



Draft Project Instructions

Date Submitted: June 14, 2010

Platform: NOAA Ship *Thomas Jefferson*

Cruise Number: TJ-10-06

Project Title: S-K919-TJ-10
Western Sentry, Leg 2

Cruise Dates: June 14 – July 2, 2010

Prepared by: _____
Commander James M. Crocker, NOAA
Chief, Operations Branch
Hydrographic Surveys Division

Dated: _____

Approved by: _____
Jeffrey Ferguson
Chief, Hydrographic Surveys Division
Office of Coast Survey

Dated: _____

Approved by: _____
Captain Michael S. Devany, NOAA
Commanding Officer
Marine Operations Center - Atlantic

Dated: _____



I. Cruise Overview

A. Cruise Period

This project is scheduled to begin on or about 14 June 2010 and end on 02 July 2010.

B. Operating Area (include optional map/figure showing op area)

The project area is located in the coast waters of the Gulf of Mexico from Louisiana to Florida. A map of the area can be found with the detailed project instructions appended to these instructions.

C. Summary of Objectives

One of the key science questions following the Deepwater Horizon well failure is the distribution and migration of oil plumes submerged at depth. Knowledge of the extent and density of subsurface oil plumes, and their movement, can support NOAA's response efforts by informing responders where oil may impact next as it is transported through the Gulf of Mexico. Direct mapping of subsurface oil plumes at depth also supports ground-truthing efforts by other vessels, supports the advancement of forecast models, and can lead to improved estimates for the total volume of oil ejected into the Gulf.

Continuing from the result of the first leg of Western Sentry, this project will conduct 1300 linear nautical miles of transect lines utilizing the three proven methods to detect and map the presence of submerged oil along the Louisiana, Mississippi, Alabama and Florida coasts. The three methods are: Turner Cyclops 7 Crude Oil Sensors deployed via CTD or via Moving Vessel Profiler (MVP); acoustic backscatter from echosounders utilizing 12kHz, 38kHz, 200kHz Simrad ES 60 singlebeam and 400kHz Reson 7125 multibeam.

D. Participating Institutions

Center for Coastal and Ocean Mapping, University of New Hampshire

E. Personnel (Science Party)

The Science Party consists primarily of ship personnel; survey department, wardroom, and deck department personnel under the direction of the Commanding Officer as delegated to the Operations Officers for day to day survey operations. Additionally the science party consists of the following participants:

Chief Scientist:

CDR Shepard M. Smith, NOAA, Commanding Officer, *Thomas Jefferson*

Other embarked personnel:

LT Samuel Greenaway-data integration, visualization, adaptive mission planning

Dr. Alex DeRobertis, AKFSC, bioacoustics
Dr. Dennis Apeti, NCCOS, Coastal Oceanography and Chemistry
LT Mark Blankenship, Operations Officer, TJ
CST Dan Wright, Chief Survey Tech, TJ
ST Samantha Allen, NOAA Ship Nancy Foster, CTD ops
ENS Jasmine Cousins, Lead for water sampling
Jason Sadler, NRDA, Chain of Custody

F. Administrative

1. Points of Contacts:

Principle Investigator:

Captain John Lowell, NOAA
Director, Office of Coast Survey
Office of Coast Survey
1315 East West Hwy, #6147
Silver Spring, MD 20910
(301) 713-2770 x134
John.Lowell@noaa.gov

Chief Scientist:

CDR Shepard Smith, NOAA
Commanding Officer, NOAA Ship *Thomas Jefferson*
439 West York Street
N/CS33
Norfolk, VA 23510-1114
(757)-647-0187
CO.thomas.jefferson@noaa.gov

2. Diplomatic Clearances

N/A

3. Licenses and Permits

N/A

II. Operations

A. Cruise Plan/Itinerary

June 15- Depart Galveston, baseline water sampling and CTD in the vicinity of Flower Gardens National Marine Sanctuary

June 16-Continue baseline work working Northeast toward shallower water just west of

Port Fourchon.

June 17-21 Reconnaissance for submerged oil in the coastal zone

June 21-Water, personnel, sample transfer in Pascagoula

June 21-25 Wellhead and vicinity

June 26-27 Reconnaissance for submerged oil in coastal zone, moving east

June 27 Water, personnel, and sample transfer in Pascagoula

June 27-July 2 Reconnaissance for submerged oil in coastal zone, moving east

July 2-Arrive Key West

B. Staging and De-staging

The ship will stage in Galveston, TX and de-stage in Key West, FL. Additional time may be required for ship and equipment decontamination at the conclusion of this project.

C. Operations to be Conducted

1. Underway Operations

The ship will square off Coast survey project in Western Gulf before beginning remaining baseline transects from SW Pass to Galveston. The ship will then begin coastal oceanographic transects along the affected coast.

The ship will operate with multiple echo sounders at different frequencies logging water column data continuously along track. If acoustic anomalies are detected in the echo sounder water column records, the extent of the anomaly will be investigated by running additional transects and locations will be selected for in-situ measurements.

The ship's Moving Vessel Profiler (MVP), outfitted with a multi-sensor package, takes casts four to six times per hour. The ship can acquire both sonar and MVP data at over 10kts, resulting in over 200 nautical miles per day of transect data that can be acquired. The presence of surface oil and submerged oil plumes are to be reported ashore periodically.

The ship will acquire data in waters approximately 20 – 200 meters deep along the coasts. The deep water work will focus on detecting the movement of oil away from the source.

2. Station Operations

Periodic direct samples will be taken to confirm the in-situ measurements of the MVP and the sonar observations. These sample sites will be chosen in areas with crude oil indicated at depth by the MVP, and where the echo sounder indicates an acoustic anomaly is of large enough size to reliably reach with direct sampling methods. CTDs and water sampling will be done at least once every 4 hours. Once acquired, water samples (surface or at depth) will be handled to meet

protocols as directed by the Unified Command. Water samples will be delivered ashore for contracted lab analysis.

The MVP can be used in depths of up to 100 meters at 10 kts and can be extended to 300 meters if the ship is stationary. The ship's sidescan winch was re-cabled with 0.322" data cable (estimated 1344 meters). The ship's oceanographic winch has been re-cabled with 2286 meters of 0.25" stainless steel wire rope to facilitate water sampling

D. Dive Plan

Dive operations are not planned to support this project.

E. Applicable Restrictions

As per attached project instructions.

III. Facilities

A. Equipment and Capabilities Provided by the Ship (itemized)

1. Single beam echo sounders operating at 12kHz, 38kHz, and 200kHz
2. Multibeam echo sounders operating at 95 kHz and 400 kHz
3. ODIM Brooke-Ocean Moving Vessel Profiler
4. Refrigerators for storing water samples (qty 2)

B. Equipment and Capabilities Provided by the Program Office (itemized)

1. ODIM Brooke-Ocean Moving Vessel Profiler sensor package that includes a Turner Cyclops 7 Crude Oil Sensor and a sound speed sensor.
2. Sub-compact rosette with a 12 bottle capacity, equipped with a Seabird SBE 9 CTD, Fluorometer, Cyclops 7, Optical Backscatter sensor, and DO sensor
3. Water sampling and preservation supplies

IV. Hazardous Materials

A. Policy and Compliance

The Chief Scientist is responsible for complying with MOCDOC 15, Fleet Environmental Compliance #07, Hazardous Material and Hazardous Waste Management Requirements for Visiting Scientists, released July 2002. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by

name and the anticipated quantity brought aboard, MSDS and appropriate neutralizing agents, buffers, and/or absorbents in amounts adequate to address spills of a size equal to the amount of chemical brought aboard. The amount of hazardous material arriving and leaving the vessel shall be accounted for by the Chief Scientist

B. Radioactive Isotopes

N/A

C. Inventory

The ship will incorporate any HAZMAT into the ship's HAZMAT program in accordance with MOCDOC15

V. Additional Projects

A. Supplementary ("Piggyback") Projects

N/A.

B. NOAA Fleet Ancillary Projects

N/A

VI. Disposition of Data and Reports

A. Data Responsibilities

Data will be submitted to the Unified Command for proper dissemination and archival.

B. Pre and Post Cruise Meeting

Communications between the Commanding Officers and HSD Operations Branch are established and maintained throughout the planning process, the execution and following the project's completion. When applicable, pre-cruise and post-cruise meeting will be held as defined below.

Pre-Cruise Meeting: Prior to departure, the Chief Scientist may conduct a meeting with the Program Office to clarify any outstanding issues on the requirements of the project.

Post-Cruise Meeting: Upon completion of the cruise, the completed project will normally be discussed via a teleconference or summary e-mail. Concerns regarding safety, efficiency, and suggestions for improvements for future cruises should be discussed. Results of any discussions will be distributed to all

participants by email, and to the Commanding Officer and Chief of Operations, Marine Operations Center.

C. Ship Operation Evaluation Report

Because the Commanding Officer is the Chief Scientist for the assigned project, a conflict of interest may be presented if the Commanding Officer completes a Ship Operations Evaluation form. To handle Ship Operation Evaluation, direct communication has been established by OCS and HSD leadership directly with OMAO to communicate ship operations concerns.

VII. Miscellaneous

A. Meals and Berthing

Meals and berthing are required for ship's complement. Special dietary requirements for Program Office participants will be made available to the ship's command at least seven days prior to the survey (e.g., visiting Physical Scientist is allergic to fin fish).

Berthing requirements, including number and gender of the visiting Program Office participants, will be provided to the ship by the Program Office.

All Program Office Representatives will have proper travel orders when assigned to any NOAA ship. The Program Office will ensure that all non NOAA or non Federal scientists aboard also have proper orders. It is the responsibility of the Program Office to ensure that all visitors have a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 7, 1999 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, Revised: 08/08) must be completed in advance by each visitor that will be underway overnight. The NHSQ can be obtained from the Chief Scientist or the NOAA website at http://www.oma.noaa.gov/medical/NHSQ_Final_wi_Instructions_fill.pdf. The completed form should be sent to the Regional Director of Health Services at Marine Operations Center. The participant can mail, fax, or scan the form into an email using the contact information below. The NHSQ should reach the Health

Services Office no later than 4 weeks prior to the cruise to allow time for the participant to obtain and submit additional information that health services might require before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of the NHSQ. Be sure to include proof of tuberculosis (TB) testing, sign and date the form, and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone 757.441.6320
Fax 757.441.3760
E-mail MOA.Health.Services@noaa.gov

Regional Director of Health Services
Marine Operations Center – Pacific
1801 Fairview Avenue East
Seattle, WA 98102
Telephone 206.553.8704
Fax 206.553.1112
Email MOP.Health-Services@noaa.gov

Prior to departure, any visitors must provide a listing of emergency contacts to the Executive Officer, with the following information: name, address, relationship to member, and telephone number.

C. Shipboard Safety

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

D. Communications

Due to a new directive from Marine Operations Center, the ship must charge visitors for all calls made on the cell or sky-cell telephone. INMARSAT, Sky Cell and cellular communication costs shall be reimbursed to the ship for telephone calls made by all visitors. Currently, Sky Cell and cellular telephone services are about \$0.89 per minute and INMARSAT Mini-M is around \$1.68 per minute for voice. These charges will be assessed against the program after the ship receives the bill. There is generally a three-month delay receiving the bill for review.

E. IT Security

Any computer that will be hooked into the ship's network must comply with the *NMAO Fleet IT Security Policy* prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

- (1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
- (2) Installation of the latest critical operating system security patches.
- (3) No external public Internet Service Provider (ISP) connections.

Completion of these requirements prior to boarding the ship is preferable.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

N/A – Foreign Nationals are NOT anticipated to be aboard for project:
S-K919-TJ-10, Western Sentry Project

Appendices:

1. NOAA Ship Thomas Jefferson, Deepwater Horizon Response, Leg 3 Proposal



NOAA Ship Thomas Jefferson Deepwater Horizon Response Leg 3 Proposal

June 8, 2010



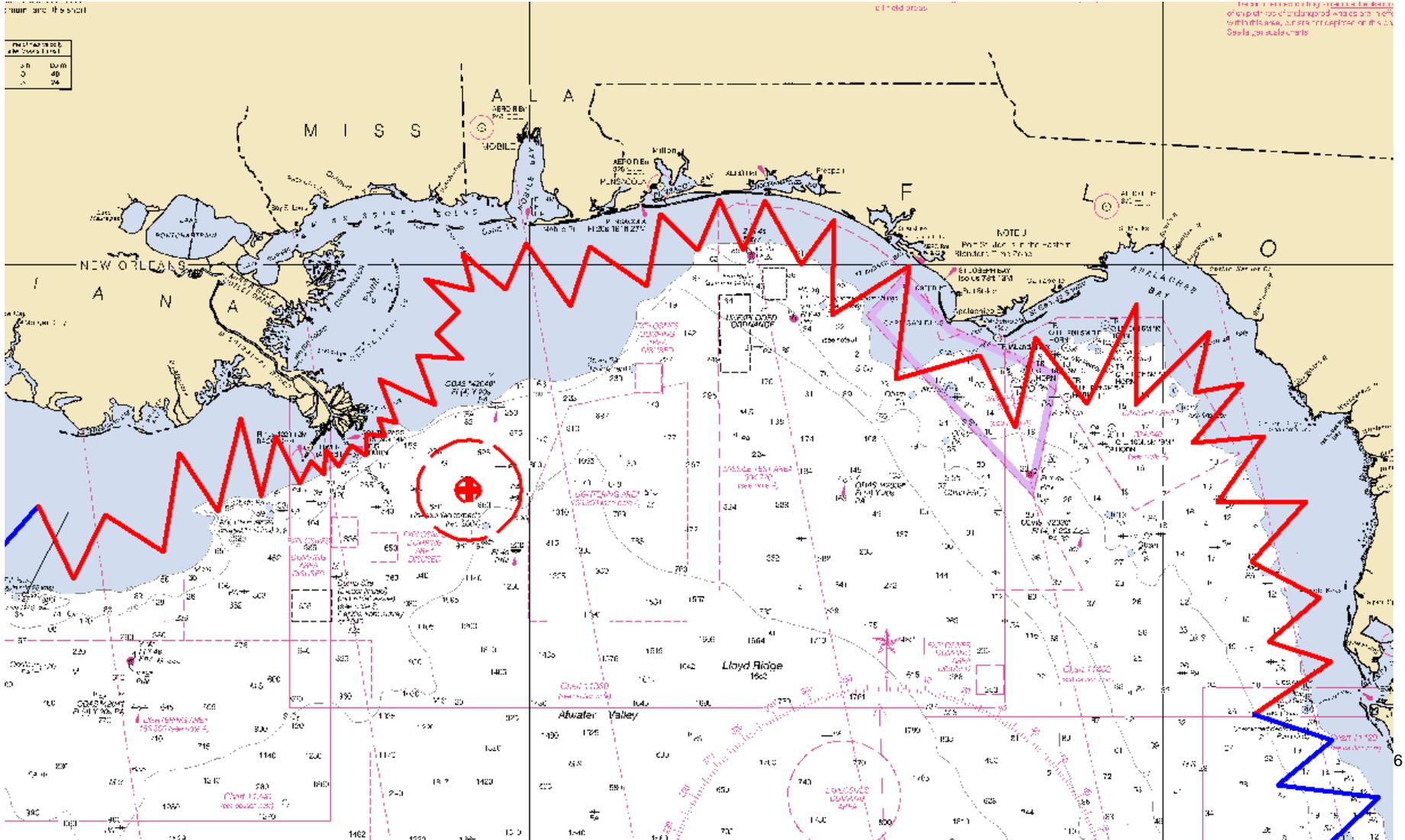
Status After Leg 2



- Hypothesis developed for acoustic signature of anomalous water mass near site
- MVP work shown to be effective way to take casts over large areas quickly.
- Baseline CTD transects in Western Gulf half complete
- Coast Survey projects in Galveston and Texas Fairways need two days of work to “square off”



MVP Proposed Area of Operations





Coastal Zone CONOPS



- 1300 LNM of MVP and acoustic transects from Port Fourchon to Tampa Bay
 - Casts taken 6-10 per hr, approx 1 NM resolution
- If “Hot Spots” are discovered in the fluorescence or DO,
 - the area is further developed with MVP
 - water samples taken
 - shoreside component notified immediately.



Timeline-TJ DWH Leg 3



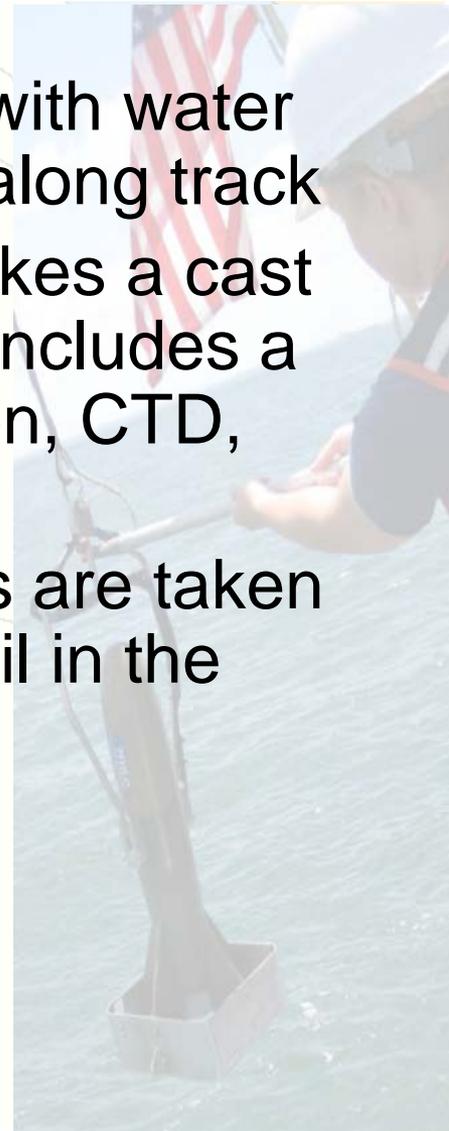
- (2 Days)-"Square off" Coast Survey work in Western Gulf of Mexico.
- (4 days)-MVP and CTD Baselines working from Galveston east toward the spill site-Continuation from unfinished work from Leg 2
- (5 days)-Inshore MVP transects from 20m curve to 100m curve-Port Fourchon to Mobile
- (3 days)-Targeted acoustic and CTD work near spill site, at direction of Acoustics Group
- (4 days)-MVP and CTD Baselines working from Mobile to Key West

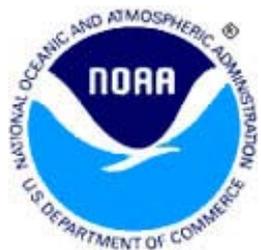


Leg 3 Capabilities



- Multiple echosounders (12, 38, 200 kHz) with water column capabilities operate continuously along track
- An MVP with a multi-sensor freefall fish takes a cast 4-6 times per hour. The sensor package includes a Turner Crude Oil Sensor, dissolved oxygen, CTD, and sound speed sensor.
- Static cast taken with CTD, water samples are taken at depth to ground truth any evidence of oil in the other two sensors.
- HAZMAT-equipped and trained crew
- 24 hour operations on all sensors





Why this combination?



- Efficient
 - Ship can steam at 9 kts while collecting both sonar and in situ measurements-can cover up to 200 LNM per day
- Rigorous
 - Water samples ground truth the Turner Crude Oil sensor, which ground truths the sonar.
- High resolution
 - The sonar is continuous along track, which may permit detection of the edges of submerged masses





Leg 3 Objectives



- Close out open Coast Survey projects in Western Gulf
- Establish baseline water chemistry in Western Gulf 50m-1200m, 50 mile transects
- Develop concept of operations for use of the MVP for widespread submerged oil detection and mapping in coastal zone
- Collect additional acoustic and CTD data around the dynamic disaggregated clouds of dispersed oil as requested by the acoustic steering group.