 hrs. Arrived back at Gulf Shores Marina 1600hrs.

Vessels: Research 1- deployed POB: 6

Captain: Jeff LaDage, BP Rep: Johnny Burescia, USCG: E-06 – Jamel Dallas Fairweather Supervisor: Vern Everett Archeologist: Chris Morris
Entrix: Amy Bergeron

Vessel: Research 2 - Did not deploy.

Operational Plan for June 27, 2011 – Day 15:

Continue Ponar and Vibro-Core sampling of anomalies

Key Issues: Vibro-core sleeves being compacted by sand, sleeves becoming lodged in the pipe. Team is addressing this tonight

June 27, 2011 – Day 15

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions 3 to 5ft swells, Winds SW 5 to 10 kts

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Heat exhaustion

COMPLETED THE PONAR GRAB SAMPLING OF THE FIVE ANOMALIES IDENTIFIED. COORDINATES OF THE LAST TWO ANOMALIES IDENTIFIED IN YESTERDAY'S REPORT. NO VIBRA-CORE SAMPLING WAS PERFORMED.

1) N-30 °13.55 – W-87 °50.11 – ALBA1-036 2) N-30 °13.55 – W-87 °50.16 – ALBA1-036

Ponar samples coordinates:

1) N-30.22603 – W-87.83517 – ALBA1-036 – Taken 0854hrs.

2) N-30.22618 – W-87.883516 – ALBA1-036 – Taken 0912hrs.

Operation hours portal to portal: Deployed 0715 hrs. Arrived back at Gulf Shores Marina 1050hrs.

Vessels: Research 1- deployed **POB:** 7

Captain: Steve Fogg, **BP Rep:** Johnny Burescia, **USCG:** E-06 – Jamel Dallas **Fairweather Supervisor:** Jeff LaDage ; **Faireweather Tech;** Vern Everett **Archeologist:** Chris Morris **Entrix:** Amy Bergeron

Vessel: Research 2 - Did not deploy.

Operational Plan for June 28, 2011 – Day 16:

Moving the Research 1 to Sportsman Marina in Orange Beach to start surveying Florida SCAT segments FLES1-001 through 009 (Wednesday June 29, 2011).

Key Issues:

June 28, 2011 – Day 16

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions 3 to 5ft swells, Winds SW 5 to 10 kts

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Hazard identification in the work place

Moved Research 1 to Sportsman Marina in Orange Beach to start surveying Florida SCAT segments FLES1-001 through 009 (Wednesday June 29, 2011). Reviewed the JSA's, BMP's and Safety inspection of the vessel with Florida Safety.

Operation hours portal to portal: Deployed 1145 hrs. Arrived back at Gulf Shores Marina 1335hrs.

Vessels: Research 1- deployed

POB: 2

Captain: Randy Martinez, BP Rep: USCG: Fairweather Supervisor: Jeff LaDage ; Fairweather Tech; Archeologist: Entrix:

Vessel: Research 2 - Did not deploy.

Operational Plan for June 29, 2011 – Day 17:

Start surveying Florida SCAT segments FLES1-001 through 009 with the side scan sonar and the sub bottom profiler.

Key Issues:

June 29, 2011 – Day 17

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions 3 to 5ft swells, Winds NW 5 to 10 kts

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – boating safety

Started surveying Florida SCAT segments FLES1-001 through 009. We made two parallel pass across the nine segments with the side scan sonar and sub-bottom profiler. There were some surface anomalies located with the side scan and we should have a clearer definition of these anomalies tomorrow (6-30-11).

Operation hours portal to portal: Deployed 0800 hrs. Arrived back at Gulf Shores Marina 1500hrs.

Vessels: Research 1- deployed

POB: 6

Captain: Jeff LaDage, **BP Rep:** Johnny Burrencia **USCG:** Jamel Dallas
Fairweather Supervisor: Dave Aldrich ; **Faireweather Tech;** Randy Martinez
BP safety: Bill Crowe **Archeologist:** Entrix:

Vessel: Research 2 - Did not deploy.

Operational Plan for June 30, 2011 – Day 18:

Continue to survey Florida SCAT segments FLES1-001 through 009 with the side scan sonar and the sub bottom profiler.

Key Issues:

June 30, 2011 – Day 18

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions 2 to 3ft swells, Winds NW 5 to 10 kts

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Complacent

Completed surveying Florida SCAT segments FLES1-001 through 009 with the side scan sonar and sub-bottom profiler. There were some surface anomalies located with the side scan and we start ponar sampling these anomalies tomorrow (7-01-11).

Operation hours portal to portal: Deployed 07240 hrs. Arrived back at Gulf Shores Marina 1300hrs.

Vessels: Research 1- deployed

POB: 5

Captain: Jeff LaDage, **BP Rep:** Johnny Burrencia **USCG:** Jamel Dallas
Fairweather Supervisor: Dave Aldrich ; **Faireweather Tech;** Randy Martinez
BP safety: Archeologist: Entrix:

Vessel: Research 2 - Did not deploy.

Operational Plan for July 1, 2011 – Day 19:

Tomorrow we will start ponar sampling of eight surface anomalies located in FLES1-001 through 009.

Key Issues:

July 01, 2011 – Day 19

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions 2 to 3ft swells, Winds NW 5 to 10 kts

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Entanglement

Completed ponar sampling of Florida SCAT segments FLES1-001 through 009. There were eight anomalies identified. The samples appeared to be organic material with a decaying odor not petroleum and left no sheen. We sampled these at these GPS coordinates:

- | | |
|----------------------------|----------------------------|
| 1) N-30.17.181 W-87.28.425 | 5) N-30.16.892 W-87.29.733 |
| 2) N-30.17.179 W-87.28.105 | 6) N-30.16.833 W-87.30.341 |
| 3) N-30.17.018 W-87.28.105 | 7) N-30.16.794 W-87.30.361 |
| 4) N-30.16.896 W-87.29.701 | 8) N-30.16.740 W-87.30.570 |

Moved Research 1 from Sportsman Marina to Lost Key Marina to start surveying Florida SACT segments FLES2-012 through 016 and 018 with the side scan sonar and the sub-bottom profiler.

Operation hours portal to portal: Deployed from Sportsman Marina 0715 hrs. Arrived back 1050hrs. Departed Sportsman Marina @ 1315hrs and arrived at Lost Key Marina @ 1430hrs.

Vessels: Research 1- deployed

POB: 6

Captain: Jeff LaDage, **BP Rep:** Johnny Burrencia **USCG:** Jamel Dallas
Fairweather Supervisor: Dave Aldrich; **Faireweather Tech;** BP safety:
Archeologist: Amy Leuchtmann **EntriX:** Lendsey Pastaski

Vessel: Research 2 - Did not deploy.

Operational Plan for July 2, 2011 – Day 20:

Tomorrow we will start surveying Florida SCAT segments FLES2-012 through 016 and 018 with the side-scan sonar and the sub-bottom profiler. We will also have an archeologist and Entrix person on board to ponar sample should we identify a surface anomaly.

Key Issues:

July 02, 2011 – Day 20

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions 2 to 3ft swells, Winds NW 5 to 10 kts

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Distractions in the field

Completed the survey of Florida SCAT segments FLES2-018 and the east part of 016. There were no anomalies identified in these areas.

Operation hours portal to portal: Deployed from Lost Key Marina @ 0835hrs. Started survey @ 1036hrs. ended survey @ 1335hrs. Arrived back to Lost Key Marina @1440hrs.

Vessels: Research 1- deployed

POB: 6

Captain: Jeff LaDage, **BP Rep:** Johnny Burrencia **USCG:** Jamel Dallas
Fairweather Supervisor: Dave Aldrich; **Faireweather Tech;** BP safety:
Archeologist: Amy Leuchtmann **Entrix:** Lendsey Pastaski

Vessel: Research 2 - Did not deploy.

Operational Plan for July 3, 2011 – Day 21:

Tomorrow we will continue surveying Florida SCAT segments FLES2-012 through 016 with the side-scan sonar and the sub-bottom profiler. We will continue to have an archeologist and Entrix person on board to ponar sample should we identify a surface anomaly.

Key Issues:

July 03, 2011 – Day 21

AOR: Alabama – ALBA1-035-042, 135 and Florida – FLES1-001-009, 012-016 and 018

Weather on scene: Sea conditions 1 to 2ft swells, Winds NE 5 to 10 kts switching to the south

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Three point contact

Completed the survey of Florida SCAT segments FLES2-012 through 016. There were no anomalies identified in these areas. This completes the Florida identify, delineate and sample operations. There were a total of eight anomalies sampled in Florida. All samples were collected in FLES1-001-009. Segments FLES2-012-016 and 018 no anomalies were identified.

Operation hours portal to portal: Deployed from Lost Key Marina @ 0715hrs. Started survey @ 0830hrs. ended survey @ 1040hrs. Arrived back to Lost Key Marina @1150hrs.

Vessels: Research 1- deployed

POB: 6

Captain: Jeff LaDage, **BP Rep:** Johnny Burrencia **USCG:** Jamel Dallas
Fairweather Supervisor: Dave Aldrich; **Faireweather Tech;** BP safety:
Archeologist: Amy Leuchtmann **Entrix:** Lendsey Pastaski

Vessel: Research 2 - Did not deploy.

Operational Plan for July 4, 2011 – Day 22:

Tomorrow we will be moving Research 1 back to dry storage.

Key Issues:

July 04, 2011 – Day 22

AOR: Alabama – ALBA1-035-042, 135 and Florida – FLES1-001-009, 012-016 and 018

Weather on scene: Sea conditions – N/A

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion –

Research 1 (Survey vessel) is in dry dock in Gulf

Shores

Operation hours portal to portal: Deployed –N/A

Vessels: Research 1- did not deploy

POB: 3

Captain: Jeff LaDage, BP Rep: Johnny Burrescia USCG:

Fairweather Supervisor: Dave Aldrich; Fairweather Tech; BP safety:
Archeologist: Entrix:

Vessel: Research 2 - Did not deploy.

Operational Plan for July 5, 2011 – Day 23:

Tomorrow: The sample vessel should arrive in the afternoon at Gulf Shores Marina. We will schedule the work plan and safety inspection for Wednesday July 6, 2011.

Key Issues:

July 05, 2011 – Day 23

AOR: Alabama – ALBA1-035-042, 135 and Florida – FLES1-001-009, 012-016 and 018

Weather on scene: Sea conditions – N/A

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion –

Sample vessel is located in Louisiana. The vibra core and the piston core sample systems added to much weight to the front of the 30' vessel for working safe. Fairweather is currently recruiting a larger vessel to safely handle the load. The bigger vessel can't be tailored and will travel by waterways. Bottom line, the five vibra core and piston samples will be delayed. More details tomorrow.

Operation hours portal to portal: Deployed –N/A

Vessels: Research 1- did not deploy

POB: 1

Captain: , BP Rep: Johnny Burescia USCG:

Fairweather Supervisor: Fairweather Tech; **BP safety:** Archeologist:
Entrix:

Vessel: Research 2 - Did not deploy.

Operational Plan for July 6, 2011 – Day 24:

Tomorrow: More news on the sample vessel.

Key Issues:

July 06, 2011 – Day 24

AOR: Alabama – ALBA1-035-042, 135 and Florida – FLES1-001-009, FLES2-012-016 and 018
Weather on scene: Sea conditions – N/A
HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion –

A sample vessel has been located in Louisiana. Once the vessel pass safety specifications, should be ready to transport.

Operation hours portal to portal: Deployed –N/A

Vessels: Research 1- Did not deploy

POB: 1

Captain: , BP Rep: Johnny Burescia USCG:

Fairweather Supervisor: Faireweather Tech; **BP safety:** Archeologist:
Entrix:

Vessel: Research 2 - Did not deploy.

Operational Plan for July 7, 2011 – Day 25:

Tomorrow: Tentative plan is to transport, by truck, the sample vessel to Gulf Shores Marina in FT. Morgan.

Key Issues:

July 07, 2011 – Day 25

AOR: Alabama – ALBA1-035-042, 135 and Florida – FLES1-001-009, FLES2-012-016 and 018

Weather on scene: Sea conditions – N/A

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion –

Waiting on vessel spec. paper work and proof of insurance before leaving Louisiana.

Sampling equipment will be leaving Houston, Tx. Saturday morning for Gulf Shores and should arrive late Saturday evening.

Alabama One Call notified and new ticket # 111880638
Expires 7-23-11

Operation hours portal to portal: Deployed –N/A

Vessels: Research 1- Did not deploy

POB: 1

Captain: , BP Rep: Johnny Burrencia USCG:

Fairweather Supervisor: Fairweather Tech; **BP safety:** Archeologist:
Enrix:

Vessel: Research 2 - Did not deploy.

Operational Plan for July 8, 2011 – Day 26:

Tomorrow: Hope everything continues to go smooth

Key Issues:

July 08, 2011 – Day 26

AOR: Alabama – ALBA1-035-042, 135 and Florida – FLES1-001-009, FLES2-012-016 and 018

Weather on scene: Sea conditions – N/A

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion –

Continue to wait on vessel spec. paper work and proof of insurance before leaving Louisiana.

Operation hours portal to portal: Deployed –N/A

Vessels: Research 1- Did not deploy

POB: 1

Captain: , BP Rep: Johnny Burescia USCG:

Fairweather Supervisor: Fairweather Tech; **BP safety:** Archeologist:
Enrix:

Vessel: Research 2 - Did not deploy.

Operational Plan for July 9 2011 – Day 27:

Tomorrow: Sample equipment (vibra-core and piston-core) schedule to arrive in Gulf Shores late Saturday evening.

Key Issues: Continue to have problems with paper work for the sample vessel. Other options are being explored if this problem continues.

July 15, 2011 – Day 33

AOR: Alabama – ALBA1-035-042

Weather on scene: Sea conditions calm a.m. building as day progressed, Winds light and variable a.m. 10 to 15 knt W

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Tripping hazards/Safe deck operations. Reviewed JSA

Sampling operations with Vibro-core tool in ALBA1 – 36, 37 & 42. Coordinates as follows
Segment 042 - N 30 13.702 W 087 48.208 sample retrieved 2.5'
Segment 037 - N 30 13.626 W 087 49.745 sample retrieved 1.25'
Segment 036 - N 30 13.620 W 087 50.212 sample retrieved 6"
Segment 036 - N 30 13.620 W 087 50.144 sample retrieved 6"

Operation hours portal to portal: Deployed 0710 hrs. Arrived back at Gulf Shores Marina 1600hrs.

Vessels: Ms DiDi - deployed

POB: 8

Master: Rick Leblanc, **D/hand:** Matt Capretta, **BP Rep:** Johnny.Burrescia, **USCG:** Adam Anderson, **Vibro-Core Operator:** Gerald Trumm, **BP Safety:** Les Stensom, **Archeologist:** Chris Morris, **Entrix:** Daniel Kowalski

Operational Plan for July 16, 2011 – Day 34:

Weather permitting resample ALBA1 – 036 & 037 coordinates

Key Issues:

July 19, 2011 – Day 37

AOR: Alabama – ALBA1 - 036

Weather on scene: Sea conditions calm a.m. and continued throughout the day, Winds light from the north a.m. PM - 5 to 10 knt ESE

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion – Reviewed JSA. WINCH BREAKDOWN CAUSED VESSEL TO RETURN FOR MAINTENANCE MID-morning. Departed GS marina again at 1400 after winch was repaired. Sampling operations with Vibro-core tool in ALBA1 – 036 Coordinates as follows:

Segment 036 - N 30 13.621 W 087 50.210
Sample core retrieved 3'

Segment 036 - N 30 13.622 W 087 50.141
Sample core retrieved 3'

No visible hydrocarbons in either sample core

Operation hours portal to portal: Departed GS marina 0740 hrs, returned for winch maintenance at 1015. Departed again at 1400 arrived back at GS marina 1845.

Vessel: Ms Di Di

POB: 8

Master: Rick Leblanc, **D/hand:** Matt Capritto, **BP Ops:** Johnny Burescia, **USCG:** Adam Anderson, **Vibro-Core Operator:** Gerald Trumm, **BP Ops:** Mark Nash, **Archeologist:** Chris Paul Revekant, **Entrix:** Amy Leuchtmann

Operational Plan for July 20, 2011 – Day 38:

Weather permitting resample ALBA1 – 037 & 042 survey coordinates

Key Issues:

Vessel outfitted with a jetting device to assist with recovery of vibro-core tool without compromising core sample

July 20, 2011 – Day 38

AOR: Alabama ALBA1 – 037 & 042

Weather on scene: Seas >1, Winds light from the NW 5 to 10 knt

HSE: No incidents or accidents

OPERATIONAL SUMMARY: Toolbox Safety discussion: Slips, trips and falls – Reviewed JSA. Sampling operations with Vibro-core tool in ALBA1 – 037 and 042. Coordinates as follows:

Segment 037 - N 30 13.625 W 087 49.736
Sample core retrieved 5.5'

Segment 042 - N 30 13.735 W 087 48.192
Sample core retrieved 3'

No visible hydrocarbons in 042 sample core, 037 sample core sent in for analysis, possible minimal staining but unknown to the naked eye. Entrix to send preliminary report to UAC on 20Jul.

Operation hours portal to portal: Departed GS marina 0740 hrs arrived back at GS marina 1150.

Vessel: Ms Di Di

POB: 7

Master: Rick Leblanc, **D/hand:** Matt Capritto, **BP Ops:** Johnny.Burrescia, **USCG:** Adam Anderson, **Vibro-Core Operator:** Gerald Trumm, **Archeologist:** Paul Revekant, **Entrix:** Amy Leuchtmann

Operational Plan for July 21, 2011 – Day 39:

PSCM off-hire inspection of vessel Ms Di Di, in preparation for Demob.

Key Issues:

Appendix C

Reoiling Trend Analysis

During the course of the Submerged Oil Mat (SOM) Tactical Plan execution two key questions arose:

1. Is overall shoreline reoiling on a declining trend?
2. Is there any evidence of significant movement of oily residue (SOMs, surface residue balls (SRBs) and patties (SRPs)) between shoreline segments?

Below is an analysis of each question.

Is the overall shoreline reoiling trend declining?

Areas chosen for the SOM Tactical Plan survey for potential SOMs were designated based on historical or repeated anecdotal reports of onshore reoiling by SRBs and SRPs, reports from Branch field operations, observations by SCAT teams and reports from the public. Since data indicated these sites were subjected to chronic reoiling, it was hypothesized that these sites offered the best chance of finding SOMs if they exist outside of the intertidal zone.

All segments surveyed during Phase I of the SOM Tactical Plan have experienced periodic SRB and SRP reoilings although the frequency and amount varied widely. Figures 1 and 2 show weekly reoiling trends by segment for the AOR in the state of Florida (for which the data are relatively unaffected by artificial factors such as nesting season holds and periodic allocation of additional resources):

Figure 1

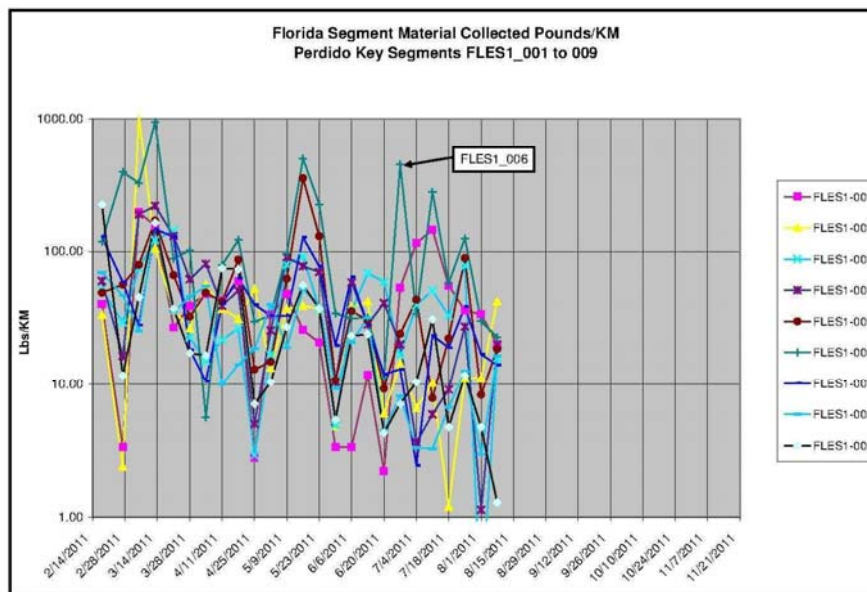
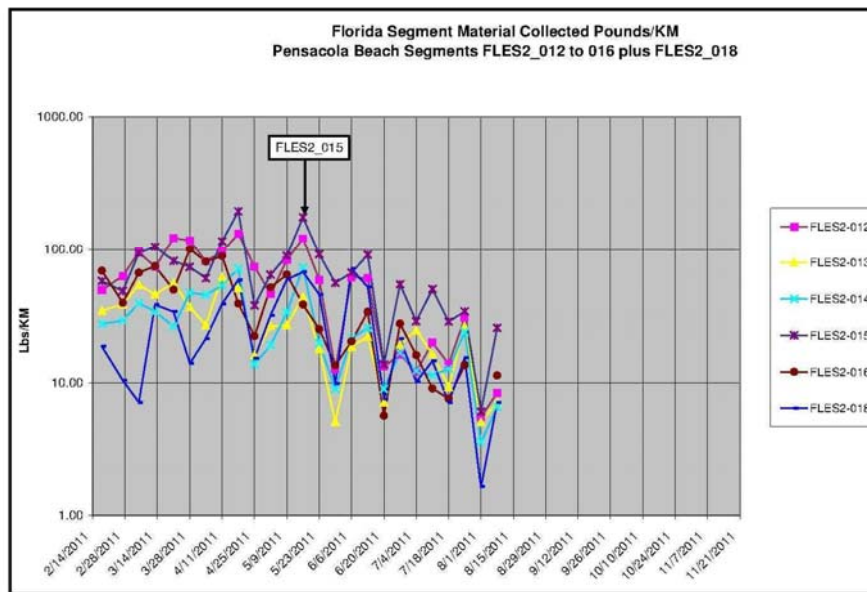


Figure 2



Inspection of Figures 1 and 2 clearly shows the steady downward trend in reoiling rate. For the sake of clarity Figures 3 and 4 show the average reoiling rate for each surveyed segment group versus all the segments in the larger area (i.e., Perdido Key or Pensacola Beach).

Figure 3

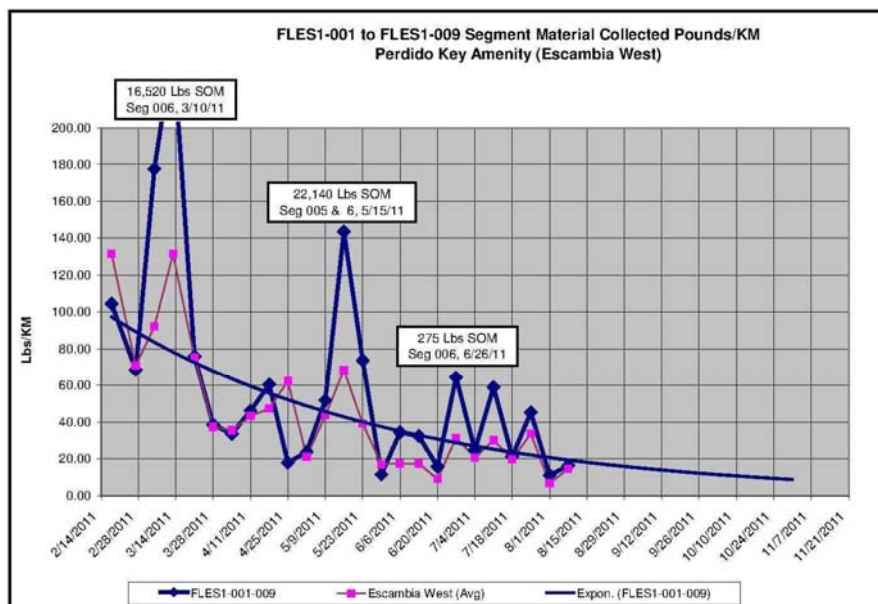


Figure 4

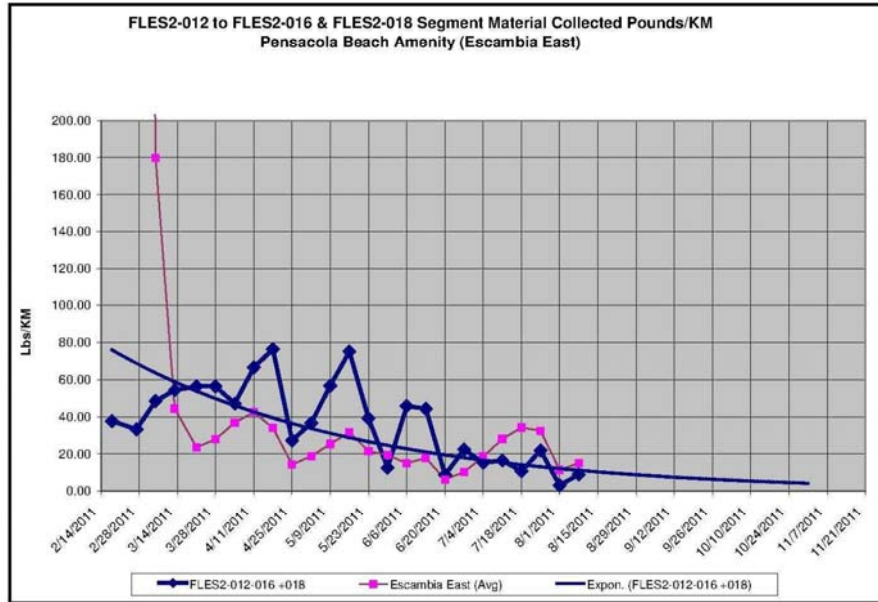


Figure 3 clearly shows the steady downward trend of reoiling rate for the nine Perdido Key segments that were surveyed. It also shows the corresponding decline for all forty-six segments in the Perdido Key area. Likewise Figure 4 shows the decline in reoiling rates for the six Pensacola Beach segments surveyed and a similar trend for all sixty segments in the Pensacola Beach area.

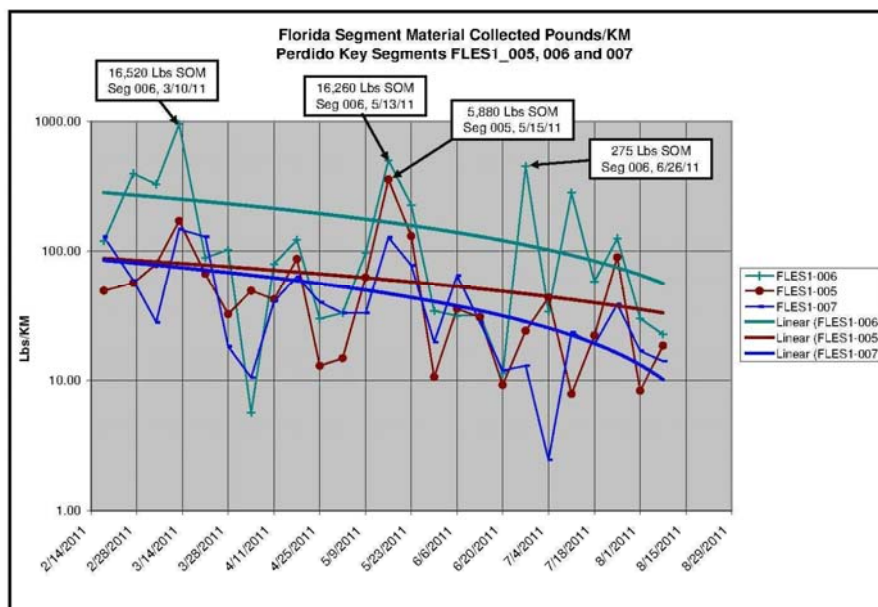
Is there any evidence of significant movement of oily residue (SOMs, SRBs and SRPs) between shoreline segments?

In order to answer the second question it was necessary to look at adjacent segments to determine what similarities or differences existed in reoiling rates and trends. In each segment group, Perdido Key and Pensacola Beach, the segment that had the highest reoiling rates for the last six months was chosen for trend analysis.

In the Perdido Key area (Figure 1), segment FLES1_006 was chosen along with adjacent segments FLES1_005 (West) and 007 (East). For the Pensacola Beach area (Figure 2), segment FLES2_015 was chosen as the segment with the highest reoiling rates. Adjacent segments FLES2_014 (West) and 016 (East) are included for comparison.

As noted earlier, all segments continue to have some level of reoiling. However, over time the trend has been downward. The trend is observed in Figures 1 through 4. Segment FLES1_006 and its eastern and western adjacent neighbors are shown in Figure 5.

Figure 5

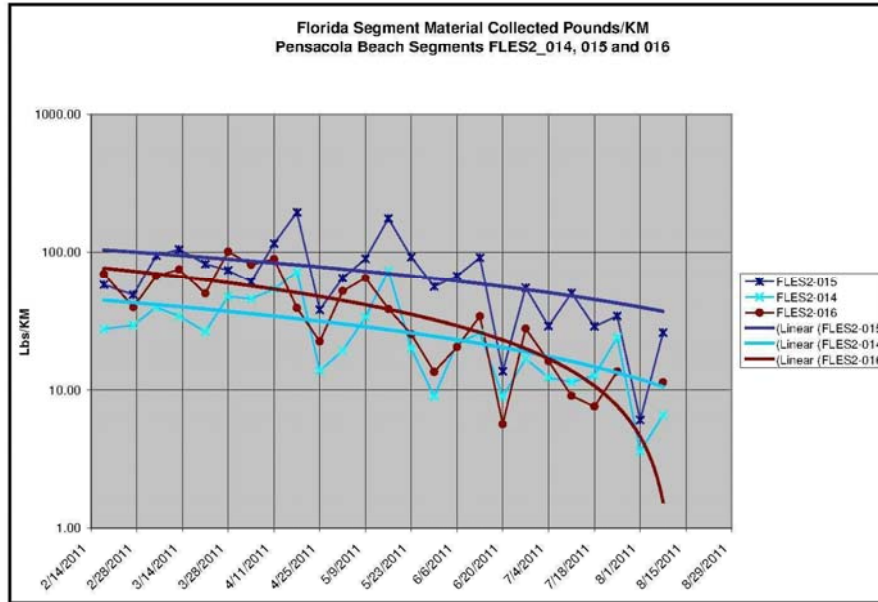


Of all Florida segments included in the SOM Tactical Plan survey, during the last six months only segments FLES1_005 and 006 have had SOMs recovered from the intertidal zone area. Recovery information and timing are noted on Figure 5. Based on anecdotal reports, the locations of these SOMs were reported to be in close proximity to areas where other mats had been recovered in the intertidal zone. This may indicate that these recently recovered mats are possibly remnants of other mats and they were exposed by continued tidal and surf action.

A number of observations can be made from reviewing Figure 5. First, while the trends overall are downward, coincidental with the removal of mats there is a significant upward spike in reoiling for the segment containing the SOM but not generally for the adjacent segments. (An exception is in segment 005 in May 2011 when a mat was recovered from the intertidal zone during the same week that a mat was also recovered in segment 006.) Secondly, the trends are all indicating lower rates of reoiling over time but do not appear to be following identical declines, nor do they have the same absolute recovery volumes per km of shoreline, as seen in the trend lines for each segment. This implies that cross-segment transfer is limited. Thirdly, there does not appear to be a consistent correlation between the reoiling or mat removal in one segment versus that in adjacent segments.

The Pensacola Beach segments FLES2_014, 015 and 016 (Figure 6) show similar trends as the Perdido Key segments. A notable difference is that no SOMs have been identified or removed from these segments in the last six months. This may explain their significantly lower reoiling rates.

Figure 6



As with the Perdido Key segments, the trends are generally downward. However, they also do not follow identical trajectories. Likewise there does not appear to be a consistent pattern of similar reoilings in adjacent segments other than a general decrease in rate as time from initial shoreline impact increases.

In summary, observation of all the data presented in the included charts (Figures 1 to 6) clearly shows the steady downward trend of reoil rates. As intertidal mats are removed, reoil rates in subsequent weeks tend to be significantly lower. This tends to support the hypothesis that intertidal mats are a significant source of SRBs and SRPs. Secondly, reviewing data for reoil trends on adjacent segments does not indicate a high correlation of reoil trends other than an overall downward tendency. Observation of reoil rate data tends to support a hypothesis that reoil on adjacent segments is not correlated. Sometimes one segment leads, sometimes it lags or all three segments trend in the same direction but not necessarily to the same degree or order of magnitude.

Collectively these data do not support a hypothesis that SRBs and SRPs are migrating appreciably from segment to segment.

Appendix D

Summary of USF Survey for Nearshore Oil

Excerpt from:

“No Significant Visually Identifiable Oil Was Found in the Nearshore Sediment along Alabama and Northwest Florida Coasts”

Ping Wang, Mark H. Horwitz, and James H. Kirby III

Coastal Research Laboratory, Department of Geology, University of South Florida, Fall 2010

Source: University of Southern Florida website

“Starting in May 2010, crude oil from the British Petroleum²⁰ (BP) Deepwater Horizon well has been depositing on over 300 km of sandy beaches along the Alabama and northern Florida coasts. The frequency of beach oiling events along the above studied stretch of coast appears to have decreased substantially since early August 2010. The apparent reduction in new beach oiling events, in conjunction with beach cleaning efforts, is promoting a gradual beach recovery, especially at the surface and near the shoreline. However, one crucial question remains: are there significant amounts of oil deposited on top of, and buried within the sediments in the nearshore zone? For the convenience of discussion, the nearshore zone is defined here as the region with water depth ranging from 3 meters (9 feet) to 15 meters (45 feet). Nearshore sediment along with any possible contained oil can be easily mobilized by large storm waves, potentially yielding a source of future beach contamination. Investigating the presence and distribution of nearshore oil is therefore essential for assessing the potential for storm related beach oiling.

“In order to obtain crucial data on the distribution of nearshore oil, a team from the University of South Florida Coastal Research Laboratory (USF-CRL) recently completed a 5-day cruise along the Alabama and northwest Florida coasts. The goal of this study was to evaluate the nearshore zone for possible oil contamination. Sediment cores and surface sediment samples were collected by divers in water depths ranging from 3 meters (9 feet) to 15 meters (45 feet). In addition, divers examined bottom conditions in and around the coring sites in order to further identify the absence or presence of visually identifiable oil contamination. This report summarizes the initial findings of this research cruise.

²⁰ A often-used reference to BP, although the company formally changed its name to “BP p.l.c.” in 2001.

“During the investigation, ***no visually identifiable oil was found lying on or buried within the shallow substrate in the nearshore zone*** (*emphasis added*). Within the context of this report, visually identifiable oil includes tar balls larger than 0.3 cm (0.12 inch), tar patties, and oil sheets. These are the most common forms of oil contamination found on the adjacent Gulf beaches. Since no significant visually identifiable oil was found in our study area as described below, we further conclude that it is unlikely that “new oil from the nearshore zone” will be transported onshore and deposited on the beach by high storm waves.”

Appendix E

Technology Field Tests



MC252 Response Field Test Final Form

ART Categories	General Description	Product Name
Other (Sonar)	Underwater identification System (UIS)	Coda Octopus Sonar
ART Categories: Bioremediation, Dispersants, Mechanical, Skimming, Sorbent, Other		
Date Submitted: Original Submission: 18 Aug 2010 Second/Revised Submission: 10 Oct 2010	Submitted By: Ken Lukins, Team Leader, HITT Team Phone: (832) 362-0174 e-mail: Ops@SecureOpsWorld.com Kurt Hansen – US Coast Guard Research e-mail: Kurt.A.Hansen@uscg.mil Phone: 860-319-4515	IC Field Test Number & Theme Houston-42 Submerged Oil Plume Detection Name of Test: Coda Octopus
Location of Test: Original test: Off of Mobile Bay Second series of tests: Off Dauphin Island, AL and Fort Morgan, AL	IC Responsible: HITT Team of GCRO Technology Team	Approximate Cost: \$23,000 for bringing inventor from overseas. Estimated additional \$10,000 may be required for additional test equipment
HITT Review: Ken Lukins	ART Review Date: Jim W. Best 10/26/2010 and 11/9/10	Approved by ART Houston? Yes

Section 1: Vendor Contact Information		
Equipment and System Owner: U.S. Coast Guard Research and Development Center LT Joe Kusek, USCG U.S. Coast Guard RDC C4ISR (860) 271-2789 Joseph.W.Kusek@USCG.MIL	Company Contacts/ Distributors: Coda Octopus Products Inc. 1601 3 rd Street South St. Petersburg, FL 33701 sales@codaoctopus.com Ben Hinett or Mike Agor Headquarters office: CodaOctopus Products Ltd Anderson House 1 Breadalbane Street Leith, Edinburgh, EH6 5JR, UK	ART Database #: N/A
Site: Area of Mobile Bay, AL Dauphine Island and Katrina Cut Fort Morgan and Mobile Point	Date / Time Initial Contact: 13 Aug 10	Date of Field Test Evaluation: Original field eval: 07 Sep 10 Second series of field eval: 06- 07-Oct and 25-Oct
HITT Team/Other Evaluators: First eval: Kurt Hansen, Eric Heinitz, Randy O'Boyle, Nick Voegtly Second eval: Ken Lukins, Vanessa Haggett – additional (Non HITT) evaluators: CWO4 Lee Graddick, USCG; LT Joe Kusek, USCG, Mr. Dave Robinson, CEO – CodaOctopus; Job Bello, EIC		

URLs: www.codaoctopus.com
VIP/User Contact/BP: Kurt Hansen, USCG R&D Center, ART Team
Section 2: Description and Reasoning for Field Test
Tactic Designation: Current Technology to compare with: Weighted absorbents and other sonar/underwater laser systems Advantages of Technology to be tested (larger volume, better efficiency, less costly, etc.): Able to identify locations of solid tar mats or dense locations of tar balls on the sea floor with sonar. Potentially can confirm or disprove the existence of tar ball accumulations or tar mats on the bottom. Criteria to Determine Successful Test: Sensor to detect patches of solid oil on the bottom with minimal false alarms.
Section 3: Concept/Tactical Situation
<p>The Coda Octopus sonar system has been used by the U.S. Coast Guard for detection of divers/underwater intruders under Homeland Security operations and has been used for other miscellaneous underwater searches. Coda was informally evaluated at the OHMSETT (New Jersey) facility in winter, 2009 and was observed detecting oil in clear water conditions. See attached photos.</p> <p>HITT personnel, U.S. Coast Guard, and vendors evaluated and determined during testing of the Coda Octopus and the EIC Laser Fluorometer (Oscar) combined with use of a basic fish finder that the 3 systems provided optimum scanning and detection capability for submerged tar balls, tar mats, and tar pieces. The Coda Octopus-Oscar combination was tested under multiple phases:</p> <p>Phase 1 (completed): Confirmed that oil did or did not exist on the sea floor and extent of oil coverage. Testing involved HITT personnel, vendor's representative and U.S. Coast Guard R&D personnel to ensure optimum test results.</p> <p>Phase 2 (completed): Second round of on-scene testing to ping map and determine oil location and thickness. This phase of testing included aerial observation, diver confirmation and seafloor sampling to verify results of equipment.</p> <p>Phase 3: (to be completed) Develop standardized procedures for use of combined system (Coda Octopus/Oscar/Fish finder) for mapping of GOM. This would be the operational phase and use of the combined systems.</p>
Section 4: Potential Limitations- Supply Availability/Capacity/HSE-Natural Resource Impact Considerations
<p>Oil may not be in a matted formation that permits adequate reflection for the sonar signals. Loose and/or oil droplets may not provide adequate signal strength. Sonar can provide false alarms. (Note: None of these potential limitations were observed during Phase One of testing)</p> <p>Concerns were raised about potential harm to marine-aquatic life due to range of sonar. Coda Octopus runs at 375 and 610khz – frequencies that have been determined not to be harmful to sea life.</p> <p>When Coda Octopus was run in conjunction with the EIC Oscar the sonar from Coda interfered with Oscar's depth finder. It appeared that whichever system was in operation first disrupted the other system. Evaluators corrected</p>

this situation by running the Coda first then activating Oscar for confirmation. Future tests and operations will separate Coda and Oscar to avoid this conflict. This issue was addressed in the late October tests and was solved by locating the Coda sonar on one side of the vessel and the Oscar on the other side of the vessel.

Concerns were initially raised about supply or availability of additional systems. These concerns have been eliminated as U.S. Coast Guard has five Coda systems available.

Section 5: Evaluation Outcome

Test results and discussion:

The Coast Guard Fire Safety Test Facility assisted in testing this technology. A 24 foot research vessel was used for the test. The Coda Octopus was attached to a submergible arm in conjunction with the EIC laser fluorometer unit (Oscar). The tests of the systems took place at Katrina Cut, Dauphin Island, AL on 10/6/10, and off of Fort Morgan, AL on 10/7/10. On both days the sea state was unsettled earlier in the day and calmed as the day progressed. Water depths ranged from 3ft to 33ft. A fish finder was used to detect possible test sites. At Katrina Cut a large cloud showed on the fish finder. The test equipment was lowered, and turned on and indicated high concentrations of petroleum. The Coda Octopus indicated quite a bit of petroleum, showing a dark blue cloud (the color that CODA has set for petroleum). The EIC Oscar, calibrated to detect only petroleum, confirmed the Coda Octopus readings when turned on. As the sea state calmed all three instrument sets showed a settling of the suspended hydrocarbon (tar) particles back to the sea floor. Testing on the second day off of Fort Morgan and Mobile Point yielded similar results.

Samples of the water from the test area did not show obvious petroleum, but small white flakes. We do not think that the petroleum is liquid at this time, but possibly minute solidified grains partially suspended in the water column. Four water samples were taken and one sand sample from Dauphin Island. The sand sample showed black sand grain sized possible petroleum contamination. All samples were given to the EIC and the USCG for further testing.

Physical confirmation of results was desired, and further testing was needed to fine tune the combined Coda Octopus and Oscar system. The next course of action (Phase 2) was to test the individual systems on opposite sides of the boat, or on separate boats, as the sonar from the Coda Octopus interfered with Oscar's depth finder. During phase 2 testing, divers were used to see and collect samples and aerial observation was used to confirm the findings. Physical sea floor and aerial observance confirmed the presence of tar or oil particles.

10/25/10 to 10/31/10 Phase Two

Phase two of testing was completed from 25-Oct until 31-Oct. The combined Coda Octopus-EIC Laser fluorometer system reliably detected petroleum in both calm and rough seas and at multiple sites. Petroleum detected clouds of tar particles that moved up and down in the water column. Also, tar mounds may have been seen but not confirmed as such. The Coda could identify the areal extent of the accumulation of tar balls, tar pieces, tar mounds, and tar mats while the Oscar could pin point the locations and identify MC252 tar versus tar from other sources.

So that the sonar would not conflict with laser, modifications were made to the set up of the deployment arm to allow for both technologies to work simultaneously. The vendors are working together to combine their software and improve the system. At this time Coda Octopus-EIC Laser fluorometer are already using the same GPS device.

Physical conformation of results by aerial observation and divers was a success. Samples were collected by divers at Katrina Cut and Dauphin Island, and will be analyzed shortly. Physical observation of the samples indicated petroleum. A high density, high definition camera was sent down with the divers. Visibility inhibited the camera, but confirmation of petroleum was still possible. The HD camera had filters which enhanced the detection of

petroleum. The EIC Oscar was calibrated for MC252 oil and could determine the difference between MC252 hydrocarbon fluorometry signatures and other types of hydrocarbon signatures when oil was detected. The Coda Octopus does not have the capability to determine different types of hydrocarbons.

The testing of the Coda Octopus technology has confirmed oil presence (tar particles) in the marine environment. When partnered with the EIC Oscar and a fish finder, Coda Octopus allows teams to confirm and track the progression of submerged oil movement, and prepare for landfall, instead of waiting blind for oil to hit. Locating submerged tar ball accumulations or tar mats may also allow for recovery in near shore environments.

This technology has changed future spill response, as it changes ideas of how oil acts underwater, as dispersed motile clouds were observed months after the initial spill. This technology can confirm or deny the existence of bottom oil better than the sorbent drags or other currently used technology

This Coda Octopus technology allows for 3D mapping and tracking of submerged or subsurface tar mats, tar balls, tar mounds and tar pieces. When teamed with the EIC "Oscar" laser fluorometer and a standard fish finder, the Coda Octopus becomes part of an advanced response system never seen or available previous to the MC 252 incident. This highly advanced technology changes the ability of response personnel in their ability to plan and respond to future incidents. By use of these blended technologies, tar balls, tar mats, and tar pieces can be found or tracked and potentially recovered prior to landfall.

Even though the Coda Octopus is a better system with the Oscar and the fish finder, testing has proven that the Coda Octopus instrumentation alone could be used to locate tar ball accumulations and tar mats. Further use of the Coda Octopus instrumentation in a test mode or operational mode will provide more data points and make us more comfortable with the readings it provides. Using the Coda alone would allow the five existing Coda Octopus systems to be used for locating oil in the GOM.

Use of the Coda Octopus combined with the EIC "Oscar" laser and a common fish finder is strongly recommended to be placed into operations. When BP places this combined system in the field, the system will be able to track and map any remaining oil, tar ball accumulation, tar mats, or tar pieces submerged near shore and to some extent in deeper offshore waters. Such tracking and mapping could be a positive PR issue and could help to mitigate NRDA issues. The tracking of tar ball movement will allow operations to pre-place clean-up resources in the correct areas along the beach front.

Safety and operational issues:

All standard safety and operational practices appropriate for vessel operations need to be observed.

Recommendation:

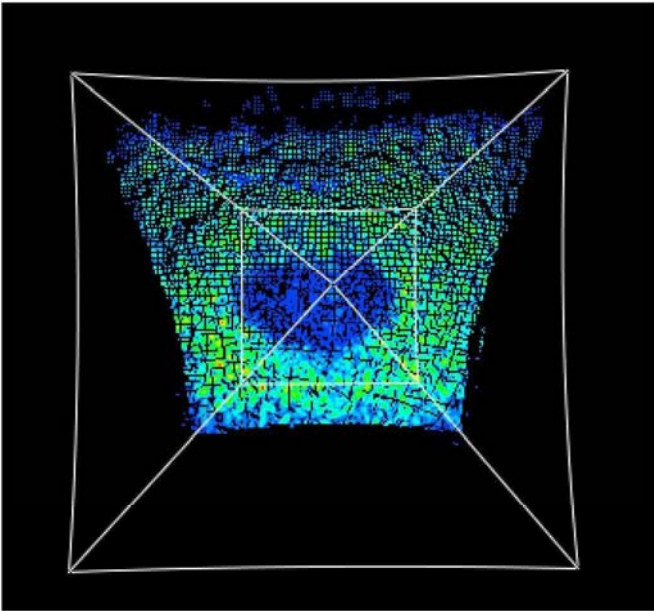
- The HITT Team highly recommends the Coda Octopus sonar system be used for the MC 252 response

Photos: (Additional photos upon request, also available in the sharepoint folder)

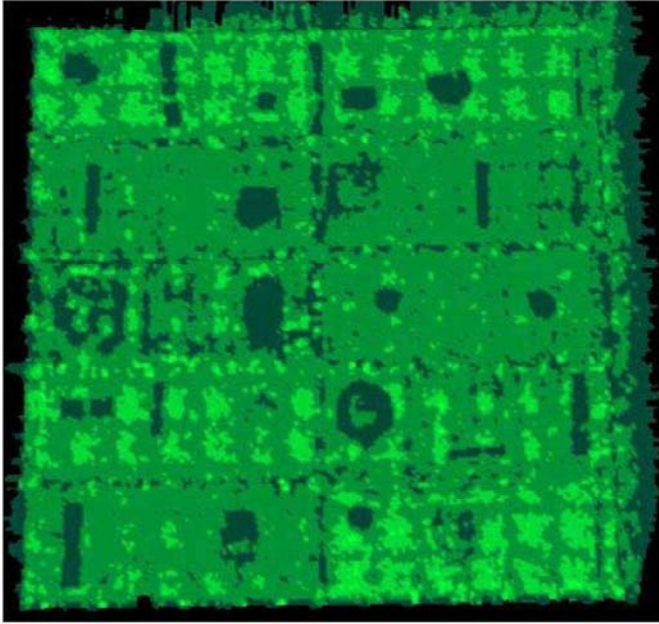
Sonar Head



Raw Data



Signal Strength Mosaic



Coda and EIC's Oscar mounted on USCG R&D vessel

Approvals Required: (BP IC (to operate in their area),USCG, EPA, NOAA, NFWS, NPS, State and Private Landowners)

N/A

Regional Response Team (RRT) Approval Required?

N/A

Wildlife issues with Federal Endangered Species Act (Section 7)?

N/A

SCAT issues?

N/A

Notes:

1. Field Test approval forms and Field Test (HITT Team) final evaluation report must be submitted to ART team for tracking: jim.best@bp.com
2. ART team will share the field test approval and results forms
3. HITT Team field testing is approved by Houston ART Technical manager
4. HITT Team TF Leader will be accountable for creating and submitting to the appropriate financial authority the 213-RR forms for equipment and personnel required for the test.
5. Field Test numbers for HITT tests will be held and assigned by ART's Jim Best. Numbers will be sequential and used for tracking purposes.
6. Names of the field test should be short
7. For ICP requested tests, the person submitting the field test should be the IC person that will be handling the planning and logistics for the field test and the final field test report.
8. IC field tests approved at the IC level should have tracking field test numbers.
9. In 7 above, the field test approvals should be tracked by ART Houston as in 4 above.



MC252 Response Field Test Final Form

ART Categories	General Description	Product Name
Detection & Surveillance	Subsea & Subfloor Oil Detection	Acoustic Doppler Profiler
ART Categories: Bioremediation, Dispersants, Mechanical, Skimming, Sorbent, Other		
Date Submitted: January 30, 2011	Submitted By: Name: Josh Dubach Phone: 281-330-9930 Email: josh.dubach@obriensrm.com	IC Field Test Number & Theme Houston-46 Submerged Oil Detection Name of Test: Acoustic Doppler Profiler
Location of Test: Fort Morgan, AL	IC Responsible: GCRO Technology & GC IMT Operations	Approximate Cost: Initial test paid by vendor
HITT Review: Josh Dubach	ART Review Date: Hunter Rowe, Jan 31 2011	Approved by ART Houston? Yes

Section 1: Vendor Contact Information		
Company Owner: KBKM and Associates Inc.	Company Contacts/ Distributors: Name: Kelly Wilson Phone: 832-278-9900 Email: Kelly@kbkminc.com	ART Database #: (TBD)
Site: Fort Morgan, AL	Date / Time Initial Contact: Mid January 2011	Date of Field Test Evaluation: January 28, 2011
HITT Team/Other Evaluators: Josh Dubach		
URLs: N/A		
VIP/User Contact/BP: N/A		
Section 2: Description and Reasoning for Field Test		
Tactic Designation: This is a software tool for performing real time sediment concentration measurements using a Teledyne RDI Acoustic Doppler Current Profiler (ADCP). The software converts the backscatter intensity by the ADCP to suspended sediment concentrations by integrating the backscatter intensity with information on salinity, temperature, and reference measurements of sediment concentrations obtained from water samples if necessary. This technique allows to search for hydrocarbons suspended both in the water column and tar mats / tar balls in the sediment below.		
Current Technology to compare with: <ul style="list-style-type: none">Side Scan Sonar		
Advantages of Technology to be tested (larger volume, better efficiency, less costly, etc.): <ul style="list-style-type: none">Can cover a large area in a short amount of time.Technology is passive, not intrusive.		

- Can provide real time data to operations in the field as well as printed charts for communicating to stake holders.
- Vast improvement over “Hit and Miss” method of core sampling.

Criteria to Determine Successful Test:

- Demonstrate the ability to detect oil both on the surface of the floor as well as subsurface oil.
- Delineate tar mats in a fluid, understandable format.
- Provide the final product from the field work within a short amount of time (12 hours).

Section 3: Concept/Tactical Situation

This device is currently mounted to the side of a 30 ft survey vessel, although it can be permanently mounted in shallow water vessels such as a Rigid Hull Inflatable Boat (RHIB). Much like a traditional survey the vessel will travel over a suspected area scanning the bottom. This will be the initial survey to delineate the mats. Once a chart is completed the vessel will be on site during recovery operations to provide real-time data to operations during the recovery process.

Section 4: Potential Limitations- Supply Availability/Capacity/HSE-Natural Resource Impact Considerations

- As with any water borne equipment, its operation is subject to weather.
- Shallow water depth and a high energy environment could cause safety concerns.
- May have Section 7 limitations attached.

Section 5: Evaluation Outcome

Field Test results and discussion:

The test was conducted off of the Fort Morgan / Bon Secour beaches on the seaward side. This area was selected by SCAT as an area most likely to have tar mats due to continuous re-oiling conditions. Snorkel SCAT data was also used to incorporate data from their findings of mats that have previously been delineated. The survey started at N 30 13.745' / W -087 54.777' and travelled in an easterly path. All testing was conducted within Division ALBA 001.

Based off of findings during the calibration of the equipment the day before the team proceeded to the coordinates listed above. While this was not an area SCAT had identified it was noted that a long stick excavator was recovering a near shore tar mat indicating the presence of further mats. The survey was conducted on an average of 500 ft from shore in 10-20 ft of water. The vessel and equipment are capable of working in shallower water (as little as 2 ft) however building seas prevented us from doing so.

Approximately 0.5 miles east of the starting point (N 30 23.644' / W -087 54.188') the presence of hydrocarbon was detected on the bottom. Due to the poor visibility of the water the team was unable to verify that detection with the ROV. The team continued the survey, detecting another hydrocarbon presence further north (N 30 13.710' / W -087 54.121) that was visually confirmed via ROV as pictured below. The team continued to delineate the mat prior to ending the test.

Safety and operational issues:

Due to the nature of an on water survey as well as the passive nature of the equipment, no PPE is required beyond Level D (i.e. steel toed shoes, life jacket, safety glasses). All safety guidelines set forth for this response, including the 50/50 rule, will be adhered to during these surveys.

A Job Safety Analysis (JSA) will be conducted prior to any operations beginning at the start of each shift and prior to

any work to be conducted outside the standard scope of the survey.

Discussion:

While the initial results of the testing are very encouraging, the final deliverable as well as the software behind the detection devices needs refinement. The deliverable requested was somewhat difficult to operationalize. This test allowed the team to collect the data needed to refine both elements and can move forward rapidly from here.

Recommendation:

As mentioned previously, the results of this test are promising if not complete. Recommend to continue working with this team to stream line the deliverable expected from this process and refine the best method of use.

Photos: (Additional photos upon request, also available in the SharePoint folder)



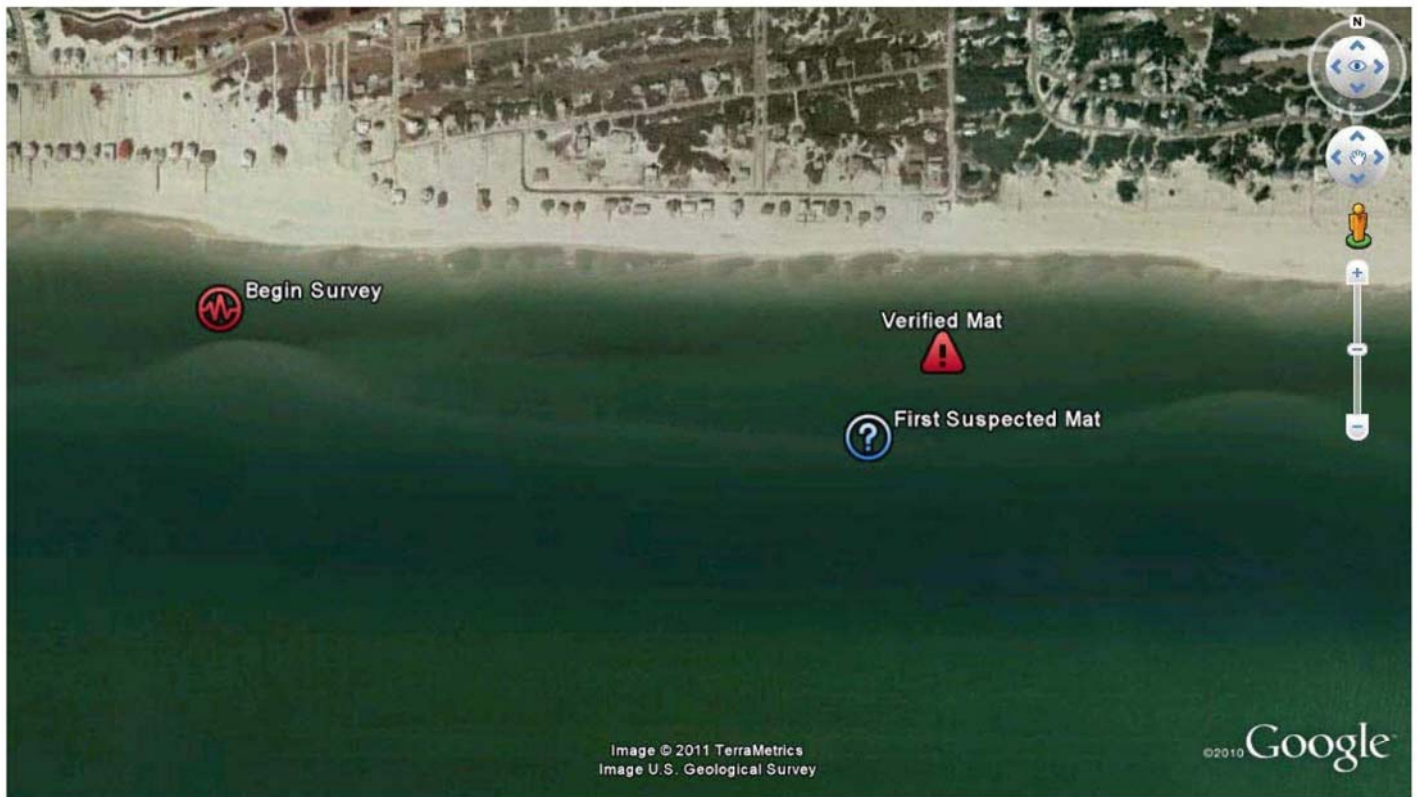
Test Vessel



Scanning equipment mounted over the side



Presence of hydrocarbons confirmed via ROV



Key test locations

Approvals Required: (BP IC (to operate in their area),USCG, EPA, NOAA, NFWS, NPS, State and Private Landowners)

- Section 7 (NOAA)

Regional Response Team (RRT) Approval Required?

No

Wildlife issues with Federal Endangered Species Act (Section 7)?

Possible issues with frequencies being used and porpoises. Will verify with NOAA.

SCAT issues?

N/A

Notes:

10. Field Test approval forms and Field Test (HITT Team) final evaluation report must be submitted to ART team for tracking: jim.best@bp.com
11. ART team will share the field test approval and results forms
12. HITT Team field testing is approved by Houston ART Technical manager
13. HITT Team TF Leader will be accountable for creating and submitting to the appropriate financial authority the 213-RR forms for equipment and personnel required for the test.

14. Field Test numbers for HITT tests will be held and assigned by ART's Jim Best. Numbers will be sequential and used for tracking purposes.
15. Names of the field test should be short
16. For ICP requested tests, the person submitting the field test should be the IC person that will be handling the planning and logistics for the field test and the final field test report.
17. IC field tests approved at the IC level should have tracking field test numbers.
18. In 7 above, the field test approvals should be tracked by ART Houston as in 4 above.



MC252 Response Field Test Final Form

ART Categories	General Description	Product Name
ART Categories: Bioremediation, Dispersants, Mechanical, Skimming, Sorbent, Other		
Date Submitted: March 9 th , 2011	Submitted By: Name: Josh Dubach Phone: 281-330-9930 Email: josh.dubach@obriensrm.com	IC Field Test Number & Theme Name of Test:
Location of Test: Fort Morgan, AL	IC Responsible:	Approximate Cost:
HITT Review:	ART Review Date:	Approved by ART Houston?

Section 1: Vendor Contact Information		
Company Owner: Fairweather Science	Company Contacts/ Distributors: Name: Dave Aldrich Phone: 907-244-0060 Email: dgaldrich@gmail.com	ART Database #:
Site: Fort Morgan, AL	Date / Time Initial Contact:	Date of Field Test Evaluation: February 25 th , 2011
HITT Team/Other Evaluators: Josh Dubach		
URLs: N/A		
VIP/User Contact/BP: N/A		
Section 2: Description and Reasoning for Field Test		
Tactic Designation: This is a system that has been tested in Alaska with regards to locating deep-water, naturally occurring seeps. The system uses both Side-Scan Sonar for surface identification, as well as a Sub-Bottom Profiler to detect Submerged Oil Mats (SOMs) while using an acoustic drop out method. This technology is established and recognized within the industry as the standard for underwater surveying and can be adapted to identify SOMs. This equipment can provide deliverables in both GIS formats as well as ARC formats that can be uploaded directly into a vessel-mounted GPS, allowing a direct transfer of data to operations.		
Current Technology to compare with: <ul style="list-style-type: none">Mesotech		
Advantages of Technology to be tested (larger volume, better efficiency, less costly, etc.): <ul style="list-style-type: none">Can cover a large area in a short amount of time.		

- Technology is passive, not intrusive.
- Can provide real time data to operations in the field as well as printed charts for communicating to stake holders.
- Vast improvement over “Hit and Miss” method of core sampling.

Criteria to Determine Successful Test:

- Demonstrate the ability to detect oil both on the surface of the floor as well as subsurface oil.
- Delineate tar mats in a fluid, understandable format.
- Provide the final product from the field work within a short amount of time (12 hours).

Section 3: Concept/Tactical Situation

Currently this equipment is mounted on two vessels. One is a traditional cabin survey vessel while the other is a shallow water jet-drive. The jet drive vessel can operate in depths as shallow as 2 ft. The second survey vessel can operation in depths a shallow as five feet, but can operate in heavier seas than the jet-drive. Much like a traditional survey the vessel will travel over a suspected area scanning the bottom. This will be the initial survey to delineate the mats. Once a chart is completed the vessel will be on site during recovery operations to provide real-time data to operations during the recovery process.

Section 4: Potential Limitations- Supply Availability/Capacity/HSE-Natural Resource Impact Considerations

- As with any water borne equipment, its operation is subject to weather.
- Shallow water depth and a high energy environment could cause safety concerns.
- There were some initial Section 7 (wildlife) concerns over the frequencies that were used affecting marine wildlife, but those were addressed and there are no further concerns anticipated.

Section 5: Evaluation Outcome

Field Test results and discussion:

The test was conducted off of the Fort Morgan beaches on the bay side. This area was selected based off of historical re-oiling during this incident as well as data provided by Snorkel SCAT indicated a SOM in the near shore area. Other areas were identified on the seaward side of the beach, however extremely heavy fog during the testing times limited the team to the bay side. The areas tested were located in ALBA 001, Segment 135 as noted in the charts below.

The area was scanned in a typical search grid ranging from the beach to approximately 1,000 meters offshore, with 40 meters of spacing in between. While the swath of the equipment varied with the water depth the team still had good overlap of the data with this amount of spacing. The depth of the water surveyed ranged from 2 feet to 50 feet.

Over the course of the survey, a SOM was located at N 30 13.965' W 088 01.437' and later confirmed. This was a successful, real-time, demonstration of the equipment's ability to locate a SOM with confirmation.

The second part of a successful test is the ability to display the results of the survey in a readable format that can be used both from an operational standpoint as well as a format that can be easily understood by stakeholders. While the material provided could use some improvements in detail, it is believed these improvements can be made within a relatively short amount of time.

Safety and operational issues:

Due to the nature of an on water survey as well as the passive nature of the equipment, no PPE is required beyond

A Job Safety Analysis (JSA) will be conducted prior to any operations beginning at the start of each shift and prior to any work to be conducted outside the standard scope of the survey.

As demonstrated during this test, standard on-water navigation hazards apply to these surveys. Some of these issues include adequate visibility, proper sea conditions and the adherence to standard navigation rules.

This test provided very encouraging data, especially for an initial run in the Gulf of Mexico. While there may be a concern over the amount of time it takes to turn around the raw data into an operational product, it is believed those issues will be properly addressed if the team is mobilized to the area and is able to refine their process.

The technology and the equipment are both tested and adaptable. It is of this evaluator's opinion that this is a viable option to identify and delineate the SOMs.

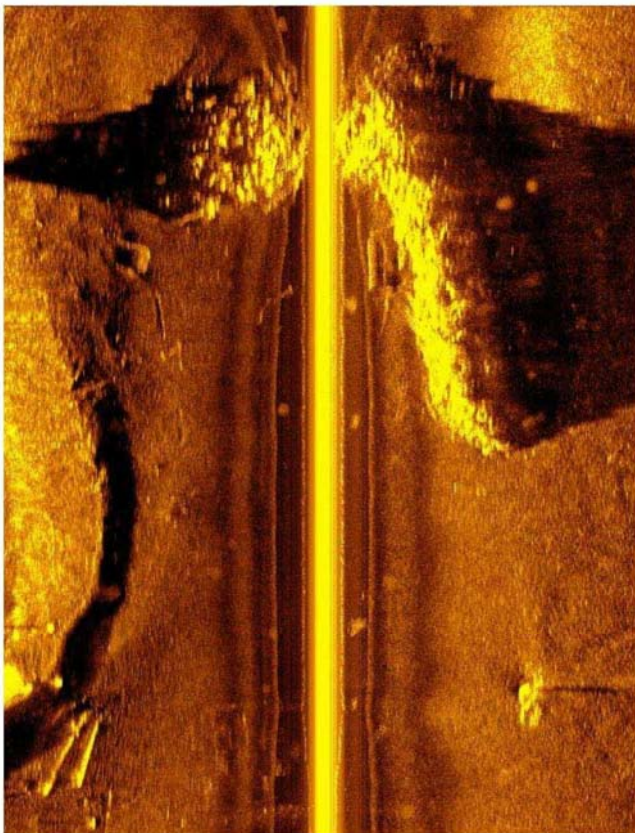
SOM and Tarball Locations



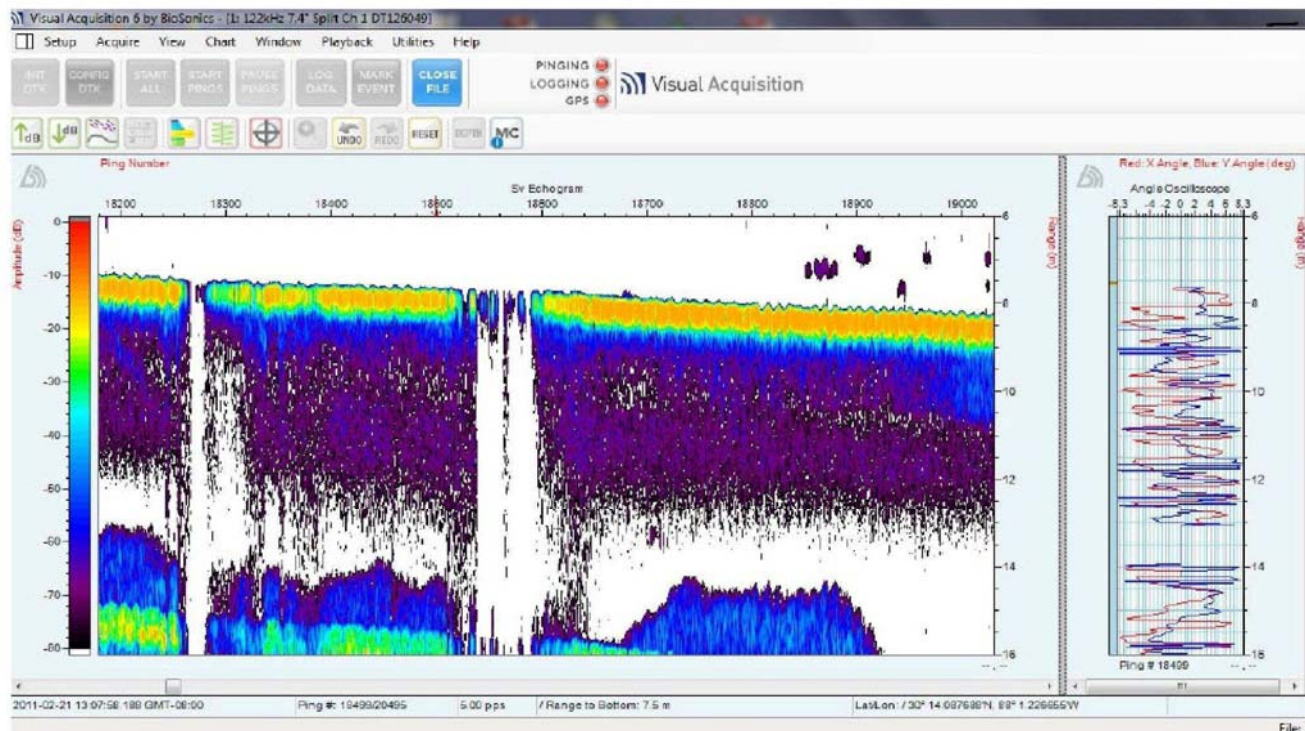
Survey Vessel with Side Scan Sonar Tow-Fish



Sub Bottom Profiler



Side Scan Imagery Showing Break Water & Debris



Screen Shot Showing the Acoustic Drop Out of a SOM

Approvals Required: (BP IC (to operate in their area),USCG, EPA, NOAA, NFWs, NPS, State and Private Landowners)

The operation will have to follow the standard STR approval process that includes Section 7, Section 106, and other various stakeholders.

Regional Response Team (RRT) Approval Required?

No

Wildlife issues with Federal Endangered Species Act (Section 7)?

These issues have been addressed with NOAA. The explanation will be provided upon request.

SCAT issues?

N/A

Notes:

19. Field Test approval forms and Field Test (HITT Team) final evaluation report must be submitted to ART team for tracking: jim.best@bp.com
20. ART team will share the field test approval and results forms
21. HITT Team field testing is approved by Houston ART Technical manager
22. HITT Team TF Leader will be accountable for creating and submitting to the appropriate financial authority the 213-RR forms for equipment and personnel required for the test.
23. Field Test numbers for HITT tests will be held and assigned by ART's Jim Best. Numbers will be sequential and used for tracking purposes.

24. Names of the field test should be short
25. For ICP requested tests, the person submitting the field test should be the IC person that will be handling the planning and logistics for the field test and the final field test report.
26. IC field tests approved at the IC level should have tracking field test numbers.
27. In 7 above, the field test approvals should be tracked by ART Houston as in 4 above.

