BP SPILL

QUALITY ASSURANCE SAMPLING PLAN
TO EVALUATE THE EFFECTS TO WATER AND SEDIMENT
FROM OIL AND DISPERSANT
TO SHORELINE, NEARSHORE AND FAR OFF-SHORE AREAS

EPA REGION 6

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EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) plans to conduct water and sediment sampling, analysis and monitoring for the BP Spill along the U.S. Gulf Coast, including off the coast of Louisiana, Mississippi, Alabama, and Florida. Additional portions of the Gulf Coast (e.g., Texas) may be added if the extent of the oil spill expands. Although impacts are closest to U.S. waters, the Agency also recognizes the potential impacts on international waters and the waters of other countries. Because of the potentially long-term nature of the response to the BP Spill, the government is concerned that the crude oil, dispersant application, and response technologies may have negative short- and/or long-term impacts on the aquatic environment as the spill moves to and within the near-shore environment. In order to monitor the spill, EPA has developed this Quality Assurance Sampling Plan (QASP) to assess the chemical contamination and toxicity to water and sediment as a result of the BP Spill.

METHODLOGY OVERVIEW

EPA is coordinating with the National Oceanic and Atmospheric Administration (NOAA) to conduct water sampling from far off-shore (3 to 50 miles from shoreline). EPA will collect water and sediment samples nearshore (1 to 3 miles from shoreline) and in shoreline areas (up to 1 mile from shoreline). This sampling approach is designed to provide EPA with feedback on the effects of the oil spill and with dispersant application. Sampling includes the following approach:

- Laboratory sampling and analyses will be instituted as a baseline in the event that fluorometer monitoring indicates the approach of the plume. This effort includes the collection of water samples from within the dispersed oil plume and outside the plume for spectrofluorometric analysis and laboratory analyses of parent and alkyl polycyclic aromatic hydrocarbons (PAHs) and benzene, toluene, ethylbenzene, and xylene (BTEX) constituents. Sample analyses also includes chemical oxygen demand (COD), biological demand (BOD), dissolved oxygen (DO), and ecotoxicity analyses to include short-term chronic testing of standard toxicity test species indicative to the Gulf.

- Visual monitoring relies on visual observations by trained observers (federal partner and/or contractor personnel). Following surface application of dispersant, trained observers will determine the extent to which dispersion has occurred.

- Fluorescence monitoring combines the visual monitoring with real-time water column monitoring utilizing a submersible fluorometer that is towed or casted by boat at specified depths within the plume and outside the plume. Water samples may also be taken for later analysis at a laboratory.

SUMMARY OF INITIAL AND ONGOING ACTIVITIES

EPA has also been assessing water and sediment quality along the Gulf Coast. Multiple project teams have been deployed to multiple locations collecting surface water and sediment samples and collecting real-time water data utilizing multi-parameter water quality instruments. Additional sampling, to determine the presence of free oil globules and/or surface oil at near shore surface water locations (i.e., within approximately 100 feet of the shoreline), was conducted to characterize the oil and dispersant mixture that is reaching the shoreline. Further sampling along beaches, marshes, tidal flats, or other shoreline types was conducted to collect samples of fresh oil, mousse, tar, tar balls, tar patties that had accumulated as part of the oil release. Samples are being analyzed for volatile organic chemicals (VOCs), semi-volatile organic chemicals (SVOCs), metals (including mercury), total petroleum hydrocarbon (TPH), oil and grease, dispersant chemicals, toxicity in sediments, and total organic carbon. Additional water and sediment samples will be collected during the National Coastal Condition Assessment (NCCA) which is scheduled to be initiated in June 2010. The NCCA data will be used to supplement the planned post-impact water and sediment sampling.

Summary of air, water, sediment and toxicity testing along the Gulf Coast

Position Relative to Shoreline	Media Sampled	Chemicals Sampled	Toxicity Testing	Lead Agency
Far Off-shore (3 to 50 miles)	Air (ASPECT only)	Chemical vapors and plumes	Not applicable	EPA
	Water	Oil and dispersant constituents Water quality parameters	Rototox	National Oceanic and Atmospheric Administration (NOAA)
Nearshore (1 to 3 miles)	Air (ASPECT only)	Chemical vapors and plumes	Not applicable	EPA
	Water	Oil and dispersant constituents Organic chemicals Metals Oxygen demand Water quality parameters	Silverside fish Mysid shrimp Sea urchin and/or Eastern oyster	EPA
	Sediment (depth less than 40 feet)	Oil and dispersant constituents Organic chemicals Metals	Amphipod Polychaete	EPA
Shoreline areas (up to 1 mile)	Air	Oil and dispersant constituents Organic chemicals	Not applicable	EPA
	Water	Oil and dispersant constituents Organic chemicals Metals Oxygen demand Water quality parameters	Silverside fish Mysid shrimp Sea urchin and/or Eastern oyster	EPA
	Sediment	Oil and dispersant constituents Organic chemicals	Amphipod Polychaete	EPA

1. INTRODUCTION

The U.S. Environmental Protection Agency (EPA) plans to conduct water and sediment sampling analysis and monitoring to examine the effects of the BP Spill along the Gulf Coast, including off the coast of Louisiana, Mississippi, Alabama, Florida. Additional portions of the Gulf Coast (e.g., Texas) may be added if the extent of the oil spill expands. Although impacts are closest to U.S. waters, the Agency also recognizes the potential impacts on international waters and the waters of other countries. Proposed monitoring locations are shown in Figure 3-1 which is focused at this time on areas from the Louisiana/Texas boundary to the Florida panhandle. Expansion to coastal areas of Texas and the west coast of Florida will occur as needed and in anticipation to spill migration. This Quality Assurance Sampling Plan (QASP) was prepared by EPA Region 6 in coordination with headquarters personnel including multiple offices, regional water quality divisions, and Environmental Response Team (ERT) personnel. This plan describes the technical scope of work to be completed as part of this Emergency Response.

EPA is concerned with the potential impact of dispersant chemicals and crude oil on public health and on shoreline and nearshore aquatic environments. Because of the potentially long-term nature of the spill impacts and the ongoing response, a robust study of the public health and environmental impacts of the spill and response is needed.

1.1 PROJECT OBJECTIVES

The objective of this sampling plan is to provide assessment of the chemical contamination and the toxicity of water and sediment that may be contaminated as a result of the spill and response activities. The plan provides for sampling from three general positions relative to the Gulf shoreline: shoreline (up to 1 mile), nearshore (1 to 3 miles), and far off-shore (3 to 50 miles) sampling. Sampling will be conducted for chemical constituents of dispersant compounds and crude oil. In addition, samples will also be collected for ecotoxicity assessments at all three locations.

1.2 PROJECT TEAM

The Project Team will consist of a collaborative team of persons from EPA, National Oceanic and Atmospheric Administration (NOAA), U.S. Coast Guard (USCG), and contract personnel to implement the monitoring and sampling strategies described herein. The project team will con-

sist of a site lead(s) and the necessary number of operational personnel to implement the approach included herein. In addition, EPA and EPA contractor personnel will be assigned as necessary to facilitate successful implementation of shoreline and nearshore tasks detailed in the QASP. Figure 1-1 illustrates the currently proposed organization chart.

EPA will also be on-site to assist with coordination and on-site direction of sampling, data collection, and analysis as needed. EPA will coordinate with the Unified Command as necessary.

1.3 QASP FORMAT

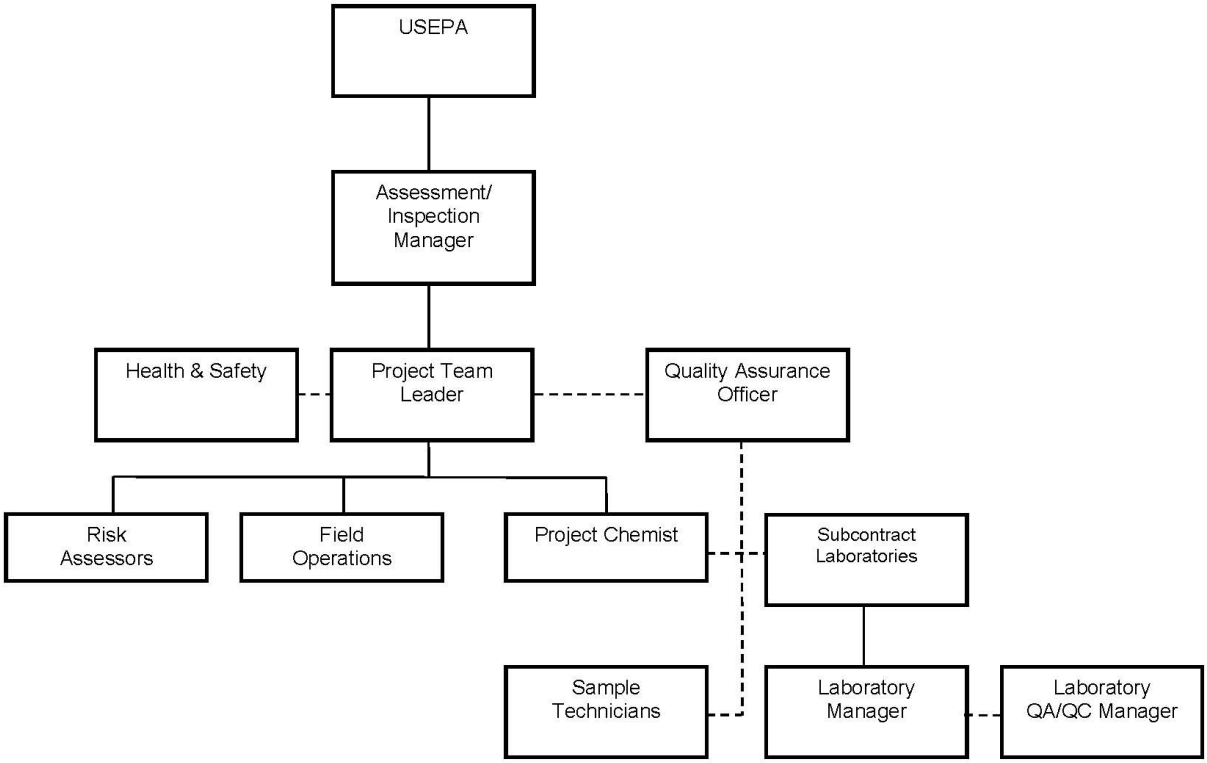
This QASP has been organized in a format that is intended to facilitate and effectively meet the objectives of this portion of the emergency response. The QASP is organized as follows:

- Section 1 – Introduction
- Section 2 – Site Description and Background
- Section 3 – Sampling Approach and Procedures
- Section 4 – Analytical Approach
- Section 5 – Quality Assurance
- Section 6 – References

Figure 3-1 and Appendices referred to in this document are presented as separate portable document format (PDF) files. Tables are presented at the end of each respective section.

Figure 1-1

Organization Chart



2. SITE DESCRIPTION AND BACKGROUND

2.1 SITE DESCRIPTION

The BP Spill source is located approximately 52 miles southeast of Venice, Plaquemines Parish, Louisiana, (28.73667˚ N, -88.38722˚ W). The source is a leaking production well caused by damage from the sinking of the Transocean Deepwater Horizon drill rig at BP Site Mississippi Canyon 252. The size of the impacted area resulting from the release varies from day-to-day, but is presently several hundred square miles in size. The spill is affected by wind and wave action, which continues to impact the size, shape, and movement of the oil. The potential impact zone includes the shorelines of Louisiana, Mississippi, Alabama, Florida and Texas.

2.2 INITIAL AND ONGOING WATER AND SEDIMENT SAMPLING

As a result of the BP Spill, EPA has been assessing water and sediment quality along the Gulf Coast. Multiple project teams have been deployed to multiple locations based upon site conditions and operations. As the meteorological and operational situations change, sampling and monitoring teams and operations have adapted, based upon direction from the Unified Command. EPA has been collecting surface water and sediment samples and collecting real-time water data utilizing multi-parameter water quality instruments. Additional sampling, to determine the presence of free oil globules and/or surface oil at near shore surface water locations (i.e., within approximately 100 feet of the shoreline), is being conducted to characterize the oil and dispersant mixture that is reaching the shoreline. Further sampling along beaches, marshes, tidal flats, or other shoreline types is being conducted to collect samples of fresh oil, mousse, tar, tar balls, tar patties that had accumulated as part of the oil release. Samples are being analyzed for volatile organic chemicals (VOCs), semi-volatile organic chemicals (SVOCs), total petroleum hydrocarbon (TPH) for gas range organics (GRO), diesel range organics (DRO) and oil range organics (ORO), oil and grease, dispersant chemicals, toxicity in sediments, and total organic carbon. Field parameters include the collection of pH, conductivity, dissolved oxygen (DO) and turbidity.

Additional water and sediment samples will be collected during the National Coastal Condition Assessment (NCCA) which is scheduled to be initiated in June 2010. Post-impact water and sediment sampling is being planned and will be implemented at the end of the spill.

3. SAMPLING APPROACH AND PROCEDURES

The sampling approach that will be applied to the BP Spill is discussed in this section. In general, the sampling plan consists of the following activities:

- Water and Sediment Sampling, Analysis and Monitoring
  - Shoreline Water and Sediment Sampling
  - Nearshore Water and Sediment Sampling
  - Far Off-shore Water Sampling

Sampling methods, locations, quality assurance (QA) procedures, and the analytical approach and methods that will be used are discussed in the following sections. This plan may be increased or modified as necessary to address areas beyond those identified herein.

3.1 OVERVIEW OF SAMPLING ACTIVITIES

EPA, NOAA, and USCG (hereafter federal partners) will conduct the sampling, analysis and monitoring as outlined herein.

3.1.1 Data Quality Objectives

Data Quality Objectives (DQOs) have been developed using the seven-step process set out in the *EPA Guidance for Quality Assurance Project Plans:* EPA QA/G-5 (EPA 2002a). Shoreline, nearshore and off-shore water and sediment DQOs established for this project are included in Appendix A.

3.1.2 Health and Safety Implementation

Maintaining and assuring the health and safety of all federal partners and contract personnel is the top priority of this sampling effort. The federal partners will provide planning functions consistent with activities and responsibilities of the Incident Command System (ICS). At the beginning of each operational period, a daily operation meeting will be held to discuss objectives of the operational period, division assignments, field instrumentation calibration and use, and health and safety protocol.

The sampling activities will be conducted in accordance with the site-specific Health and Safety Plan (HASP). The federal partners will conduct the sampling activities in Level D personal pro-

tective equipment (PPE), with the potential to upgrade PPE as necessary, and as stated in the site HASP. The Field Team Leader (FTL) or designated Field Safety Office (FSO) will be responsible for implementation of the HASP during the sampling activities.

Personnel will be instructed to communicate unsafe situations immediately to supervisors and co-workers, and to immediately take appropriate measures. Sampling activities will be stopped whenever necessary to assure the safety of all engaged personnel.

3.2 WATER AND SEDIMENT SAMPLING

Water sampling activities will be conducted in accordance with the EPA guidelines, standard industry practices; and with EPA ERT and Regional Standard Operating Procedures (SOPs). The site-specific sampling activities are described in the following subsections. For reference, SOPs supporting this QASP are included in Appendix B. Water sampling will be collected at shoreline (up to 1 mile), nearshore (1 to 3 miles off-shore), and far off-shore at distances between 3 and 50 miles.

3.2.1 Far Offshore Sampling

EPA is coordinating with the NOAA and our federal partners to conduct water sampling and monitoring activities from far off-shore (3 to 50 miles from shoreline). These activities are designed to provide Unified Command with feedback on the effects of dispersant application.

Monitoring relies on visual observation by a trained observer (federal partner and/or contractor personnel). Following surface application of dispersant, the observers shall determine by visual observation the extent to which dispersion has occurred. These observations shall be made at several times after the dispersant application (immediately after application, 30 minutes later, and 60 minutes later).

Additional monitoring combines the visual monitoring with real-time water column monitoring. Fluorometric analyses utilizing the Turner Designs C3 submersible spectrofluorometer or equivalent (excitation wavelength of 320 nanometers [nm] and emission wavelength of 400-600 nm) or equivalent spectrofluorometer (pending federal partner approval) shall be towed or casted by boat through the dispersed oil plume at specified depths to make measurements of the dispersed oil plume both within the plume and up to 100 meters (m) outside the plume. These

measurements shall be made continuously for a period of 1 hour after dispersant application. If the weather conditions preclude such measurements, grab samples of water shall be taken with Kemmerer or rosette (Niskin bottle) samplers at specified depths for measurement on board ship by the two spectrofluorometers. Spectrofluorometers shall operate at an excitation wavelength of 280 nm with one operating at a fixed emission wavelength of 340 nm and the other at 445 nm. If it is determined that onboard spectrofluorometer analyses cannot be properly conducted, then samples shall be preserved with 0.02 ml of 10% hydrochloric acid (HCl) and brought to shore to be analyzed at a subcontracted fixed laboratory where a scanning spectrofluorometer is set up. The samples should provide quantitative information on the extent of dispersion induced by the surface application of dispersant.

Field observations, including digital photographs, shall be collected to assist the Unified Command in documenting the data for future use. The field team shall record the time, instrument readings, and relevant observations at selected time intervals. Global positioning system (GPS) instruments will be used to ascertain the exact position of each reading.

3.2.1.1 Far Off-shore Sampling Locations

Sampling locations will be determined by input from the federal partners based on visual observations. Since dispersant application area locations are currently unknown, sample locations will be determined by the locations of dispersant applications utilizing visual monitoring and real-time water column monitoring. A submersible spectrofluorometer shall be towed or casted by boat through the treated area as described at specified depths. If the weather conditions or equipment availability preclude the use of the submersible spectrofluorometer, grab samples of water shall be made using Kemmerer or rosette (Niskin bottle) samplers and measured on board the ship by the two spectrofluorometers, or for subsequent laboratory-based spectroflurometer analyses. Field parameters include pH, conductivity, DO, and turbidity. DO measurements may be taken using Method 360.1 (via membrane probe) or via Method 360.2 (Winkler method).

Prior to arriving at a sample station, reference fluorescence values using a submersible spectrofluorometer or onboard Turner Designs 10-AU-005-CE field fluorometer or equivalent shall be determined. For each sample location, personnel will deploy the submersible spectrofluorometer or collect water samples for onboard or subsequent laboratory-based fluorometric analysis using the field spectrofluorometer, or equivalent laboratory-based analytical equipment.

3.2.2 Shoreline and Nearshore Assessment

Nearshore water sampling activities involve fluorometry, chemical, and ecotoxicity analysis. As described above, visual observation of a plume in open waters is expected. In the nearshore area, fluorescence and laboratory analyses will predominate. As the spectrofluorometers are placed into service, data from these units will be correlated with water chemistry data as a means to evaluate as a potential procedure to provide a real time detection of spill-related chemicals. For this reason, an expedient turnaround time should be requested for all laboratory analyses. Specific laboratory information is discussed in Section 4 of this QASP. Where feasible and deemed appropriate, EPA will coordinate assessment activities with BP and BP contract personnel during shoreline and nearshore sampling and monitoring tasks.

The submersible spectrofluorometer (excitation wavelength of 320 nm and emission wavelength of 400-600 nm) shall be towed or casted by boat at the sampling location specified in Section 3.2.2.1. These measurements shall be made along the 3-mile sentinel line shown in Figure 3-1. If the weather conditions preclude such direct measurements, grab samples of water shall be made using Kemmerer or rosette (Niskin bottle) samplers at 1- and 2-m depths and measured on board the ship by the two spectrofluorometers operating at excitation wavelengths of 280 nm and one operating at an emission wavelength of 340 nm and the other at 445 nm. If it is determined that onboard spectrofluorometer analyses cannot be properly conducted, then samples shall be preserved with 0.02 ml of 10% hydrochloric acid (HCl) and brought to shore to be analyzed at a fixed laboratory where a scanning spectrofluorometer is set up. Care should be taken to avoid contaminating the sampler with standing oil or surface sheen. These samples will provide quantitative information on the approach of the dispersed plume, and the information may be used by NOAA to refine its trajectory modeling. Reconnoitering sorties may be made periodically between the 3 mile limit and the nearest edge of the spill until the spectrofluorometer gets a reading above the reference value.

Additional chemical and biological laboratory analysis will be instituted as a baseline in the event that fluorometer monitoring indicates the approach of the plume. Laboratory analyses include triplicate grab samples of water from 2- and 10-m depths below the water surface using rosette or Kemmerer samplers. These samples shall be split and preserved following methods described above.

3.2.2.1 Shoreline Monitoring Sample Locations

The shoreline monitoring locations will target locations likely to have oil and/or dispersant contamination (NOAA trajectory modeling) and will consider returning to the same locations that were sampled to characterize the initial conditions at the beginning of the response. The current water and sediment sampling plans have been amended to add ammonia analysis, and simultaneously extracted metals and acid-volatile sulphide (AVS/SEM) for sediments. If visible oil is observed or detected, a sediment sample must be collected and analyzed using the procedures specified in the Region 6 Water and Sediment Sampling and Monitoring QASP. Further detailed information is contained in Section 3.3.

3.2.2.2 Nearshore Monitoring Sample Locations

Sampling locations for fluorometer measurements and laboratory analyses will be prioritized to target locations likely to have oil and/or dispersant contamination (NOAA trajectory modeling). Figure 3-1 illustrates the locations of these stations. Information regarding station identification and geographic position (latitude, longitude in decimal degrees) is included in Appendix C. Water quality samples for chemistry and toxicity testing will be collected at each location. Field parameters include pH, conductivity, dissolved oxygen (DO), and turbidity. DO measurements may be taken using Method 360.1 (via membrane probe) or via Method 360.2 (Winkler method). Conductivity, temperature and depth (CTD) measurements may be taken using a submersible monitoring device, whereby depth measurements can be recorded too.

Prior to arriving at a sample station, reference fluorescence values will be determined using the submersible spectrofluorometer or onboard field spectrofluorometer. For each sample location, the following sampling/survey procedure shall be followed:

1. Deploy the submersible spectrofluorometer or collect water samples for onboard fluorometric analysis using the field spectrofluorometer (see Subsection 3.2.4).

2. Collect water samples for laboratory chemistry and biological analyses (see Subsection 3.2.5.2).

3. Evaluate the percent difference between the reference values and station values. If the station values are greater than 20% of the reference value, it is likely that polycyclic aromatic hydrocarbons (PAHs) from dispersed oil are present. If present, then transit to a location outside of the dispersed plume, and collect a reference water samples for laboratory chemistry and biological analyses (see Subsection 3.2.5.2).

4. Return to the planned target sampling station and initiate surveys of fluorescence by deploying the fluorometer. Continue along the 3-mile limit for a distance of approximately three kilometers or the next sampling station, whichever comes first (see Subsection 3.2.4).

If oil is observed or detected, a sediment sample must be collected and analyzed using the procedures specified in the Region 6 Water and Sediment Sampling and Monitoring QASP. Sediment will be collected if the water depth is less than 40 feet (12 m).

3.2.3 Vessels of Opportunity and Navigation

Water quality surveys and sampling will be conducted from vessels of opportunity. As such, there are no specific requirements for each vessel other than each vessel must be: (1) operated by a U.S. Coast Guard (USCG)-licensed captain (consideration should be given to captains with local knowledge of water conditions); (2) provisioned with properly maintained safety equipment; and (3) equipped with GPS instruments capable of continuously recording vessel position. The vessel's GPS should be capable of receiving differential corrections from the USCG or Wide Area Augmentation System (WAAS) corrections from the Federal Aviation Administration (FAA). Each vessel should have adequate deck space for the safe deployment, retrieval and operation of water samplers, as well as for storage of water samples as determined by the Health and Safety Officer.

Although not required, survey or navigation software (e.g., Hypack by Coastal Oceanographics or equivalent) is recommended to aid the vessel operator in maneuvering along the 3 mile limit in a systematic fashion. Parallel transect lines (approximately 500 m spacing) trending along the 3 mile limit shall be pre-determined prior to fluorometric surveys. If the fluorometric surveys conducted along the 3 mile limit line do not indicate the presence of dispersed oil, surveys along a parallel line further offshore may be conducted at the EPA's discretion to provide information regarding the location of the dispersed plume.

3.2.4 Continuous In Situ Fluorescence Measurements

If it is determined that fluorescence is required, continuous measurements of in situ fluorescence will be conducted. Although measurements of fluorescence do not provide specific concentrations of PAHs in the water column, they will give a qualitative assessment of fluorescence relative to reference readings in order to determine the location of the dispersed oil plume. A spec-

trofluorometer (excitation wavelength of 320 nm and emission wavelength of 400-600 nm) shall be towed or casted by boat at 1-m and 2-m depths in order to collect simultaneous measurements of fluorescence at increasingly deeper depths. The units shall be secured to a load bearing weighted tow line in order to maintain near vertical assessments of the water column while under way. The fluorometers will output digital data through RS232 interface cables to a datalogger or field computer onboard the vessel for review by field scientists. Deployment and operation of the fluorometers will be conducted in accordance with the standard operating procedures provided by the manufacturer.

3.2.5 Water Sample Collection

Water samples shall be collected to satisfy fluorescence monitoring or laboratory objectives. For fluorescence monitoring, water samples may be collected at each station if *in situ* measurements of fluorescence are not practicable due to sea conditions or other logistical or environmental constraints. Water samples collected for fluorescence monitoring shall be analyzed for fluorescence using an onboard field spectrofluorometer(s) operating at excitation wavelengths of 280 nm, 340 nm and 445 nm, and calibrated to the manufacturers' operating procedure. If it is determined that onboard spectrofluorometer analyses cannot be properly conducted, then samples shall be preserved with 0.02 ml of 10% hydrochloric acid (HCl) and brought to shore to be analyzed at a fixed laboratory where a scanning spectrofluorometer is set up. For laboratory analyses, waters samples shall be collected at each station for chemical and ecotoxicity (i.e., bioassay) analyses.

3.2.5.1 Water Samples for Fluorescence Monitoring

Fluorescence monitoring water samples shall be collected only if *in situ* measurements of fluorescence are not collected. Two samples from each station shall be collected. One sample shall be collected at 1 m depth; the second sample shall be collected at 2 m depth.

Water samples shall be collected using a stainless steel Kemmerer or rosette (Niskin bottle) type water sampler. Once on location, and outside influences such as propeller wash have cleared the sampling area, the Kemmerer bottle will be set to sample. To set the Kemmerer, gently pull the two end caps until the triggering mechanism is engaged and locked. To ensure the mechanism is locked hold the Kemmerer upright supporting the weight by the connected graduated line. If the Kemmerer bottle closes repeat the setting process. The open sampler is lowered on a graduated

line to the desired depth which assures complete flushing of the bottle as it is lowered. When the Kemmerer reaches the desired sampling depth a messenger that is connected to the graduated line is sent down. This messenger triggers the locking mechanism to release, and both ends of the bottle are closed. The undisturbed sample is brought to the surface by retrieving the graduated line. Samples can be drawn off by means of a drain in the lower stopper of the Kemmerer.

Samples shall be collected into the cuvette provided with the field fluoremeter or equivalent. Operation of the field fluoremeter shall be conducted according to the standard operating procedure provided by the manufacturer.

3.2.5.2 Laboratory Samples

Two samples from each station shall be collected. One sample shall be collected at 2 m depth; the second sample shall be collected at 10 m depth. Two triplicate samples shall be collected at each location.

Water samples for laboratory analyses shall be collected utilizing the same methods employed for fluorescence analyses.

Field notes shall be recorded to document the weather conditions (e.g., presents of clouds and haze). Stationary measurements shall be taken at the location of the nearshore water sample.

3.2.6 Quality Assurance/Quality Control Samples

EPA and EPA contractor personnel shall collect blind field duplicate/triplicate samples of water and equipment rinsate blanks during the sampling effort. Quality assurance/quality control (QA/QC) samples shall be collected according to the following:

- Blind field duplicate samples will be collected during sampling activities at locations selected by the EPA. The data obtained from these samples will be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. Blind field duplicate samples will be collected at the rate of one duplicate sample for every 10 samples collected or as directed by the EPA.
- Equipment rinsate blanks will be prepared by pouring laboratory grade deionized water over nondisposable sampling equipment after it has been decontaminated and collecting the rinse water in sample containers for analyses. These samples will be prepared to demonstrate that the equipment decontamination procedures for the sampling equipment were performed ef-

fectively. The equipment rinsate blanks will be prepared each day that nondisposable sampling equipment is used or as directed by the EPA.

- Sequential replicates are samples that are collected consecutively instead of simultaneously. Sequential replicates are used to assess variability among samples resulting from collection, processing, shipping, and laboratory procedures conducted at different sampling times. The sequential replicate can be designed to assess sample variability from inhomogeneities in the system being sampled by spacing samples over short or long periods. If needed, the collection of sequential replicates will be approved by the EPA.

- Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected as part of laboratory requirements during sampling activities at locations selected by the field personnel. The data obtained from these samples will be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. Efforts will be made to collect MS/MSD samples in locations where there is visual evidence of contamination or where contamination is suspected. The collection of MS/MSD samples shall be approved by the EPA.

- Temperature blanks shall be prepared in the field and shall consist of one 40-milliliter glass sample container with Teflon-lined septum cap. The temperature blank shall be packaged along with the field samples in the shipping cooler and will represent the temperature of the incoming cooler upon receipt at the laboratory. Use of these samples within a shipping container enables the laboratory to assess the temperature of the shipment without disturbing any of the field samples.

The EPA and EPA contractor personnel will be responsible for QA/QC of the field investigation activities. Laboratories utilized during the field activities will be responsible for QA/QC related to the analytical procedures including the analysis of MS/MSD spike duplicates.

- Matrix spike/matrix spike duplicate (MS/MSD) samples shall be specified as part of laboratory requirements. Data obtained from these samples shall be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. Efforts shall be made to collect MS/MSD samples in locations where there is visual evidence of contamination or where contamination is suspected. The collection of MS/MSD samples shall be approved by the EPA.

All data will be validated and approved by EPA.

3.3 SAMPLE MANAGEMENT

Sample handling, nomenclature and container/equipment decontamination procedures are discussed in the following subsections.

3.3.1 Sample Handling Procedures

Water samples will be collected using equipment and procedures appropriate to the matrix, parameters, and sampling objectives. The volume of the sample collected will be sufficient to perform the analysis requested. Samples will be stored in the proper types of containers and preserved in a manner for the analysis to be performed per laboratory guidelines. Personnel responsible for sampling will change gloves between each sample collection/handling activity.

The sample containers will be handled using gloves appropriate for the hazards involved with handling of petroleum spill related samples (e.g., nitrile). The gloves serve two purposes, (1) personnel protection, and (2) prevention of sample cross-contamination. The gloves shall be replaced at a minimum between each sample collected or as frequently as needed.

3.3.2 Sample Nomenclature

Sample identification involves the assignment of sample location numbers and sample depth indicators to all samples collected during the sampling activity. The EPA will specify the sample location number and depth of the samples in the field. Sampling personnel shall record this information using a permanent marker on a label applied to the side of the container.

For the purposes of the activity, each sample will receive an individual identification number consisting of a four-digit number (ex. SW01). This four-digit number will be followed by a two digit number which will be used to identify the sample depth as follows: 1 meter below surface (01), 10 meters below surface (10). A QC Code for the type of sample is added to designate a sample as normal (11), duplicate (12), or rinsate (43).

An example, Sample ID is: SW01-01-11. This number corresponds to a normal subsurface water sample collected at a depth of 1 meter below surface from location SW01.

Blind field duplicate samples will be identified in the same manner as the sample locations and will also follow in sequential order. These samples will be given a unique sample number so as not to be obvious to the laboratory.

3.3.3 Sample Container and Equipment Decontamination

Each sample shall be collected with clean decontaminated equipment. Equipment decontamination will be required to prevent contamination of clean areas and cross-contamination of samples and to maintain the health and safety of field personnel. Decontamination of all sampling equipment will occur prior to sampling and between each sample location. Decontaminated sampling equipment and sample containers will be maintained in a clean, segregated area. Appropriate equipment decontamination procedures for field sampling equipment will be followed according to applicable EPA, and EPA contractors' SOPs.

Equipment decontamination will be completed in the following steps:

- Tap water and Alconox Luminox® rinse with soft scrub brush
- Deionized water rinse, three times

Personnel decontamination procedures will be described in the site-specific HASP (Section 3.1.2).

3.4 SAMPLE PRESERVATION AND HOLD TIMES

EPA and EPA contractor personnel will obtain and use precleaned sample containers for water samples collected during the sampling effort. The sample containers will be certified clean, and documentation of this will be required with each bottle lot. Laboratory samples will be stored in coolers with ice until they are submitted for analysis.

EPA will request expedited turnaround time for water analytical results unless otherwise advised based on discussions with the laboratory. Turnaround time is initiated when the samples are received at the laboratory and continues until the analytical results are made available to EPA. EPA and EPA contractor personnel will also ensure that the maximum hold time, initiated when the samples are collected in the field, and continues until the samples are analyzed, are not exceeded. Samples that have been analyzed will be disposed by the designated laboratory in accordance with the laboratory SOPs.

4. ANALYTICAL AND LABORATORY APPROACH

Information regarding analytical methods and data validation procedures is discussed in the following sections.

4.1 ANALYTICAL METHODS

After samples are received by the laboratory, samples will be prepared and analyzed in accordance with the EPA SW-846 or appropriate methods. Laboratory turnaround time for samples is 24 hours from receipt of samples by the laboratory.

Deliverables will include preliminary data via email in PDF format and an Electronic Data Deliverable (EDD) in the Microsoft Excel format.

4.1.1 Chemistry Analytical Methods

Information regarding analytical methods, sample containers, preservation and hold times is included in Table 4-1. Appendix D contains the screening levels for water. EPA uses screening levels for an initial comparison of analytical data generated from a sample. Screening levels use conservative assumptions regarding exposure and toxicity, and are used as a tool to indicate whether or not further evaluation is warranted. Exceeding a screening level is not a trigger for action.

The following are potential EPA analytical laboratories for the water and sediment sampling:

- Houston Laboratory
  6310 Rothway Street
  Houston, Texas 77040
  713.690.4444
  Contact: Lab Manager

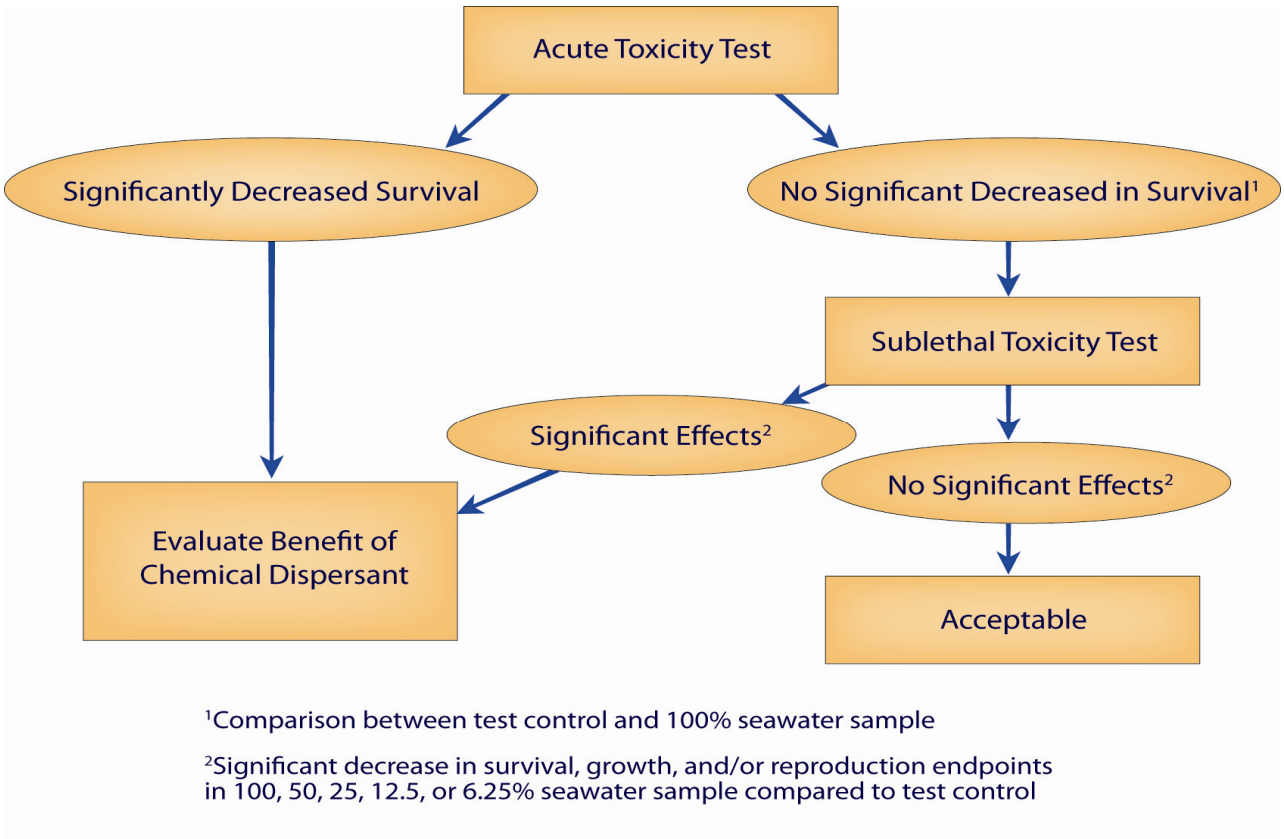
EPA analytical capabilities may be supplemented by commercial laboratories.

4.1.2 Ecotoxicity Methods

Ecotoxicity will be assessed at nearshore and shoreline areas using a short-term chronic toxicity tests. Toxicity testing will targeted to nearshore and shoreline locations likely to have oil and/or dispersant contamination (NOAA trajectory modeling). The toxicity tests shall have a control (dilution water; see test manual), reference samples collected from non-impacted areas (i.e., an area that appears free from visible oil contamination or detectable oil related constituents) and from areas likely to have oil and dispersant contamination. A summary of information regarding analytical methods, sample containers, preservation and hold times is included in Table 4-1. The evaluation criteria for the toxicity analyses are shown in the Figure 4-1.

Figure 4-1

Toxicity Test



4.1.2.1 Short-term Chronic Toxicity Tests

Short term chronic toxicity tests shall be conducted during nearshore activities to provide an assessment of water column toxicity. Short-term chronic toxicity assays shall be performed on the inland silverside fish, *Menidia beryllina*, the mysid shrimp, *Americamysis bahia* (formerly identified as *Mysidopsis bahia*), and the sea urchin, *Arbacia punctulata* and/or the eastern oyster, *Crassostrea virginica*. Toxicity tests using the inland silverside fish and the mysid shrimp will be initiated first and the sea urchin and/or eastern oyster will be added later. Test procedures shall be performed in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (EPA 2002b), Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms (EPA 2002c), ASTM Method E724-98 (2004), ASTM Method E1563-98 (2009), and Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA, 1995). A summary of test conditions and measurement endpoints proposed for the short-term chronic tests are presented in Tables 4-2 (*A. bahia*), and 4-3 (*M. beryllina*). In addition, rapid acute toxicity (i.e., survival) will be evaluated daily. Each batch of test organisms shall be evaluated in reference toxicant tests and results shall be compared with historical control charts to establish test organism sensitivity.

4.1.2.2 Collection of Samples Specific to Toxicity Tests

For each toxicity test conducted, samples shall be collected from the 100% water sample at test initiation (1 sample for all tests initiated concurrently) and at test termination (1 sample from each test conducted) to detect any loss of oil constituents (e.g., adhesion to carboy) during shipment. Confirmatory chemical analyses shall include PAHs, TPH, fluorometric analyses, SVOCs, and alkyl-PAHs. Total and dissolved metals also will be analyzed for aid in interpretation of toxicity test results.

4.1.2.3 Evaluation Criteria for Ecotoxicity Assessment

If there are no significant differences in the ecotoxicity test results (survival, growth, and reproduction endpoints) between the control and the highest treatments (100% water sample), the evaluation will be a determination of acceptable risk to aquatic life. If toxicity is observed in 100% water sample or its dilutions, then EPA and NOAA will interpret the adverse results of the toxicity tests in conjunction with the benefits of dispersing the oil to inform ongoing determina-

tions of utility of continued application of dispersants. Two repeated rounds of acceptable toxicity tests result (all endpoints) will elevate the biological monitoring to the EPA Regional Response Team (RRT) for potential discontinuation.

4.2 DATA VALIDATION

During shoreline and nearshore sample activities, EPA will perform a Level 2 data validation on the analytical data generated by the laboratory using EPA-approved validation procedures in accordance with the EPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review. A summary of the data validation findings will be presented in Data Validation Summary Reports as part of the final report. EPA will evaluate the following applicable parameters to verify that the analytical data is within acceptable QA/QC tolerances:

- The completeness of the laboratory reports, verifying that required components of the report are present and that the samples indicated on the accompanying chain-of-custody are addressed in the report.
- The calibration and tuning records for the laboratory instruments used for the sample analyses.
- The results of internal standards analyses.
- The results of laboratory blank analyses.
- The results of laboratory control sample (LCS) analyses.
- The results of matrix spike/matrix spike duplicate (MS/MSD) analyses.
- The results of surrogate recovery analyses.
- Compound identification and quantification accuracy.
- Laboratory precision, by reviewing the results for blind field duplicates.

Variances from the QA/QC objectives will be addressed as part of the Data Validation Summary Reports.

Table 4-1

Analytical Methods, Container, Preservation and Holding Times
BP Spill, Gulf Coast

Name	Analytical Methods	Matrix	Container	Preservation	Minimum Volume or Weight	Maximum Holding Time
VOCs	SW846 8260B	Water	Glass (Teflon-lined septum for water)	4°C, HCl to pH<2	4x40 ml vials	14 days (7 days if unpreserved by acid
SVOCs	SW846 8270C	Water	Amber Glass, (Teflon- lined for water)	4°C	2 x 1 L	7 days extract (water), 40 days analysis
Alkyl PAHs	ASTM D7363-07	Water	Amber Glass, (Teflon- lined for water)	4°C	2 x 1 L	7 days extract (water), 40 days analysis
TPH GRO	SW846 8015B	Water	Glass (Teflon-lined septum for water)	4°C, HCl to pH<2	4x40 ml vials	14 days (7 days if unpreserved by acid
TPH DRO and ORO	SW846 8015B	Water	Amber Glass, (Teflon- lined for water)	4°C	4x40 ml vials	7 days extract (water), 40 days analysis
Metals (including mercury) (total and dissolved)	SW846 6010B and SW846 7470A	Water	Polyethylene	HNO_3 to pH<2 4°C	500 ml	28 days for mercury and 180 days all other metals
Dispersant chemicals	Aqueous direct injection GC/MS	Water	Amber Glass, (Teflon- lined for water)	4°C	1 L	To Be Determined
COD	Standard Methods 410.3	Water	Glass	H2SO4, 4°C	50 ml	28 days
BOD	Standard Method 5210 B (5-day BOD Test)	Water	Glass	4°C	1 L	48 hours
DO, membrane probe[1] (or Winkler method)	EPA Method 360.1 (or 360.2)	Water	1 x 250 ml HDPE Bottle[3]	4°C	300 ml	Analysis in 4 to 8 hrs[2]

Name	Analytical Methods	Matrix	Container	Preservation	Minimum Volume or Weight	Maximum Holding Time
Total organic carbon (TOC)	SW-846 Method 9060/SM5310	Water	Glass	4°C, HCl to pH<2, protected from sunlight	1 L	
Americamysis bahia Chronic Toxicity	EPA-821-R-02-014, Test Method 1007.0	Water	[1]Cubitainer, precleaned LDPE	Ice, ≤ 4°C, in dark environment	[2] 16 L	36 hours
Menidia beryllina Chronic Toxicity	EPA-821-R-02-014, Test Method 1006.0	Water	[1]Cubitainer, precleaned LDPE	Ice, ≤ 4°C, in dark environment	[2] 16 L	36 hours

[1]Preferred over glass containers for safety during shipment

[2]2-20L cubitainers + 1-5L cubitainer

Table 4-2

Test Conditions and Measurement Endpoints: *A. bahia* Chronic Toxicity

Test Species		*Americamysis bahia*
Test Protocol		EPA-821-R-02-014 (EPA 2002)
Test Type / Duration		Static-renewal / 7 days
Water Quality Parameters	**Temperature[1]**	26 ± 1°C
	Dissolved Oxygen[1]	≥4.0 mg/L
	Salinity[1]	5-32 ppt ± 2 ppt
	pH[1]	Monitor for pH drift
	Total ammonia[2]	96-Hour NOEC (24.7 mg/L)
	Unionized ammonia[2]	96-Hour NOEC (1.01 mg/L)
Photoperiod/light intensity		16h light, 8h dark (50-100 ft-c)
Test chamber size		500 ml
Test solution volume		250 ml
Renewal of test solution		Daily
Age of test organisms		7 days
Treatments		Control, reference, 6.25, 12.5, 25, 50 and 100%
Replicates/treatment		8
Organisms/replicate		5
Feeding		75 *Artemia nauplii* per mysid, twice per day
Control water		Natural seawater; 3µm filtered, UV sterilized
Test salinity		20-30 ppt ± 2 ppt
Endpoints:		Survival (daily); growth (7 days); egg development at test termination if ≥ 50% of females in controls produce eggs
Test acceptability		≥ 80% survival in controls; average dry weight 0.20 mg or greater in controls
Reference toxicant / duration / endpoint		Copper sulfate / 7-Day / LC50; EC50
Reference toxicant concentrations		Control, 62.5, 125, 250, 500, and 1000 ppb

[1] Measured daily

[2] Measured at beginning and end of test

Table 4-3

Test Conditions and Measurement Endpoints: *M. beryllina* Chronic Toxicity

Test Species		*Menidia beryllina*
Test Protocol		EPA-821-R-02-014 (EPA 2002)
Test Duration		7 days
Water Quality Parameters	**Temperature**[1]	25 ± 1°C
	Dissolved Oxygen[1]	≥4.0 mg/L
	Salinity[1]	5-32 ppt ± 2 ppt
	pH[1]	Monitor for pH drift
	Total ammonia[2]	96-Hour NOEC (4.53 mg/L)
	Unionized ammonia[2]	96-Hour NOEC (0.3 mg/L)
Photoperiod/light intensity		16h light, 8h dark (50-100 ft-c)
Test chamber size		1000 ml
Test solution volume		500 ml
Renewal of test solution		Daily
Age of test organisms		7-11 days (within 24h range in age)
Treatments		Control, reference, 6.25, 12.5, 25, 50 and 100%
Replicates/treatment		4
Organisms/replicate		10
Feeding		Approx. 1000 *Artemia* nauplii per replicate on days 0-2; 1500 *Artemia* nauplii per replicate on days 3-6.
Control water		Natural seawater; 3µm filtered, UV sterilized
Test observations		Survival (daily); growth after 7 days
Test acceptability		≥ 80% survival in controls; ≥ 0.43 mg average dry weight per surviving control larvae
Reference toxicant / duration / endpoint		Copper sulfate / 7-Day/ LC50; EC50
Reference toxicant concentrations		Control, 25, 50, 100, 200, and 400 ppb

[1] Measured daily

[2] Measured at beginning and end of test

5. QUALITY ASSURANCE

Quality assurance will be conducted in accordance with EPA protocols. EPA and EPA contractor personnel will be assigned and will monitor work conducted throughout the entire project including reviewing interim report deliverables and field audits. The EPA and EPA contractor personnel will be responsible for QA/QC of the field sampling and monitoring activities. The designated laboratory(s) utilized during the investigation will be responsible for QA/QC related to the analytical work. EPA and EPA contractor personnel will also collect samples to verify that laboratory(s) QA/QC is consistent with the required standards and to validate the laboratory data received.

5.1 SAMPLE CUSTODY PROCEDURES

5.1.1 Chain-of-Custody (COC)

This section describes the program requirements for sample handling and COC procedures. Samples are considered to be in custody if they are: (1) in the custodian's possession or view, (2) retained in a secured place (under lock) with restricted access, or (3) placed in a secured container. The principal documents used to identify samples and to document possession are COC records, field log books, and field tracking forms. COC procedures will be used for all samples throughout the collection, transport, and analytical process, and for all data and data documentation, whether in hard copy or electronic format.

COC procedures will be initiated during sample collection. A COC record will be provided with each sample or sample group. Each person who has custody of the samples will sign the form and ensure that the samples are not left unattended unless properly secured. Minimum documentation of sample handling and custody will include the following:

- Sample identification
- Sample collection date and time
- Any special notations on sample characteristics
- Initials of the person collecting the sample
- Date the sample was sent to the laboratory
- Shipping company and waybill information

Upon filling one cooler with samples and prior to transferring custody, the cooler will be affixed with a custody seal to prevent any tampering of the samples during transport. Any transfer of

custody of the sample or cooler must be documented on the COC. The COC form will be signed by the person transferring custody of the samples. Each custody transfer will also include a copy of the COC for the field sampling team's files. The completed COC form will be placed in a sealable plastic envelope that will be attached to the ice chest containing the listed samples.

Upon receipt at the laboratory, the laboratory receiving personnel will follow their standard login sampling procedures outlined in the laboratory's approved quality assurance program plan. The field team or courier will also be provided a receipt of sample login and a copy of the COC for their records.

5.1.2 Sample Shipment

The samples will be preserved and packaged in coolers with ice according to appropriate sample packing guidelines. In general, the samples will be shipped via overnight carrier to the participating laboratories by either the United Parcel Service (UPS) or Federal Express (Fed Ex). The Department of Transportation (DOT) and International Air Transport Association (IATA) regulations governing environmental and hazardous sample packaging, labeling and sampling will be followed.

Prior to shipping, sample containers will be placed in sealable plastic bags and securely packed with bubble wrap or similar padding inside the cooler with ice. COC forms will be filled out (see Subsection 3.2.6), and the original signed COC forms will be inserted in a sealable plastic bag and placed inside the cooler. The cooler lids will be securely taped shut, a custody seal applied, and then delivered to shipping company, courier, or directly to the analytical laboratories.

EPA and EPA contractor personnel will prepare and complete chain-of-custody forms using the Scribe Environmental Sampling Data Management System (SCRIBE) for all samples sent to an EPA designated off-site laboratory. The COC procedures are documented and will be made available to all personnel involved with the sampling. A typical COC record will be completed each time a sample or group of samples is prepared for shipment to the laboratory. The record will repeat the information on each sample label and will serve as documentation of handling during shipment. A copy of this record will remain with the shipped samples at all times, and another copy will be retained by the member of the sampling team who originally relinquished

the samples. At the completion of the project, the data manager will export the SCRIBE COC documentation to the Analytical Service Tracking System (ANSETS) database.

Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

Samples will be accompanied by the COC record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. This custody records document transfer of sample custody from the sampler to another person or to the laboratory.

Samples will be properly packed for shipment and dispatched to the appropriate laboratory for analysis with separate, signed custody records enclosed in each sample box or cooler. Sample shipping containers will be custody-sealed for shipment to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and stuck to seal to ensure that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape.

If sent by common carrier, a bill of lading or airbill will be used. Bill of lading and airbill receipts will be retained as part of the permanent documentation of sample shipping and transfer.

5.2 PROJECT DOCUMENTATION

Field observations and any changes to the sampling performed will be recorded legibly and in ink and by entry into field logbooks, Response Manager, or SCRIBE. Response Manager is the Enterprise Data Collection System designed to provide near real-time access to non-analytical data normally collected in logbooks. Response Manager provides a standard data collection interface for modules of data normally collected by EPA field personnel while on-site. These modules fall into two basic categories for Response and Removal. The modules include Emergency Response, Reconnaissance, Facility Assessment, Shipping, Containers, Materials, Calls, HHW, and General/Site Specific data. The system provides users with a standard template for laptop/desktop/tablet PCs that will synchronize to the secure web interface using merge replication technology to provide access to field collected data via on the RRC-EDMS EPA Web Hub. Response Manager also includes a PDA application that provides some of the standard data entry

templates from Response Manager to users for field data entry. Response Manager also includes an integrated GPS unit with the secure PDA application, and the coordinates collected in Response Manager are automatically mapped on the RRC-EDMS interactive mapping site. GIS personnel can then access this data to provide comprehensive site maps for decision-making support.

Response Manager also includes an Analytical Module that is designed to give SCRIBE users the ability to synchronize the SCRIBE field data to the RRC-EDMS Web Hub. This allows analytical data managers and data validators access to data to perform reviews from anywhere with an Internet connection. The Analytical Module is designed to take the analytical data entered into EPA SCRIBE software and make it available for multiple users to access on one site. EPA personnel will utilize SCRIBE for data entry on-site and will upload to the Response Manager Analytical module.

5.2.1 Field Documentation

The following field documentation will be maintained as described below.

Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. Logbook entries will be signed by the individuals making them. Entries should include, at a minimum, the following:

Site name and project number.
Names of personnel on-site.
Dates and times of all entries.
Description of all site activities, including site entry and exit times.
Noteworthy events and discussions.
Weather conditions.
Site observations.
Identification and description of samples and locations.
Subcontractor information and names of on-site personnel.
Dates and times of sample collections and chain-of-custody information.
Records of photographs.
Calibration results.
Deviations from the prescribed methods and reason(s).

Sample Labels

Sample labels will be securely affixed to the sample container. The labels will clearly identify the particular sample and include the following information:

Site name and project number.
Date and time the sample was collected.
Sample preservation method.
Analysis requested.
Sampling location.

Chain-of-Custody Record

A chain-of-custody will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept by each individual who has signed it.

Custody Seal

Custody seals demonstrate that a sample container has not been tampered with or opened. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

Photographic Documentation

EPA and EPA contractors will take photographs to document site conditions and activities. Photographs should be taken with either a film camera or digital camera capable of recording the date on the image. Each photograph will be recorded in the logbook and within Response Manager with the location of the photographer, direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Where appropriate, the photograph location, direction, and subject will also be shown on a site sketch and recorded within Response Manager.

5.2.2 Report Preparation

At the completion of the project, EPA will review and validate laboratory data and prepare a draft report of field activities and analytical results for EPA review. Draft deliverable documents will be uploaded to the EPA TeamLink® website for EPA review and comment.

5.2.3 Response Manager

EPA and EPA contractors will use the Response Manager module located on the EPA Web Hub, https://solutions.westonproject.net/epawebhub/, to collect and organize the data collected from project activities. The information to be included encompasses some or all of the following depending on the specific project needs:

- General Module – Site specific data including location and type of site. It also includes an area for key site locations including geo-spatial data associated with the key site locations.
- Emergency Response Module – includes the following sub-modules: Basic Info, HAZMAT, Release, Time Line Log, Incident Zones, Photos, Sensitive Receptors, Evacuations, Source, Cause, and Weather.
- Reconnaissance Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for targeted reconnaissance efforts. Typically the data in this module is associated with ESF-10 deployments and the clean-up of orphaned containers and hazardous debris, but the module can be utilized for any and all reconnaissance activities.
- Facility Assessment Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for assessments of structures. This is typically utilized for EPA regulated program facilities during an ESF-10 deployment of resources. This module can be utilized to track the assessment of any facilities including multiple assessments of the fixed facilities.
- Shipping Module – provides standard templates for creating a cradle-to-grave record of waste shipments from the site until they are recycled or destroyed. This includes the ability to capture manifests and manifest line items and to upload photos/original documents to support the records.
- Container Module – provides standard templates for cataloguing containers including HAZCAT and Layer information in each container. The module also allows for the tracking of which containers are bulked.
- Properties Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for collection of property data including access agreements and assessments of the property and current status of property regarding the site removal action.
- Materials Module – provides standard templates for tracking materials that are brought onsite or that are removed from the site.
- Daily Reports – provides standard templates for tracking daily site activities, daily site personnel, and daily site notes for reporting back to the EPA in a Pollution Report (POLREP) or Situation Report (SITREP).

- HHW Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for tracking the amount of HHW collected at individual collection stations by HHW type.
- Data Files – data files can be uploaded in the photo-module section and be associated with individual records or with the site in general. The meta data associated with that data file can be filled in using the photo log fields.

The data stored in the Response Manager database can be viewed and edited by any individual with access rights to those functions. At anytime deemed necessary, POLREP and/or SITREPs can be generated by exporting the data out of Response Manager into Microsoft Excel/Word. The database is stored on a secure server and backed up regularly. The Data Management Plan for Regions 4 and 6 is presented in Appendix E.

6. REFERENCES

ASTM. 2004. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Mollusks. Annual Book of ASTM Standards, Vol. 11.06. E724-98(2004). American Society for Testing and Materials, Philadelphia, PA.

ASTM (American Society for Testing and Materials). 2009. E 1563-98 (Reapproved 2004) *Standard Guide for Conducting Static Acute Toxicity Tests with Echinoid Embryos*. In Annual Book of Standards, Vol. 11.06. West Conshohocken, PA.

EPA (U.S. Environmental Protection Agency). 1995. *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms*. EPA/600/R-95/136. USEPA Office of Research and Development. August.

EPA (U.S. Environmental Protection Agency). 2002a. Guidance for Quality Assurance Project Plans. EPA QA/G-5. EPA/240/R-02/009. Office of Environmental Information. December.

EPA (U.S. Environmental Protection Agency). 2002b. *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*. EPA-821-R-02-012. USEPA Office of Water. October.

EPA (U.S. Environmental Protection Agency). 2002c. *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms*. EPA-821-R-02-014. USEPA Office of Water. October.