

# Mississippi Canyon 252 Incident

## Work Plan for Sediment and Water Collection and Analyses for Baseline NRDA in Louisiana

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*"Approval of this work plan is for the purposes of obtaining data for the Natural Resource Damage Assessment. Parties each reserve its right to produce its own independent interpretation and analysis of any data collected pursuant to this work plan."*

*"All samples will be sent to laboratories agreed upon by the trustees and BP."*

*"Each laboratory shall simultaneously deliver raw data, including all necessary metadata, generated as part of this work plan as a Laboratory Analytical Data Package (LADP) to the trustee Data Management Team (DMT), the Louisiana Oil Spill Coordinator's Office (LOSCO) on behalf of the State of Louisiana and to ENTRIX (on behalf of BP). The electronic data deliverable (EDD) spreadsheet with pre-validated analytical results, which is a component of the complete LADP, will also be delivered to the secure FTP drop box maintained by the trustees' Data Management Team (DMT). Any preliminary data distributed to the DMT shall also be distributed to LOSCO and to ENTRIX. Thereafter, the DMT will validate and perform quality assurance/quality control (QA/QC) procedures on the LADP consistent with the authorized Quality Assurance Project Plan, after which time the validated/QA/QC'd data shall be made available to all trustees and ENTRIX. Any questions raised on the validated/QA/QC results shall be handled per the procedures in the Quality Assurance Project Plan and the issue and results shall be distributed to all parties. In the interest of maintaining one consistent data set for use by all parties, only the validated/QA/QC'd data set released by the DMT shall be considered the consensus data set. The LADP shall not be released by the DMT, LOSCO, BP or ENTRIX prior to validation/QA/QC absent a showing of critical operational need. Should any party show a critical operational need for data prior to validation/QA/QC, any released data will be clearly marked "preliminary/unvalidated" and will be made available equally to all trustees and ENTRIX."*

Approved:

  
\_\_\_\_\_  
BP Representative

July 3, 2010  
Date

  
\_\_\_\_\_  
Federal Trustee Representative

3 July 2010  
Date

 FOR ROBERTA GUDRY  
\_\_\_\_\_  
Louisiana Trustee Representative

10 July 2010  
Date

**Work Plan for  
Sediment and Water Collection and Analyses  
for Baseline NRDA purposes in Louisiana**

**July 2, 2010**

Contributors: NOAA, USFWS, LOSCO, and BP/ENTRIX

Louisiana Department of Environmental Quality

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## 1.0 Sampling Plan Objective

As a result of the on-going BP Deepwater Horizon Oil Spill incident, baseline samples of sediment and water will be collected to document exposure to and presence of petroleum hydrocarbons for the purposes of natural resource damage assessment (NRDA). These data will document baseline conditions of interior coastal marshes for NRDA purposes. The data collected pursuant to this Work Plan will provide a portion of information necessary to make a determination whether to conduct restoration planning under Section 990.42 of the OPA regulations and applicable OSPRA regulations, La. Admin. Code 43:101 *et seq.* Protocols and operational criteria contained within this document borrow heavily from NOAA protocols developed for use by all NRDA activities gulf-wide for this incident. Sample collection protocols followed will be comparable to protocols used post-impact. Baseline sample collection will follow a random site-selection procedure for characterization of major coastal hydrologic units. Data variability will determine the degree of confidence with which the data represents the given hydrologic unit, although baseline data is not expected to have high variability. Geographic information system software will be utilized to randomly generate sample sites in the targeted hydrological unit for baseline condition characterization. Pre-sampling reconnaissance will be used to determine if selected sites are suitable for baseline sampling. Sites will not be chosen in areas that have confirmed oiling or are inaccessible. Attachment A outlines the process for randomized site selection using GIS software.

## 2.0 Scope of Water and Sediment Sampling

The following protocols will be followed to ensure sediment and water data collection is consistent with other sediment and water data collections that have occurred or may occur pursuant to other NRDA work group activities. Locations include inshore coastal areas across southern Louisiana from Texas to Mississippi. Sampling location determination will be randomized for baseline characterization of specific coastal hydrologic units (site locations will be made available through the Research Planning FTP site). Non-LDEQ personnel wishing to participate will be required to undergo safety training and sign an indemnity waiver prior to boarding any State of Louisiana vessels.

## 3.0 Summary of Sample Numbers

Baseline sampling is intended to represent pre-impact petroleum hydrocarbon concentrations in coastal marsh waters and sediment. Samples will represent the below described coastal hydrologic units, providing random representation of areas delineated by SCAT grid maps. Should high data variability occur (but is not expected) additional baseline testing may be warranted, but will be discussed with State trustee representatives, Federal trustee representatives and Responsible Party representatives prior to additional sampling. Baseline samples will not be collected if baseline conditions cannot be represented due to sensory detection of fresh oil (e.g. sight, smell). The site numbers are estimated based on the ability of a single crew to collect samples at an average of 4 sites per day, the ability to conduct the baseline sampling effort prior to area impact, and to represent roughly 1500 acre areas per selected site. Sampling for baseline characterization will include coverage in the following coastal hydrologic units:

- Lake Pontchartrain Basin Marshes (East of Mississippi River): estimate 16 sites, from Lake Catherine to Plaquemines Parish.

- Bird's foot delta (mouth of Mississippi River): will not be sampled for "baseline" as some shoreline impacts have occurred.
- Barataria Basin marshes (West of the Mississippi River): estimate 16 sites, from Lake Salvador south to Wisner WMA, between the Mississippi River and LA Hwy 1.
- Terrebonne Basin marshes: estimate 24 sites, from La Hwy 1 west to the Atchafalaya River.
- Vermilion-Teche Basin marshes: estimate 16 sites, from Atchafalaya Bay to West Cote Blanche Bay includes Marsh Island.
- Sabine, Mermentau and Calcasieu Basins: estimate 24 sites, from Paul Rainey Wildlife Sanctuary to Sabine River.

Each station will yield one set of composite sediment samples from the intertidal zone, one set of composite sediment samples from the sub-tidal zone, one set of composite waters samples (PAH, THC) and three grab water samples (VOC). Data derived from these samples can be used to calculate the degree of confidence that the coastal hydrologic unit is adequately represented using the formula in Section 8.0.

#### **4.0 Equipment Needs**

Equipment needs for recon activities for each team are:

- 2 LDEQ Employees
- Vehicle
- Boat
- Navigation GPS unit
- Mapping GPS unit
- Field Notebook
- Field Maps
- Appropriate PPE and Safety Equipment

The number of recon teams will vary dependant on the size of the hydrologic unit and the available man power.

Equipment needs for sample collection activities for each team are:

- 3 LDEQ Employees
- Vehicle
- Boat
- Compatible GPS Unit
- Camera
- Field Log Book
- Field Maps
- Appropriate PPE and Safety Equipment
- Sampling equipment (dredges, spoons, ice chest & etc) including cleaning and decontamination supplies
- Sample bottles

The number of sampling teams will vary dependant on the size of the hydrologic unit and the available man power. The number of boats and vehicles will vary dependant on the sampling locations. Attachment B includes cost estimates for the project.

## 5.0 Safety

All lead personnel will be 40 hr HAZWOPER trained and will have completed any other training modules required by Incident Command (IC). All other personnel will be at least 24 hr HAZWOPER trained and will have completed any other training modules required by IC. Float plans will be filed with the IC for each day's activities on the water. Vessel operators and passengers must be trained according to LDEQ requirements. All necessary PPE will be used.

## 6.0 Sampling

All sampling methods will follow the NOAA Protocols for Collecting NRDA Samples. Any deviation from these methods will be recorded in the field notes. The NOAA documentation can be located at [REDACTED]. The username and login will be provided to the sample collectors. It is the sample collectors' responsibility to monitor the website to ensure current protocols are being followed.

### 6.1 Sediment

Sediment samples will be taken from the intertidal and subtidal areas. Sediment samples will be a composite sample consisting of a minimum of three (3) aliquots. Composite samples will be collected to represent a wider area than a single point, that is, an area 20-100 feet around the sample site and along the same vertical horizon to represent the same zone. Refer to the NOAA protocol documents on collecting subtidal and intertidal sediment. Any deviations from these protocols will need to be noted in the field notes.

#### 6.11 Sampling Objectives

- To determine the concentration of oil compounds in sediments in the baseline condition.
- To measure sediment characteristics for interpreting chemical and biological results.
- To maintain the integrity of the sample(s) during sampling, transport, and storage.

#### 6.12 Sample Volume and Container by Analytical Method

<u>Parameter</u>	<u>Sample Volume</u>	<u>Container</u>
THC by GC/FID	250ml or 8oz Wide mouth; ¾ full	Glass containers, certified-clean organic-free (solvent rinsed), with teflon- or aluminum foil-lined lids (Wide-mouthed for sediments)
PAH by GC/MS-SIM	250ml or 8oz Wide mouth; ¾ full	Glass containers, certified-clean organic-free (solvent rinsed), with teflon- or aluminum foil-lined lids (Wide-mouthed for sediments)
TOC	10 g	Taken from THC bottle
Grain size	250ml or 8oz Wide mouth; ¾ full	Same bottle as THC/PAH

## 6.2 Protocols for Collecting NRDA Samples: INSHORE WATER COLUMN

Water samples will be grab samples taken at a depth of fifteen (15) cm. Water samples should be collected before sediment samples in order to minimize any interference from sediment samples. Refer to the NOAA protocol documents on collecting shallow subsurface water sampling. Any deviations from these protocols will need to be noted in the field notes.

### 6.21 Sampling Objectives

- To determine the concentration of oil compounds in the inshore water samples collected for baseline conditions.
- To maintain the integrity of the sample(s) during sampling, transport, and storage.

### 6.22 Sample Volume and Container by Analytical Method

Parameter	Sample Volume	Container
THC by GC/FID	1-liter Amber glass jar	Glass containers, certified-clean organic-free (solvent rinsed), with Teflon- or aluminum foil-lined lids
PAH by GC/MS-SIM	1-liter Amber glass jar	Glass containers, certified-clean organic-free (solvent rinsed), with Teflon- or aluminum foil-lined lids
VOC analysis	3- 40ml vials with Teflon septa	Glass vials with Teflon septa

## 7.0 Data Management and Shipping Protocols for Field Samples

These instructions outline the protocol for generating field sampling forms, uploading field sampling data, CoC information, and uploading photos into the NOAA NRDA sampling data management system. Sample and analytical data will be managed by the Data Management Team throughout the NRDA process. The database output will be made into spatial data products such as ERMA and Google Earth for planning and communication purposes. Ensuring sample integrity by following the guidelines below will greatly improve this process. All sampling data, photos, and CoC information should be uploaded by the end of the day in which they were sampled; they will be used daily in the planning of future activities. The LDEQ NRDA sediment and water sampling teams will be trained in and will use the Research Planning FTP website to generate all forms. The NOAA Data Management Mobile Teams will upload data from all field activities and ship the samples to the NOAA laboratory. See Section 6.0 for the username and login. The guidance documents can be found on the Research Planning FTP site for this incident.

## 8.0 Formula for Calculating Statistical Confidence in Area Representation Based on Sample Variability

The following formula can be used to calculate statistical confidence of the area representation of a given set of samples based on sample variability.

$$n = \left[ \frac{z_{\alpha/2} \sigma}{d} \right]^2$$

Where:

$n$  = sample size per unit area,

$z$  value corresponds to the chosen alpha level (type 1 error rate); For example, for a two-sided 95% confidence interval,

$z_{\alpha/2} = 1.96,$

$\sigma$  = standard deviation of the known data set,

$d$  = the maximum margin of error; For example, if one wanted the sample mean to be plus or minus 1 ppm of the population mean then  $d = 1$ .

## 9.0 Data Deliverables

The laboratory will deliver sample results per Trustee directed protocols and follow all Analytical QAPP directives. Summary reports will be prepared by the LDEQ Project Manager and shared with all appropriate interested parties. All data will be captured on Trustee approved forms and formats. All data uploads will be synchronized and follow Trustee requirements. LDEQ will utilize the State Data Intake and Data Management contractor to ensure compatibility of all databases, NRDA formats / protocols and expedite data transfer.

## **Attachment A**

### **Sampling Site Selection Procedures**

1. Define area of interest (AOI).
2. Extract water bodies for the AOI, including linear features, wide streams, coastal bays and lakes, but excluding the Gulf of Mexico.
3. Buffer linear features 3 meters, merge with other polygonal features.
4. Dissolve merged water body polygons to achieve one single feature for all water within the AOI.
5. Calculate total area, in acres, of water within the AOI, divide by 1,500 to get the number of sample points for the AOI (one sample site per 1,500 acres).
6. Execute Create Random Points routine in ESRI ArcGIS using the number of points calculated in the previous step, constrained to the AOI, with a 1,000 meter minimum distance between points.
7. Randomized sites are placed on a map with latest SCAT oiling data for reconnaissance and accessed by recon teams for suitability determination (not oiled, able to get sampling equipment to site).
8. Site coordinates are adjusted by the recon team to identify the nearest shoreline for access to intertidal sediments.
9. New coordinates are returned to the GIS unit for final mapping and sample team deployment.

## Attachment B Resources and Budget

**Baseline sampling is estimated at 4 samples per crew per day, does not include recon time**

Resource estimates for sample collection are as follows:	<u>\$ COST (per Workday)</u>	<u>\$ COST (one-time purchase)</u>
• (2) 20' boats (LDEQ)	912	-
• (2) 20' boats (Subcontractor)*	(TBD if needed)	-
• (1) LDEQ Project Manager, 40 hrs	91.14/hr	-
• (6) trained personnel (LDEQ staff) @ 56.76/hr @12hr/day	5448.96	
• (6) trained personnel (Subcontractor)*	(TBD if needed)	(TBD if needed)
• (4) 150qt ice chests		600
• (30) 48qt ice chests		900
• (6) boxes Nitrile gloves, Nomex or (3) cases Tyvec coveralls		390
• (8) Eckman dredges mounted on poles		6,400
• Metal spoons/drip pans as re-useable sample collection tools		300
• Sample containers as described in the protocol below	(BP provided at cost)	(BP provided at cost at cost)
• Laboratory grade detergent, nylon brushes, paper towel		200
• Sorbent pads		300
• Plastic sheeting		100
• 6 gallons HPLC-GC/MS grade dichloromethane		900
• 6 gallons LC-MS grade methanol		400
• Gallon-sized HDPE cubitainers for clean rinse water		100
• Food/water for remote deployment of personnel		300
• Misc supplies, launch fees		400
• Laboratory Analyses	(Trustee/RP approved)	(Trustee/RP approved)
• Shipping	(Trustee/RP approved)	(Trustee/RP approved)

*\*Subcontractors will be utilized if LDEQ personnel and equipment are not available*

### **DAY RATE for NRDA Pre-assessment / Assessment:**

**LDEQ Day rate for NRDA baseline sampling on an as needed basis for a two team deployment:**

**DAY RATE = \$7,320 (Basis = \$58,559 divided by the above 8 days to establish a day rate)**

**NOTE: Space will be accommodated for 1 (one) BP representative and one Federal trustee on all sampling events. Non Government personnel will be required to sign an indemnity waiver to participate on State of LA vessels.**