QUALITY ASSURANCE SAMPLING PLAN

FOR

MISSISSIPPI CANYON OIL SPILL

Prepared for
U.S. Environmental Protection Agency Region 6

Prepared in conjunction with:
EPA Region 6
EPA Region 4
EPA Environmental Response Team
EPA ASPECT
CTEH

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1. INTRODUCTION

The Superfund Technical Assessment and Response Team (START) contractor has been tasked by the U.S. Environmental Protection Agency (EPA) Region 6 Prevention and Response Branch (PRB) to conduct air, water and sediment sampling and air and water monitoring for the Mississippi Canyon Oil Spill also known as Deepwater Horizon Oil Spill off the coast of Louisiana near Venice, Plaquemines Parish, Louisiana. Region 4 has requested that state and local air monitoring agencies located near the Gulf of Mexico coastline in Florida, Alabama and Mississippi adjust their sampling schedules for this event. EPA Region 6, EPA Region 4, START, Environmental Response Team (ERT)/Scientific, Engineering, Response and Analytical Services (SERAS), Center for Toxicology, Environmental Health (CTEH) and ASPECT have prepared this Quality Assurance Sampling Plan (QASP) to describe the technical scope of work to be completed as part of this Emergency Response. In the event of future burns and depending on where the oil comes ashore an additional air monitoring plan will need to be generated to include sites in Region 4.

Region 6 has requested the ASPECT airborne monitoring system be prepared to deploy to collect data regarding emissions and release tracking. The goal of this mission is to collect data over the source area (sunken rig) to establish a chemical fingerprint of the release source, collect data over the site of an in-situ burn of contained oil to provide information on burn effectiveness, and a higher altitude photo recon to cover a broader area of the oil release.

The ASPECT sensor suite is mounted in a twin engine aircraft and uses the principles of remote passive infrared detection to image, map, identify, and quantify chemical vapors and plumes. A wide-area (one half mile wide) infrared imager coupled with a high speed spectrometer permits plume measurements to be made at a rate of about two square miles per minute. The ASPECT Operations and Sampling Plan can be found in Appendix A.

In addition to chemical detection, radiological data is collected using a high resolution multi-crystal gamma-ray spectrometer. Supporting data includes a high resolution aerial digital photography concurrently collected with either chemical or radiological data and forms the basis for a geographical information system data cube. Efficient mission execution requires that data is processed on-board the aircraft for subsequent transmission or hand-off to the On-Scene Coordinator (OSC). Airborne situational data is ready for dissemination using a satellite data system in less than 15 minutes after collection.

EPA Headquarters has requested the presence of the Trace Atmospheric Gas Analyzer (TAGA) Mobile Laboratory to provide real-time monitoring and analyses capabilities for volatile organic compounds (VOCs) during both upwind and downwind situations as the weather and plume conditions change. Mobile monitoring using a TAGA mass spectrometer/mass spectrometer (MS/MS) system will be conducted in the direct air monitoring mode for the selected compounds of interest. A gas chromatograph/mass spectrometer (GC/MS) housed in the TAGA Mobile Laboratory will provide quick turnaround of samples collected in Tedlar bags for VOCs.

Region 4 EPA will coordinate with the Unified Command, Region 6, the states of Alabama (AL), Mississippi (MS) and Florida (FL), and contractor assets to conduct ambient air monitoring and air sampling for particulate matter with an aerometric diameter of 2.5 microns and smaller ($PM_{2.5}$) and VOCs in the Region 4 Gulf Coast area. The Gulf Coast of Region 4 presently contains a robust fixed ambient air monitoring network of sites which are operated and maintained by state and local operators from the respective states. These monitoring sites monitor for a large array of ambient pollutants including $PM_{2.5}$. The state monitoring sites from the Louisiana border to Panama City operating filter based $PM_{2.5}$ samplers will sample on a 1 in 3 day sampling schedule. As conditions warrant, the $PM_{2.5}$ filter based sampling may be increased to every day sampling. Five of these existing sites will be augmented with

additional monitoring equipment including continuous $PM_{2.5}$ samplers and VOC samplers to provide continuous $PM_{2.5}$ data and VOC data. The sites that will be augmented include: Waveland, MS; Gulfport, MS; Fairhope, AL; Pensacola, FL; and Panama City, FL. The augmentation will include continuous $PM_{2.5}$ monitors and VOC samplers located at each site. In addition to the ambient monitoring, VOC grab samples will be conducted as requested or necessary according to meteorological patterns.

The START field team will mobilize the equipment required for the emergency response from the EPA warehouses as necessary. If possible, START will use government furnished property.

EPA Region 4 has a wide array of programmatic and technical resources to serve the air monitoring study. ERRB is providing equipment, technical assistance contractors, field teams and will coordinate all resources through the REOC to support the response needs as requested by the Unified Command. APTMD will provide program management to coordinate and guide the study. SESD will provide equipment, technical assistance, and field crews to upgrade and maintain the fixed monitoring sites in order to meet the monitoring objectives. The state agencies and/or ERT contractors will likely provide support in the operation of the monitoring network in the long term. The SESD Laboratory will provide PM2.5 and VOC analysis for a short time during implementation; for longer term support, contract lab service will be required for PM2.5 and VOC analyses. The Environmental Services Assistance Team (ESAT) contract can provide experienced air monitoring staff to help collect samples, operate the monitoring equipment, and maintain the fixed station network.

1.1 PROJECT OBJECTIVES

1.1.1 Monitoring and Sampling Strategies

EPA Region 6. EPA Region 6 will assess the impacts of the Mississippi Canyon Oil Spill on the air and water quality of far southeast Louisiana, specifically the area around Venice, Duvic and Fort Jackson, Plaquemines Parish and an area between Alluvial City and Chalmette in St. Bernard Parish, Louisiana. EPA will utilize PQ200 air samplers, DataRAM DR-4000 particulate monitors, Tedlar bags for VOC grab samples and AreaRAE air monitors. Additionally, SUMMA® canisters with flow controllers will be used to sample for volatile organic compounds. Each monitoring instrument will be set up to log data. The SUMMA® canisters will be set up to collect a sample every 8 hours. The PQ200 air samplers will be set up to collect one sample every 24 hours. EPA will utilize multi-parameter water quality instruments, and water and sediment sampling equipment for water sampling and monitoring.

Air samples will be collected by the PQ200 and analyzed for concentrations of particulates 2.5 microns and smaller. Grab samples for VOCs will be collected using Tedlar bags and low flow pumps and analyzed using EPA/ERT TAGA bus. VOC 8-hour samples will be collected using the SUMMA® canister and analyzed by method TO-15A. DataRAMs will be used in real-time monitoring of the PM-2.5 particulate levels and AreaRAEs to monitor for VOCs.

EPA Region 4. EPA Region 4 will conduct monitoring at several locations using several methods to measure PM and VOCs that are expected to be present as a result of the burn. Affected Region 4 areas where impact is possible include the states of Mississippi, Alabama, and Florida.

Region 4 EPA will coordinate with the Unified Command, Region 6, the states of Alabama, Mississippi and Florida, and contractor assets to conduct ambient air monitoring and air sampling for $PM_{2.5}$ and VOCs in the Region 4 Gulf Coast area. The Gulf Coast of Region 4 presently contains a robust fixed ambient air monitoring network of sites which are operated and maintained by state and local operators from the respective states. These monitoring sites monitor for a large array of ambient pollutants including PM. The state monitoring sites from the Louisiana border to Panama City operating filter based

$PM_{2.5}$ samplers will sample on a 1 in 3 day sampling schedule. As conditions warrant, the $PM_{2.5}$ filter based sampling may be increased to every day sampling. Five of these existing sites will be augmented with additional monitoring equipment including continuous $PM_{2.5}$ samplers and VOC samplers to provide continuous PM data and VOC data. The sites that will be augmented include: Waveland, MS; Gulfport, MS; Fairhope, AL; Pensacola, FL; and Panama City, FL. The augmentation will include continuous $PM_{2.5}$ monitors and VOC samplers located at each site. In addition to the ambient monitoring, VOC grab samples will be conducted as requested or necessary according to meteorological patterns.

In addition to the monitoring sites in direct vicinity of the spill, two National Air Toxics Trends Sites (NATTS) stations are located in the Tampa Bay area. One is located in Pinellas County, and the other is located in Hillsborough County both monitoring on a 1 in 3 day schedule. These two sites operate an array of air toxics monitors including VOCs and have laboratory capability for analysis of several air toxics components. These sites could be requested to provide additional monitoring data by increasing the sampling frequency.

ERT/SERAS. Air monitoring will be conducted along the coastlines of EPA Regions 4 and 6. The TAGA Mobile Laboratories will provide mobile monitoring for the selected compounds of interest (i.e., benzene, toluene, ethylbenzene and xylenes). ERT/SERAS will also provide quick turnaround analysis of selected compounds for samples collected in Tedlar bags.

Center for Toxicology and Environmental Health, L.L.C. CTEH will conduct integrated air sampling in representative locations around the perimeter of the spill area for VOCs and semivolatile organic compounds (SVOCs). The air monitoring locations have not yet been selected and will be supplemented with a map showing sampling locations. In addition to air sampling, air monitoring is being conducted by roaming vehicles throughout the community. The roaming vehicle has real-time air monitoring equipment for VOCs, lower explosive limit (LEL), benzene, and hydrogen sulfide (H_2S). The roaming vehicle in the community operates 24 hours each day. Additionally, real-time air monitoring is being conducted on the water in the area of the mitigation activities to help ensure the health and safety of oil-spill response personnel. Air monitoring will be conducted at selected locations that will address potential off-site receptors, accounting for possible changes in wind-direction. In addition, air monitoring will be conducted as needed to respond to potential concerns raised.

CTEH will perform real-time air monitoring for VOCs during oil cleanup activities. Real-time air monitoring will be performed using the AreaRAE, MultiRAE Plus, UltraRAE, and Gastec colorimetric detector tubes. The AreaRAE and MultiRAE Plus will be set up to monitor for VOCs with a photo-ionization detector (PID) and H_2S using an electrochemical sensor. Additionally, real-time air monitoring will be performed for benzene using the UltraRAE benzene specific PID. Benzene is not anticipated as a significant constituent, however; concerns have been raised and monitoring is being conducted to address this concern. The PIDs will be used to detect volatile components of the crude oil. Detector tubes and the UltraRAE will be used for chemical specific analysis in the event that elevated VOCs are detected using a PID.

1.2 PROJECT TEAM

The Project Team will be divided into multiple locations and multiple teams based upon site conditions and operations. As the meteorological and operational situations change, sampling and monitoring teams and operations will adapt, based upon direction from the Unified Command. EPA OSCs and START from Region 6 will have responsibility for sampling and monitoring in Louisiana, and Texas if necessary. EPA OSCs and START from EPA Region 4 will have responsibility for sampling and monitoring of the plume in Mississippi, Alabama and Florida as necessary. EPA ERT members will assist EPA Region 6

and 4 with sampling and data collection and analysis as needed. EPA will coordinate with the Unified Command through EPA OSCs located in Houma, Louisiana and USCG Sector Mobile.

The ERT/SERAS project team will consist of four persons for each TAGA mobile laboratory (driver, TAGA Operator, GC/MS Operator and GIS Data Reduction Specialist) as well as an EPA/ERT member for each 12-hour shift. EPA/ERT members will assist EPA Regions 6 and 4 with sampling, data collection and analysis, as needed.

The EPA National Decontamination Team (NDT) will provide over-flight operations over the affected areas utilizing the ASPECT airborne monitoring system.

CTEH® responded in support of site operations for the MC 252 fire and oil release on Sunday, April 25, 2010. CTEH is providing air monitoring, air sampling, and toxicology support along the Gulf coast from Pensacola, Florida to Venice, Louisiana to address public health and worker health and safety concerns resulting from the crude oil spill.

2. SITE DESCRIPTION AND BACKGROUND

The Gulf of Mexico Transocean Oil 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 as wells as a release of diesel fuel caused by damage from the sinking of the Transocean Deepwater Horizon drill rig at BP Site Mississippi Canyon 252. The current spill is estimated to be approximately 80 miles east to west and 42 miles north to south in size. The spill is affected by wind and wave action, which is currently keeping the spill offshore, however, forecasted weather conditions in the coming days is predicted to push the spill towards the southeast Louisiana coastline. Through coordination with the United State Coast Guard, British Petroleum PLC (BP), the Responsible Party, through their Oil Spill Response Organization (OSRO) contractors and the USCG are planning to burn the oil in sections while weather conditions are approachable.

3. SAMPLING APPROACH AND PROCEDURES

Samples collected by START will be used to evaluate the nature of the contaminants present. EPA will conduct air monitoring and sampling along the Louisiana coastline as part of the in-situ burn process and resulting plume observation. EPA will collect water and sediment samples as necessary, including background water and sediment sampling around the Venice Louisiana area. Samples collected as part of this emergency response (ER) will be obtained in accordance with START Standard Operating Procedures.

3.1 OVERVIEW OF SAMPLING ACTIVITIES

START will conduct air sampling of $PM_{2.5}$ as well as VOCs. Air sampling will be conducted at three air monitoring locations in Plaquemines Parish and three locations in St. Bernard Parish. At each air monitoring location one BGI PQ200 air sampler collecting air samples for PM-2.5 and one SUMMA® canister collecting ambient air for VOC analysis will be sited. Tedlar bags will be used to collect grab samples for VOC analysis as necessary. Additionally, each air monitoring site will include one DataRAM DR-4000 to monitor the particulate levels and one AreaRAE PGM-5020 to collect readings for VOC using a 10.6 electron volt (eV) photoionization detector (PID) lamp. This plan will be amended to include sampling locations in EPA Region 6 as necessary. START will use EPA Scribe Environmental Sampling Data Management System (SCRIBE) software to manage sample data. Data will be managed according to the Data Management Plan developed for this response by the National Data Team (Appendix B).

3.1.1 Data Quality Objectives

The objective of air monitoring and sampling will be to confirm the presence of particulates (2.5 microns and smaller) and VOCs in air resulting from the off shore in-situ burn and from expected impacts with the oil spill coming on-shore.

The most likely constituents of any airborne plume from the oil would be the aromatic hydrocarbons. The Agency for Toxic Substances and Disease Registry (ATSDR) recommends the use of toluene as the surrogate for this class of chemicals. As an action level for considering protective measures at the point of exposure, ATSDR recommends the use of the Acute Exposure Guidance Level (AEGL) of 200 parts per million (ppm) for an 8-hour average. As a screening level for occupancy, ATSDR recommends the use of EPA's Reference Concentration (RfC) equivalent to 1 ppm. The RfC is based on a subchronic human occupational study that matches the projected exposure duration the best.

Saturated hydrocarbons are also present in the vapor phase. Given the characteristic of the crude oil (e.g., no polyaromatic hydrocarbons [PAHs], no paraffins), these would tend to be straight chain hydrocarbons. ATSDR recommends the use of normal Hexane as the surrogate for this fraction of the possible air contaminants. As an action level for considering protective measures, ATSDR recommends the use of the Department of Energy's Emergency Evaluation Level (TEEL-0) of 50 ppm for a 1-hour average. As a screening level for occupancy, ATSDR recommends the use of the Chronic Inhalation Minimum Risk level (MRL) of 0.6 ppm. The MRL is based on human occupational studies with an uncertainty factor of 100.

Given that the actual plume is likely to be a mixture, the most representative sampling method could be considered to be a broad spectrum real-time air monitoring device for total organic compounds. Given the nature of these instruments and the levels indicated above, ATSDR would consider a steady state

reading of 1 ppm above a control reading from an unaffected area to be protective of public health. A reading above 50 ppm would be indicative of the need for protective measures.

In the event that in-situ burning is implemented, ATSDR recommends the use of the action levels of PM2.5 and PM10 below the National Ambient Air Quality Standards (NAAQS) of 35 and 150 micrograms per meter cubed ($\mu g/m^3$), respectively, would be considered safe. Concentrations of $PM_{2.5}$ and particulate matter with an aerometric diameter of 10 microns and smaller (PM_{10}) approaching the Clean Air Act (CAA) Significant Harm Level of 350 and 600 $\mu g/m^3$, respectively, would warrant consideration of appropriate protective measures to reduce exposure. If the real-time air monitoring instruments for PM available on site can only detect PM_{10} particulates, ATSDR would consider their use in a survey mode and the use of only the PM_{10} action levels adequate in order to be able to prevent exposure.

3.1.2 Health and Safety Implementation

The monitoring will be conducted in accordance with the site-specific health and safety plan (HASP). START will conduct air monitoring in Level D personal protective equipment (PPE) as stated in the site HASP. The Field Safety Office (FSO) will be responsible for implementation of the HASP during the removal action. In accordance with the START general health and safety operating procedures, the START personnel will drive the route to the hospital specified in the HASP prior to initiating sampling activities. Personnel working over water will use United States Coast Guard (USCG) approved personal flotation devices and observe all safety instructions from the boat drivers.

SERAS will conduct air monitoring and VOC analyses in Level D PPE as stipulated in the SERAS site-specific HASP.

3.2 Sampling/Monitoring Approach

Air sampling and monitoring will be conducted in general accordance with the EPA guidelines and standard industry practices, included the DRAFT START Emergency Response Air QASP and with START Standard Operating Procedures (SOPs). The Region 4 samples will be collected following EPA Region 4 Science and Ecosystem Support Division (SESD) standard operating procedures.

In Region 6, a field communication protocol based upon VOC readings using the real-time data from a MultiRAE or AreaRAE PID will be implemented. START will collect Benzene or Toluene colorimetric tube samples for confirmatory air monitoring readings. This will occur when a total VOC reading of 10.0 ppm or higher is recorded. After positive confirmatory monitoring, Region 6 field teams will contact the field operations OSC to notify them of the elevated VOC monitoring reading, which will then be passed onto to EPA representatives at Unified Command.

All water and sediment samples will be collected in general accordance with the START SOPs 1002-01 for Surface Water Sample Collection and 1002-04 for Sediment Sampling as well as EPA Environmental Response Team SOPs 2013 (surface water sampling), 2016 (sediment sampling) and the Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analysis: Technical Manual. The specific sampling procedures are described below.

3.2.1 Continuous PM2.5 Monitoring (Region 4)

EPA will monitor PM2.5 concentrations at the selected 4 fixed sites using continuous $PM_{2.5}$ samplers. The samplers used will be MetOne E-BAM PM samplers and the MetOne BAM 1020 which use beta attenuation technology to measure PM concentrations on a continuous basis. Three of the selected fixed

sites, Gulfport, MS, Panama City, FL and Pensacola, FL already contain continuous PM samplers whose data can be used for monitoring the burn event. These continuous samplers have a distinct advantage over filter based methods in that the data can be transmitted directly to a central location via telephone line or satellite link. The selected sites are part of the regular ambient air monitoring network and have been approved by EPA Region 4 as meeting 40 CFR Part 58, Appendix E siting criteria for ambient air monitoring. Additional portable PM2.5 air monitors may be used to identify plumes in real-time to identify pollutant plumes. This may include the use of DataRAMs or similar equipment.

3.2.2 Fixed Monitoring Sites

Region 4 and Region 6 will collect air quality data from existing ambient air monitoring sites located in Mississippi, Alabama and Florida on the Gulf Coast. The sites are described below by site name, Air Quality System Identification number (AQS), and pollutants monitored at each site.

MS		
Waveland	280450003	$PM_{2.5}$, O_3
Gulfport	280470008	$PM_{2.5}$, O_3
Pascagoula	280590006	NO_2, SO_2, O_3, $PM_{2.5}$
AL		
Fairhope	010030010	$PM_{2.5}$, O_3
Chickasaw	010970003	PM_{10}, $PM_{2.5}$, O_3
Mobile, Bay Rd.	010972005	$PM_{2.5}$, O_3
Mobile, Telegraph Rd.	010970016	PM_{10}
FL		
Pensacola, Ellyson	120330004	NO_2, SO_2, $PM_{2.5}$, O_3
Pensacola, NAS	120330018	O_3
Panama City, Cherry St.	120051004	$PM_{2.5}$
Holmes Co., Tri County Apt.	120590004	O_3
Okaloosa Co., Lovejoy Rd.	120910002	O_3
Santa Rosa Co., Woodlawn	121130015	O_3
LA		
Kenner Site	220511001	Summa Canister VOC
Chalmette Vista	220870007	Summa Canister VOC

As part of the National Air Toxics Trends Stations (NATTS), Pinellas and Hillsborough Counties, Florida conduct monitoring for air toxics. These sites operate on a one-in-six day schedule and can provide ongoing complementary data as needed. Collection frequency may be modified to support the monitoring efforts.

Data for gaseous pollutants, Nitrogen Dioxide (NO_2), and Sulfur Dioxide (SO_2) will be collected continuous at the monitoring sites specified above. Additionally, concentrations of ozone data will be observed because hydrocarbons can be interferences for ozone detection; therefore unusual increasing levels of “ozone” can potentially be a reasonable surrogate for the presence of hydrocarbons.

For short-term data collection, Region 4 will rely on SESD for VOC sampling and the states for $PM_{2.5}$ monitoring. Sampling and monitoring support may also be supplied by ERRB OSCs with START contractors. The state and local agencies and/or contactors are expected to provide support in operation of the monitoring network in the long term.

EPA ASPECT aerial flyovers will take place during in-situ burn operations. The ASPECT will collect information of the plume including particulates and combustion products.

3.2.3 Particulate Air Monitoring (Region 6)

START will conduct baseline particulate (dust) monitoring downwind of the in-situ burn using DataRAM instruments over a 24-hour period during burning activities. The DataRAM instrument will be capable of

data logging, and the results will be logged no less than every 5 minutes and downloaded to a computer at the end of each operating period. Air monitors will be collocated with PQ200 air samplers, which will be selected using local meteorological data, daily observations, and locations of burning activities. This logged particulate data will be distributed through the Unified Command as directed by EPA OSC to support the NOAA SMART Air Monitoring Plan for In-Situ Burns.

3.2.4 VOC Temporary Monitoring Stations (Region 4)

ERRB will mobilize air monitoring teams to deploy EPA Region 4 AreaRAEs along the coastline; the teams will each consist of one OSC and several START personnel. Additional AreaRAE resources may be deployed from ERT Edison or ERT Las Vegas and will be maintained by crews consisting of ERT personnel and contractors. The placement of the temporary station locations will be selected based on real-time plume progression, forecasted weather conditions, population centers and geographical areas that will augment the fixed monitoring stations according to spatial gaps. In the event that increased VOC readings are observed, grab samples will be collected utilizing either Tedlar® bags that will be manually transported to the ERT TAGA mobile laboratory, or SUMMA® canisters that will be shipped to a contract laboratory for analysis.

3.2.5 Trace Atmospheric Gas Analyzer (TAGA) Monitoring (ERT)

TAGA Monitoring. TAGA monitoring will be conducted using draft SERAS SOP #1711, *Trace Atmospheric Gas Analyzer (TAGA) IIe.* The ECA TAGA IIe is based upon the Perkin-Elmer API 365 MS/MS and is a direct air monitoring instrument capable of detecting, in real time, trace levels of many organic compounds in ambient air. The technique of triple quadrupole MS/MS is used to differentiate and quantitate compounds.

The initial step in the MS/MS process involves simultaneous chemical ionization of the compounds present in a sample of ambient air. The ionization produces both positive and negative ions by donating or removing one or more electrons. The chemical ionization is a "soft" ionization technique, which allows ions to be formed with little or no structural fragmentation. These ions are called parent ions. The parent ions with different mass-to-charge (m/z) ratios are separated by the first quadrupole (the first MS of the MS/MS system). The quadrupole scans selected m/z ratios allowing only the parent ions with these ratios to pass through the quadrupole. Parent ions with m/z ratios different than those selected are discriminated electronically and fail to pass through the quadrupole.

The parent ions selected in the first quadrupole are accelerated through a collision cell containing uncharged nitrogen molecules in the second quadrupole. A portion of the parent ions entering the second quadrupole fragments as they collide with the nitrogen molecules. These fragment ions are called daughter ions. This process, in the second quadrupole, is called collision-induced dissociation (CID). The daughter ions are separated according to their m/z ratios by the third quadrupole (the second MS of the MS/MS system). The quadrupole scans selected m/z ratios, allowing only the daughter ions with these ratios to pass through the quadrupole. Daughter ions with m/z ratios different than those selected are discriminated electronically and fail to pass through the quadrupole. Daughter ions with the selected m/z ratios are then counted by an electron multiplier. The resulting signals are measured in ion counts per second (icps) for each parent/daughter ion pair selected. The intensity of the icps for each parent/daughter ion pair is directly proportional to the ambient air concentration of the organic compound that produced the ion pair. All of the ions discussed in this report have a single charge. The m/z ratios of all of the ions discussed are equal to the ion masses in atomic mass units (amu). Therefore, the terms parent and daughter masses are synonymous with parent and daughter ion m/z ratios.

TAGA MS/MS Calibration: At the beginning of each TAGA monitoring day, a gas mixture containing the target analytes of concern (i.e., TCE and/or PCE, etc.) will be introduced by a mass flow controller (MFC) into the sample air flow (SAF). The gas mixture is introduced into the SAF and the tuning parameters for the first quadrupole at 30, 62, 106, 130 and 166 atomic mass units (amu), and the third quadrupole at 78, 105, 131, 164 and 166 amu will be optimized for sensitivity and mass assignment. The peak widths will be limited between 0.55 amu and 0.85 amu. The mass assignments will be set to the correct values within 0.15 amu.

The calibration system will consist of a regulated gas cylinder with a MFC. The MFC will be checked with a National Institute of Standards and Technology (NIST) traceable flow rate meter. The calibration system will be used to generate the analytes response factors (RFs), in units of ion counts per second/part per billion by volume (icps/ppbv), which will then be used to quantify the trace component in ambient air. The TAGA will be calibrated for the target compounds at the beginning and end of the monitoring day and/or at the discretion of the WAM.

The gas cylinder standard, which contains a known mixture of the target compound, certified by the supplier, will be regulated at preset flow rates, and diluted with ambient air. Dilution of the gas cylinder standard will give known analyte concentrations. The calibrations will consist of a zero point and five known concentrations obtained by setting the MFC to 0, 10, 20, 40, 80, and 90 mL/min with the sample air flow at 1,500 milliliters per second (mL/sec). The approximate concentration range of the standard introduced into the TAGA will be between 1 ppbv and 25 ppbv. The RFs will then be determined by using a least-square-fit algorithm to calculate the slope of the curves. The coefficient of variation will be checked for each ion pair's RF to ensure that it is greater than 0.90. The software will utilize the analyte's cylinder concentration, gas flow rates, air sampling flow rates, and atmospheric pressure to calculate the RFs. The RFs will be obtained for the ion pairs of the compound of interest in the cylinder. The cylinder calibration will be used for benzene, toluene, ethylbenzene and xylenes (BTEX).

The following QC will be run for TAGA MS/MS Monitoring:

- Daily beginning of day (BOD) and ending of day (EOD) calibrations.
- Calculation of detection and quantitation limits for each day.
- Calculation of intermediate response factors for each day.

3.2.6 Filter-based PM2.5 Sampling (Region 4)

Eight of the state operated monitoring sites on the Gulf Coast currently monitor for PM2.5 using the filter-based method sampling for 24 hours on a 1 in 3 day schedule. As conditions warrant, the PM2.5 filter based sampling may be increased to every day sampling. EPA suggests that the states keep the filters in refrigerated storage for further speciation analysis if requested.

3.2.7 Air Sampling (Region 6)

START will deploy PQ200 air samplers equipped with a filter cassette to measure PM2.5 concentrations in ambient air at three locations in Plaquemines Parish and three locations in St. Bernard, Louisiana. The samplers will be set up at the pre-determined sampling locations that will be selected using local meteorological data, daily observations, distance from sources of interference, and locations of burning activities. Prior to use, START will calibrate the samplers with the representative sampling media to verify correct flow rates. Current meteorological conditions will be documented at each sample location when each sample period begins and ends. START will collect one 24-hour air PM-2.5 samples at each station for the duration of the in-situ burn or as directed by EPA OSC. START will also collect three 8-hour air samples using a SUMMA® canister with a flow controller at each air monitoring location. The

SUMMA® canister will be mounted and secured no less than one meter from the ground. The flow controllers will be calibrated and checked for accuracy by the laboratory prior to sampling and between each sampling run. Additional VOC grab samples will be collected using 1 liter Tedlar bags each being allowed to collect ambient air using a low-flow air pump (SKC or equivalent) for approximately 10-15 seconds. These Tedlar bags will be held and analyzed for VOCs through method TO-15 by an EPA/ERT TAGA Mobile Laboratory, two of which are currently staged in the operational area.

3.2.8 VOC Composite Sampling (Region 4)

VOC composite sampling will be conducted daily at the 5 selected sites Waveland, MS, Gulfport, MS, Fairhope, AL, Pensacola, FL, and Panama City, FL using evacuated six-liter SUMMA® electro polished stainless steel canisters over a period of 24 hours. In the beginning phase of the study, the VOC samples will be analyzed by the SESD laboratory using the SESD modified TO-15 method. Air toxics data from canisters will require 3-4 days maximum turnaround time for analysis from the laboratory. It is expected that as the study progresses the continued analysis of these VOC samples will be conducted by a contract laboratory. For quality assurance, duplicate samples will be collected at one monitoring site by placing an identical apparatus next to the primary with the sample inlets within six inches of each other. Additional portable VOC air monitors may be used to identify plumes in real-time to identify pollutant plumes. This may include the use of AreaRAEs or similar equipment.

3.2.9 VOC Grab Sampling (Region 4)

VOC grab sampling will be conducted as requested or necessary according to meteorological patterns using evacuated six-liter SUMMA® electro polished stainless steel canisters or Tedlar® bags over a period of approximately 5 minutes without the use of a flow control device. The VOC grab samples collected in the SUMMA® canisters will be analyzed by the SESD laboratory using the SESD modified TO-15 method. The grab samples collected in the Tedlar® bags will be analyzed by the ERT TAGA mobile laboratory if possible. It is expected that the VOC grab samples collected in Tedlar® bags and analyzed by the TAGA laboratory should be completed in a matter of hours. Samples collected using SUMMA® canisters will require 3-4 days maximum turnaround time for analysis from the laboratory. It is expected that as the study progresses the continued analysis of these VOC samples will be conducted by an outside laboratory.

3.2.10 Water and Sediment Sampling (Region 6)

Sediment samples will be collected. The exact number of samples and locations of the samples will be decided by the EPA OSC and START Project Team Leader (PTL). Initially, in Region 6, samples will be collected within critical target regions in Louisiana water quality sub-segments 070401, 070601, 042209, 021001, and 042001. Initially samples will be collected from impacted areas and also un-impacted areas to attempt to get data on the impacts and background areas. Sampling points, as a general rule, will be located within approximately 100 feet of ecologically sensitive areas. The sampling points will have adequate spatial separation of at least five miles to achieve even representation across the impacted areas. Frequency of the sampling will be determined by EPA OSCs in consultation with the decision tree found in Appendix C. The sediment samples will be submitted to a qualified subcontracted commercial laboratory for the following analyses:

- Total Compound List Volatile Organic Compounds (TCL VOCs) by SW-846 Method 8260B.
- TCL Semivolatile Compounds (SVOCs) by SW-846 Method 8270D.
- Total Analyte List (TAL) Metals by SW-846 Method 6010C.
- Mercury by SW-846 Method 7471.

- Total Petroleum Hydrocarbons – Gasoline Range Organics (TPH GRO) by SW-846 Method 8015B.
- Total Petroleum Hydrocarbons – Diesel and Oil Range Organics (TPH DRO/ORO) by SW-846 Method 8015B.
- Polynuclear Aromatic Hydrocarbons (PAH) by SW-846 Method 8270D SIM.

Laboratory-specific analyte lists and reporting limits will be included as received from the laboratories. Deviations from the sample locations will be due to new observations made prior to sampling, information obtained in the field that warrants an altered sampling point, difficulty in sample collection, or limited access. The EPA OSC will be notified, and concurrence will be obtained should significant deviations from the planned sampling points be proposed. Details regarding deviations of the QASP will be documented in the site logbook.

START will collect surface water samples as part of the response. The exact number of samples and locations of the samples will be decided by the EPA OSC and START PTL. Surface water samples will be submitted to a qualified subcontracted commercial laboratory for the following analyses:

- Total Compound List Volatile Organic Compounds (TCL VOCs) by SW-846 Method 8260B.
- TCL Semivolatile Compounds (SVOCs) by SW-846 Method 8270D.
- Total Analyte List (TAL) Metals by SW-846 Method 6010C.
- Mercury by SW-846 Method 7470.
- Total Petroleum Hydrocarbons – Gasoline Range Organics (TPH GRO) by SW-846 Method 8015B.
- Total Petroleum Hydrocarbons – Diesel and Oil Range Organics (TPH DRO/ORO) by SW-846 Method 8015B.
- Polynuclear Aromatic Hydrocarbons (PAH) by SW-846 Method 8270D SIM.

The laboratory-specific analyte list and reporting limits will be included in the QASP when received

3.2.11 Air Sampling and Monitoring Program for Oil at Landfall

The air sampling and monitoring program for Mississippi Canyon Oil Spill landfall operations will be modified as necessary to adjust for wind direction and landfall location. In summary, the program will include real-time monitors, aerial flyovers as necessary, real-time speciated VOC sampling for BTEX compounds using the Trace Atmospheric Gas Analyzer (TAGA) and collection of whole air samples using SUMMA® canisters and grab samples using Tedlar bags as identified below:

Based upon VOC readings using the real-time data from a MultiRAE or AreaRAE PID, Benzene or Toluene colorimetric tubes to take a confirmatory air monitoring reading for Benzene / Toluene. This will occur when a total VOC reading of 10.0 ppm or higher is recorded. Also, at that time, Region 6 field teams will contact the field operations OSC to notify them of the elevated VOC monitoring reading.

- TAGA sampling in downwind shore locations for BTEX and any other appropriate compounds (ERT) – available beginning Mid-day April 30;
- ASPECT if necessary and appropriate for oil spill delineation (NDT) – Daylight operations, as necessary;
- Downwind dataRAM/miniRAM particulate monitors near potentially exposed populations (R6 or R4 START) – available beginning April 28;
- SUMMA® canister capability for 8-hour composite samples for VOCs (R6 or R4 START) – available beginning April 28;

- Tedlar Bag grab samples for VOCs on odor complaints and as necessary (R6 and R4 START) available beginning April 29;
- AreaRae and MultiRae detectors as appropriate for odor complaints (R6 or R4 START) – available beginning April 28;
- Additional elements to be added as required.

3.2.12 Sampling and Field QC Procedures

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.

Dedicated sampling equipment, sample containers, and PPE will be maintained in a clean, segregated area. It is anticipated that each sample will be collected with dedicated sampling equipment and placed directly onto the laboratory supplied glass fibre filters. Personnel responsible for sampling will change gloves between each sample collection/handling activity. Each sample will be assigned a unique identification number and assembled and catalogued prior to shipping to the designated laboratory. SUMMA® canisters will be handled per laboratory and manufacturers' guidance, observing safe and effective collection and preservation of the data.

START will collect field duplicate samples of air samples, both filters and canisters, and prepare filter blanks as needed during the removal action. QA/QC samples will be collected according to the following:

- Blind field collocated air samples will be collected during sampling activities at locations selected by the EPA OSC and START PTL. 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 duplicate samples in locations where there is visual evidence of contamination or where contamination is suspected. Blind field collocated samples will be collected at the rate of one duplicate for every 10 samples collected.

- Filter blanks will be prepared by analyzing a laboratory supplied filter from the same batch as the collected samples at a rate of one filter per batch per day. The blank filter will be used to evaluate possible contamination.

START will collect field duplicate and MS/MSD samples of soil, sediment, and surface water and prepare equipment rinsate blank samples as needed during the removal assessment sampling activities. QA/QC samples will be collected according to the following dictates:

- Blind field duplicate samples will be collected during sampling activities at locations selected by the START PTL. 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 duplicate samples in locations where there is visual evidence of contamination or where contamination is suspected. Blind field duplicate samples will be collected at the rate of one duplicate for every 10 samples collected.

- 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 de-

contamination procedures for the sampling equipment were performed effectively. No equipment rinsate blanks will be collected as part of this sampling activity as dedicated sampling equipment will be used as part of the sampling activity.

- Field blanks will be collected when VOC samples are taken and are analyzed only for VOC analytes. The field blank consists of American Society of Testing and Materials (ASTM) Type II reagent-grade water poured into a VOC sample vial at the sampling site. It is handled like an environmental sample and transported to the laboratory for analysis. Field blanks are used to assess the potential introduction of contaminants from ambient sources (e.g., gasoline motors in operation, etc.) to the samples during sample collection. No field blanks will be collected as part of this sampling activity.

- Laboratory prepared trip blanks will be submitted with each shipment containing samples for VOC analysis. The laboratory prepared trip blanks will consist of two 40-milliliter glass sample containers with Teflon-lined septum caps. The trip blanks will be prepared with deionized water prior to leaving the laboratory. Trip blanks are used to evaluate the potential cross-contamination that may occur during the shipment of samples.

- Temperature blanks will be prepared in the field and will consist of one 40-milliliter glass sample container with Teflon-lined septum cap. The temperature blank will 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.

- MS/MSD samples will be collected during sampling activities at locations selected by the START PTL. 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 no visual evidence of contamination or where contamination is not suspected. MS/MSD samples will be collected at the rate of one MS/MSD sample per matrix for every 20 samples collected.

3.2.13 Investigation-Derived Wastes

Attempts will be made to eliminate or minimize generation of investigation-derived waste (IDW) during this investigation. All non-dedicated equipment will be decontaminated according to START SOP 1201.01. Non-dedicated equipment will be rinsed with soap and water and attempts will be made to dispose of decontamination fluids on-site. The analytical data from collected samples will be reviewed after completion of the field activities, and disposal options will be evaluated accordingly. It is anticipated that minimal amounts of IDW will be generated during this activity.

3.2.14 Sampling and Sample Handling Procedures

Samples will be collected using equipment and procedures appropriate to the matrix, parameters, and sampling objectives. The volume of the sample collected must be sufficient to perform the laboratory analysis requested. Samples must be stored in the proper types of containers and preserved in a manner appropriate to the analysis to be performed. A sample collection and analyses summary table (Table 3-1) is presented in Section 3.4.

All clean, decontaminated sampling equipment and sample containers will be maintained in a clean, segregated area. All samples will be collected with clean decontaminated equipment following START SOP 1201.01. All samples collected for laboratory analysis will be placed directly into pre-cleaned, unused glass or plastic containers. Sampling personnel will change gloves between each sample collec-

tion/handling. All samples will be assembled and catalogued prior to shipping to the designated laboratory (following START SOP 1101.1 and 1102.01).

3.3 SAMPLE MANAGEMENT

Specific nomenclature that will be used by START will provide a consistent means of facilitating the sampling and overall data management for the project (START SOP 0110.04). The START Assessment/Inspection Manager must approve any deviations from the sample nomenclature proposed below.
As stated in START SOP 0110.04, sample nomenclature will follow a general format regardless of the type or location of the sample collected. The general nomenclature consists of the following components:

- Geographic location (e.g., location within a school or park).
- Collection type (composite, grab, etc.).
- QA/QC type (normal, duplícate, etc.).
- Sequence - An additional parameter used to further differentiate samples.

Sample data management will be completed utilizing SCRIBE including Chain-of-Custody (COC) and sample documentation needs.

3.4 SAMPLE PRESERVATION, CONTAINERS, AND HOLD TIMES

Once collected, air samples will be stored in antistatic plastic baggies. The $PM_{2.5}$ samples will also be stored at and shipped at 4 degrees centigrade. There are no holding time requirements for the sample storage. The samples will be sent to the designated laboratory by a common carrier.

Water samples will be stored in coolers on-site until shipped for laboratory analysis. The samples will be shipped via common carrier to the laboratory or driven by START members.

START will receive analytical results based on discussions with the SAM. This turnaround time (TAT) is initiated when the samples are collected in the field and continues until the analytical results are made available to START either verbally or by providing facsimile or email copies of the results for review.
All samples that have been analyzed will be disposed by the designated laboratory in accordance with the laboratory SOPs.

Table 3-1

Requirements for Containers, Preservation Techniques, Volumes, and Holding Times
Mississippi Canyon Oil Spill
Plaquemines Parish, Louisiana

Name	Analytical Methods	Matrix	Container	Preservation	Minimum Volume or Weight	Maximum Holding Time
Particulate Matter ($PM_{2.5}$)	40 CFR Part 50, Appendix L and QAGD 2.12	Air	PTFE Filter	Antistatic bags, 4 C	NA	NA
VOCs	TO-15	Air	SUMMA® Canister / Tedlar Bag	None	6 Liter @ 11.5 mL/min + 10% for an 8 hour sample collection	30 days
TCL VOCs	SW846 8260B	glass, (Teflon-lined septum for water)	4°C, HCl to pH<2 (pH adjust for water only)	3 x 40 mL vials (water, 4 oz (solid)	14 days (7 days if unpreserved by acid for water)	TCL VOCs
TCL SVOCs	SW846 8270D	Amber glass, (Teflon-lined for water)	4°C	2 x 1 liter, 8 oz	7 days extract (water), 14 days (solid)/ 40 days analysis	TCL SVOCs
TAL Metals and Mercury	SW846 6010C and SW846 7470A	Polyethylene (water), Glass (solid)	HNO_3 to pH<2 (water), 4°C	500 mL, 8oz	28 days for mercury 180 days all other metals	TAL Metals and Mercury
TPH GRO	SW846 8015B	glass, (Teflon-lined septum for water)	4°C, HCl to pH<2 (pH adjust for water only)	3 x 40 mL vials (water, 4 oz (solid)	14 days (7 days if unpreserved by acid for water)	TPH GRO
TPH DRO and ORO	SW846 8015B	Amber glass, (Teflon-lined for water)	4°C	2 x 1 liter, 4 oz	7 days extract (water), 14 days (solid)/ 40 days analysis	TPH DRO and ORO
PAH	SW846 8270D SIM	Amber glass, (Teflon-lined for water)	4°C	2 x 1 liter, 8 oz	7 days extract (water), 14 days (solid)/ 40 days analysis	PAH

4. ANALYTICAL APPROACH

4.1 ON-SITE TEDLAR BAG VOC ANALYSIS

Ambient air samples collected in 1-L Tedlar® bags will be analyzed in accordance with draft SERAS SOP #1741, *Field Analysis of VOCs in Gaseous Phase Samples by GC/MSD Loop Injection*. The 1-L Tedlar® bag is attached to the sample introduction port of the heated direct dual loop injection apparatus. With the injection apparatus in the load sample position, the 1-L Tedlar® bag is opened to allow the sample to flow into the 5 mL loop. At the same time, a second loop is filled with the internal standard. By switching the injection apparatus to the inject sample position, the contents of both loops are simultaneously injected onto the head of the GC column for analysis. The VOCs are separated by a ramped temperature program and then detected by the MS using Simultaneous Ion Monitoring (SIM) mode.

On-Site GC/MS VOC Calibration: At the beginning of each day, the GC/MS system will be tuned, either automatically or manually, using perfluorotributylamine (PFTBA) to set the proper mass calibration, mass resolution and ion abundance ratios. After PFTBA tuning is successfully completed, 5 mL of 4-bromofluorobenzene (BFB) is analyzed to check the analytical performance and confirm that the ion abundance ratios for BFB meet requirements. The mass spectrum of BFB meeting the criteria must be acquired in the following manner; three scans (the peak apex and the scans immediately preceding and following the apex) are acquired and averaged. Background subtraction is conducted using a single scan prior to the elution of BFB.

Before any sample or blank analyses, the GC/MS will be calibrated using target analytes and internal standards contained in pressurized cylinders or canisters. The target analytes are at a nominal 500-ppbv concentration in nitrogen. The internal standards are at a nominal one part per million by volume (ppmv) concentration in nitrogen. A multipoint calibration, typically a five to six-point calibration, should be established before sample injection. The initial calibration curve is prepared by injecting 5 mL of the 0.5, 1, 5, 50, 250, and 500 ppbv calibration standards. One of the calibration standards should be near the QL for the compound(s) of interest. Internal standards are added by typically filling a 50 microliter (μL) loop (equivalent to 10 ppbv) of the 1-ppmv internal standard.

A minimum of three of the calibration standards analyzed must be used to generate the initial calibration curve. The primary ion should be used for quantitation unless interferences are present, in which case a secondary ion is used.

Data generated by use of an average RF or a linear regression forced through zero is acceptable. The preferred approach is to first create a calibration using average RFs. The initial calibration is acceptable when the calibration percent relative deviation (%RSD) for each analyte is less than or equal to 30%, with at most two exceptions with a limit up to 40%. The average RF is then used for calculating sample concentrations. When a linear regression forced through zero calibration curve is used, the acceptance criteria is a correlation coefficient (r) of greater than or equal to 0.99, for all target VOCs.

Quality control for the VOC GC/MS loop method will include the following:

- Method blank for on-site GC/MS analyses for each day of analysis.
- Replicate sample analysis for on-site GC/MS with the frequency of 5 percent.
- Lot blanks with the frequency of one per day
- Laboratory Control Sample with the frequency of 1:20 samples and within ±30%.

4.2 OFF-SITE VOC ANALYSIS

Samples collected by START will be analyzed by an EPA Region 6 approved laboratory utilizing 40 CFR Part 50, Appendix L and QAGD 2.12 for particulate matter and EPA Method TO-15 for VOCs. The START PTL will indicate on the Chain of Custody that a Level II data package is required. The lab contacts and shipping information are as follows:

EPA Region 4 SESD Laboratory – TO-15 for VOCs and $PM_{2.5}$
980 College Station Road
Athens, Georgia 30605-2700
Tel: 1.706.355.8551
Contact: Gary Bennett

Air Toxics – TO-15 for VOCs
180 Blue Ravine Road, Suite B
Folsom, California 95630
Tel: 1.800.985.5955
Contact: Karen Lopez

SPL, Inc. Laboratory – Houston
8880 Interchange Drive
Houston, TX 77054-2512
(713) 660-0901
Contact: Lab Manager

Chester Labnet – Particulate $PM_{2.5}$
12242 SW Garden Place
Tigard, Oregon 97223
Tel: 503.624.2183
Contact: Paul Duda

Deliverables will include preliminary data via email in pdf format and an EDD in excel format. The final data deliverable will include a full CLP-like data package in PDF format and a final EDD in excel format.

The water and sediment samples will be submitted to a qualified subcontracted commercial laboratory for the following analyses with a turn-around-time of 24 hours for analytical results.

- Total Compound List Volatile Organic Compounds (TCL VOCs) by SW-846 Method 8260B.
- TCL Semivolatile Compounds (SVOCs) by SW-846 Method 8270D.
- Total Analyte List (TAL) Metals by SW-846 Method 6010C.
- Mercury by SW-846 Method 7470A/7471.
- Total Petroleum Hydrocarbons – Gasoline Range Organics (TPH GRO) by SW-846 Method 8015B.
- Total Petroleum Hydrocarbons – Diesel and Oil Range Organics (TPH DRO/ORO) by SW-846 Method 8015B.
- Polynuclear Aromatic Hydrocarbons (PAH) by SW-846 Method 8270D SIM.

4.3 DATA VALIDATION

START will validate the analytical data generated by the outside laboratories 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. START 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.

5. QUALITY ASSURANCE

An EPA Region 6 Quality Control (QC) Officer will be assigned and will monitor work conducted throughout the entire project including reviewing interim report deliverables and field audits. The START PTL will be responsible for QA/QC of the field sampling and monitoring activities. The designated laboratory utilized during the investigation will be responsible for QA/QC related to the analytical work. START-3 will also collect samples to verify that laboratory QA/QC is consistent with the required standards and to validate the laboratory data received. Air monitoring activities occurring within Region 4 will follow SESD approved SOPs.

5.1 SAMPLE CUSTODY PROCEDURES

Because of the evidentiary nature of sample collection, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. After sample collection and identification, samples will be maintained under chain-of-custody (COC) procedures. If the sample collected is to be split (laboratory QC), the sample will be allocated into similar sample containers. Sample labels completed with the same information as that on the original sample container will be attached to each of the split samples. Personnel required to package and ship coolers containing potentially hazardous material will be trained accordingly.

START personnel will prepare and complete chain-of-custody forms using the Scribe Environmental Sampling Data Management System (SCRIBE) for all samples sent to a START designated off-site laboratory. The chain-of-custody procedures are documented and will be made available to all personnel involved with the sampling. A typical chain-of-custody 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 chain-of-custody (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 in the project file as part of the permanent documentation of sample shipping and transfer.

5.2 PROJECT DOCUMENTATION

Field observations 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 START 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. START-3 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.
- Site sketches of sample location including identification of nearest roads and surrounding developments.
- Calibration results.

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

5.2.3 Response Manager

START will use the Response Manager module located on the EPA Web Hub 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 on-site 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 OSC in a POLREP or 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.

APPENDIX A

ASPECT Operations and Sampling Plan for the Deep Water Horizon Oil Spill

Quality Assurance Sampling Plan

April 2010

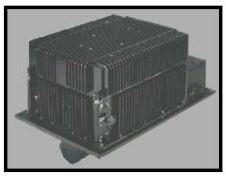
ASPECT OPERATIONS AND SAMPLING PLAN FOR THE DEEP WATER HORIZON OIL SPILL 28 APRIL 2010

I. Situation

On April 21, 2010 an offshore oil drilling platform experienced a blow out and fire during drilling and finishing operations. The Coast Guard and response crews attempted to control the fire until the drilling rig sank. The sinking of the rig collapsed the drill stem and immersed the release underwater. Although the fire was extinguished by the sinking of the rig the oil continues to be released below the surface of the sea. To date efforts to control the release have been unsuccessful and thousands of gallons of oil continue to be released each day. The oil slick created by the release is drifting with the tides and weather and threatens to come ashore if the conditions change. The Coast Guard is the lead federal response agency and continues to oversee efforts to control and contain the released oil. As part of the overall response efforts the Coast Guard is tasking the EPA with monitoring the effects to the environment, assessing threats and preparing for appropriate mitigation efforts. The EPA has activated the Regional Response Teams for the Gulf state Regions 4 and 6. Region 6 has requested the ASPECT airborne monitoring system be prepared to deploy to collect data regarding emissions and release tracking.

II. ASPECT System Description

The ASPECT sensor suite is mounted in a twin engine aircraft and uses the principles of remote passive infrared detection to image, map, identify, and quantify chemical vapors and plumes. A wide-area (one half mile wide) infrared imager coupled with a high speed spectrometer permits plume measurements to be made at a rate of about two square miles per minute.



RS800 Line Scanner

MR254 FTIR

RSX-4 Spectrometer

D2X Aerial Camera

Satellite Data System

In addition to chemical detection, radiological data is collected using a high resolution multi-crystal gamma-ray spectrometer. Supporting data includes a high resolution aerial digital photography concurrently collected with either chemical or radiological data and forms the basis for a geographical information system data cube. Efficient mission execution requires that data is processed on-board the aircraft for subsequent transmission or hand-off to the OSC. Airborne situational data is ready for dissemination using a satellite data system in less than 15 minutes after collection

III. Operational Data Collection Profile

a. Element 1 -- Mission Preparation

The flight crew will prepare for an extended deployment to the Gulf Coast region to collect remote sensing data related to the effect of the oil release and any control measures. The control efforts may include in-situ burning of pooled oil in the Gulf prior to landfall. The crew will maintain and follow all FFA flight rules and will coordinate with the officials controlling the air space controls ensure they do not conflict with other air operations in the target areas with on-site air space management. The crew will be provided with a mission profile orders prior to or while in-flight outlining the data collection parameters including information on specific locations and recommended data collection flight lines and sensor settings (Appendix A). The flight crew shall review the proposed flight lines and evaluate them against any flight safety issues, weather issues and system performance requirements. If issues with entry into designated air space arise the flight crew will notify the ASPECT team to assist with the coordination and resolution. Prior to initiating the data collection flights the contractor will perform standard systems check to ensure operational status (Standard Operations Manual)

b. Element 2 -- Remote sensing data collection, processing and transmission

ASPECT will collect a full set of chemical monitoring information including, FTIR data, IRLS data, digital photos and digital video. Raw data from each target area shall be kept separate and will be transmitted to the ASPECT ftp site for further processing upon landing. Some limited in flight data processing for the FTIR is anticipated at this time. Throughout the data collection the crew will remain in contact by internet text messaging to allow for status reports and change orders necessary. Details of the collection design are contained in the mission order.

In the event that oil makes landfill or scene conditions change, a separate mission order will be prepared and provided to the flight crew.

c. Flight Base of Operation

Based on the current location of the incident and oil plume, the aircraft is basing out of Gulf Port Municipal airport located near Biloxi, MS. The base of operation may change pending needs from the Region.

d. Communications

Appendix A contains detailed information for contacting key individuals during the deployment. Digital sensor data will be available at the FTP site per appendix G.

e. Reach back

EPA ASPECT is supporting a reach back team located at Kansas City to provide data analysis services to support Region 6. This data analysis support will provide information to Region 6 to include: (1) digital data stored on an FTP site and (2) communication through conference lines.

IV. ASPECT Digital Data Management

a. Data Structure

ASPECT aircraft consists of several distinct file types. These data types include: (1) visible camera images, (2) visible images in a data format capable for import to GIS packages, (3) wide-area high spatial resolution infrared GIS maps, (4) processed infrared spectra showing vapor species identified, (5) maps showing the location of flight paths, (6) processed Gamma Ray data, (7) data logs containing information about each collected data file, and (8) data analysis reports (in Word format) and Excel format tables.

The data for the project will be achieved in the ASPECT FTP site. The file structure in the achieve will be the following for both the raw and processed data. The
Raw data will be under "raw" while the processed data will be under "processed". Under each of these directories the following structure will be used for each flight of data:

Flight#
- FTIR - FTIR spectral data
- GIS - corresponding GIS information collected by the aircraft
- LOGS – data logs
- IR_Images – Wide area 3-5 and 8-12 micron spectral images
- Gamma – Gamma Ray data
- Photos – corrected and uncorrected images

Processed data and imagery will be posted to Google Earth using a Google script. This script will be provided to groups per Region 6 direction.

b. Data Analysis

The EPA ASPECT aircraft uses automated data analysis methods to evaluate the presence of vapor signatures in the field of view of an instrument. This method to process the results of this screening data uses a novel signal processing method that has been peer-reviewed in over 80 open literature scientific publications. This method allows an automated background removal taking into account the background radiance and atmospheric contributions. The aircraft screens for 26 compounds using automated software and reviewed for the presence of over 520 vapor species in a confirmation process (Hanst and PNNL Library).

The data analysis method uses a specialized finite impulse response filter to remove unwanted spectral background features coupled with advanced pattern recognition algorithms to identify the spectral vapor signature of interest. The algorithms have been developed since 1986 and extensively evaluated using both quantitative laboratory and field data.

The overall data processing for ASPECT uses a two stage approach consisting of an automated screening capability followed by a confirmation process. This second process uses software that custom designed to allow the reach back team to confirm any identified detections of the automated process. This process ensures a high quality assurance and confirmation of a spectral vapor signature.

Appendixes:

A – Initial Mission Order

B – Communications

ASPECT Mission Collection Order
2 Pages

Date/Time of Order: 28 April 2010/[UTC]

Response or Deployment Name: [Deepwater Horizon]

Collection Number: [1]

I. Flight Window: ASAP []
Planned Time [launch 0900], [28 April 2010]

The goal of this mission is to collect data over the source area (sunken rig) to establish a chemical fingerprint of the release source, collect data over the site of an in-situ burn of contained oil to provide information on burn effectiveness, and a higher altitude photo recon to cover a broader area of the oil release.

II. Data to Collect: Photos [x] 2800 AGL during data collection + 5000 ft. for broad area coverage

FTIR [x] 2800 AGL
IRLS [x] 2800 AGL
Gamma Data and Background [] 300 AGL
Gamma test line [] 3000 AGL
Gamma Background [] 3000 AGL

Other [x].
GPS data (GPL File) and INS data (INS File).

Note: For this mission, no gamma is required.

III. Data to Send: Communicate Status Each Pass [x]
Table [x]
KML [x]
Data Zip [x]
Photo Zip [x]

IV. Suspected Chemicals: [straight chain hydrocarbons mostly]

V. Flight Design: Designed to provide a clean background area that can be used to cross reference against the data collected over the source and plumes

a. Special Instructions, System Start up.

1) Conduct a soft iron calibration of the INS system

b. Planned Flight Lines: []

Fly ER SOP [x] : Collect data in transit to get clean backgrounds over water, upwind of target area, right over target area and three downwind lines and one along downwind direction to cover potential atmospheric releases.

Wind direction from weather buoys in area can be relayed through Google talk. Collect data of any suitable plume or oil mass and note on flight logs.

Operational Altitude: Standard 2800 AGL [x]
Special [5000 AGL], [x], photos for broad area coverage

Sunken Rig Location [28deg 44.20minN(28.73667)]Lat, [88deg 23.23minW(88.38716)]Long
ER 150 Meter Downwind [x]
ER 500 Meter Downwind [x]
ER 1000 Meter Downwind [x]
ER Up Plume [x]
Two 4-wavenumber FTIR runs one up the plume one 150meters downwind.

Burn area location: Oil corralled by boom in vicinity of sunken rig, current information on Lat./Long. Not available. Look for oil corralled inside a boom behind a ship. Last report indicated planned to occur east of sunken rig. If on fire the smoke plume should be clearly visible.

VI. Final Data Transmission Instructions:
FTP Site Name: [EPA]
Folder: [DeepHorizn]

VII. Other Instructions: [Stay in contact by Google Talk when possible]

Appendix B – Communications

A. Conference Line

The ASPECT program has a dedicated 24/7 phone bridge which be used to communicate with the reach back data analysis cell.

Phone bridge # (toll Free): 1-866-299-3188
Code: 513-487-2433

B. Contact Phone Numbers for Aircraft Support Team and Lead

A satellite system will be used to transmit chemical and situational data to the ground team. All data will be examined for Quality Assurance prior to release. The Region will have complete access to all data (tentative and final) and will be the data custodian for all released information.

ASPECT Team:

Mark Thomas, EPA, ASPECT
Environmental Protection Agency (EPA)
Phone: 513-675-4753

Tim Curry, EPA, ASPECT
Environmental Protection Agency (EPA)
Phone: 816-718-4281

Robert Kroutil LANL – ASPECT 505-665-8144
(Cell) 505-699-3733

Paul Lewis, NGA, ASPECT Support
National Geospatial Agency (NGA)
Phone: 703-735-2570
Cell: 804-366-3435

Dave Miller
ASPECT Support
Northrop Grumman / NGA
Phone: 703-877-5010
Cell: 703-517-8791

Flight Operations:

Paul Fletcher ARRAE,Inc. 214-632-4987

Ray Brindle ARRAE,Inc. 972-467-5846

Beorn Leger ARRAE,Inc. 972-921-1893

Rich Rousseau ARRAE,Inc. 972-825-6953

APPENDIX B
Draft Oil Spill Data Management Plan
Quality Assurance Sampling Plan
April 2010

Deepwater Horizon Rig Explosion Air Sampling & Monitoring Data Management Plan

Prepared by: National DATA Team

0) Executive Summary

This plan is an initial attempt at describing the data management needs for potential air monitoring activities related to the Deepwater Horizon Rig Explosion.

1) General Information

1a) Scenario:

Background: Late on Tuesday night, April 20, an explosion and fire occurred on a Mobile Offshore Drilling Unit (MODU) in the Gulf of Mexico about 50 miles offshore of Venice, LA. The rig is owned by Trans Ocean and under contract to BP. On Thursday morning, April 22, the oil rig capsized and sank.

The rig had an estimated 700,000 gallons of diesel on board. An unknown amount burned in the fire. It is unknown if the tanks holding the diesel fuel are intact or leaking underwater. The well, at the seafloor, was also leaking crude oil and natural gas.

1b) Special Considerations:

This plan involves the management of large amounts, over 350,000 records per day, of real-time monitoring data. Managing data at this level is laborious and every attempt should be made to reduce the data to meet the Data Quality Objectives (DQOs) of the assessment.
This incident has the potential to involve more than one data management group, either due to geography, or because additional organizations become involved. If that is the case each data management group would maintain their own master Scribe database with those projects being merged through Scribe.NET.

1c) Privacy Concerns? No

1d) Last Updated:

Document Version	Date of Revision	Section	Description of Changes
Initial Release (V1.0)	4/27/10	N/A	N/A
V1.1	4/28/10		Added Scribe.NET, ASPECT information
V1.2	4/28/10		Added GIS Mgmt, Reporting, and Photo Mgmt
V1.3	4/28/10		Added data elements

2) Overall Workflow

2a) Data Flow Diagram:

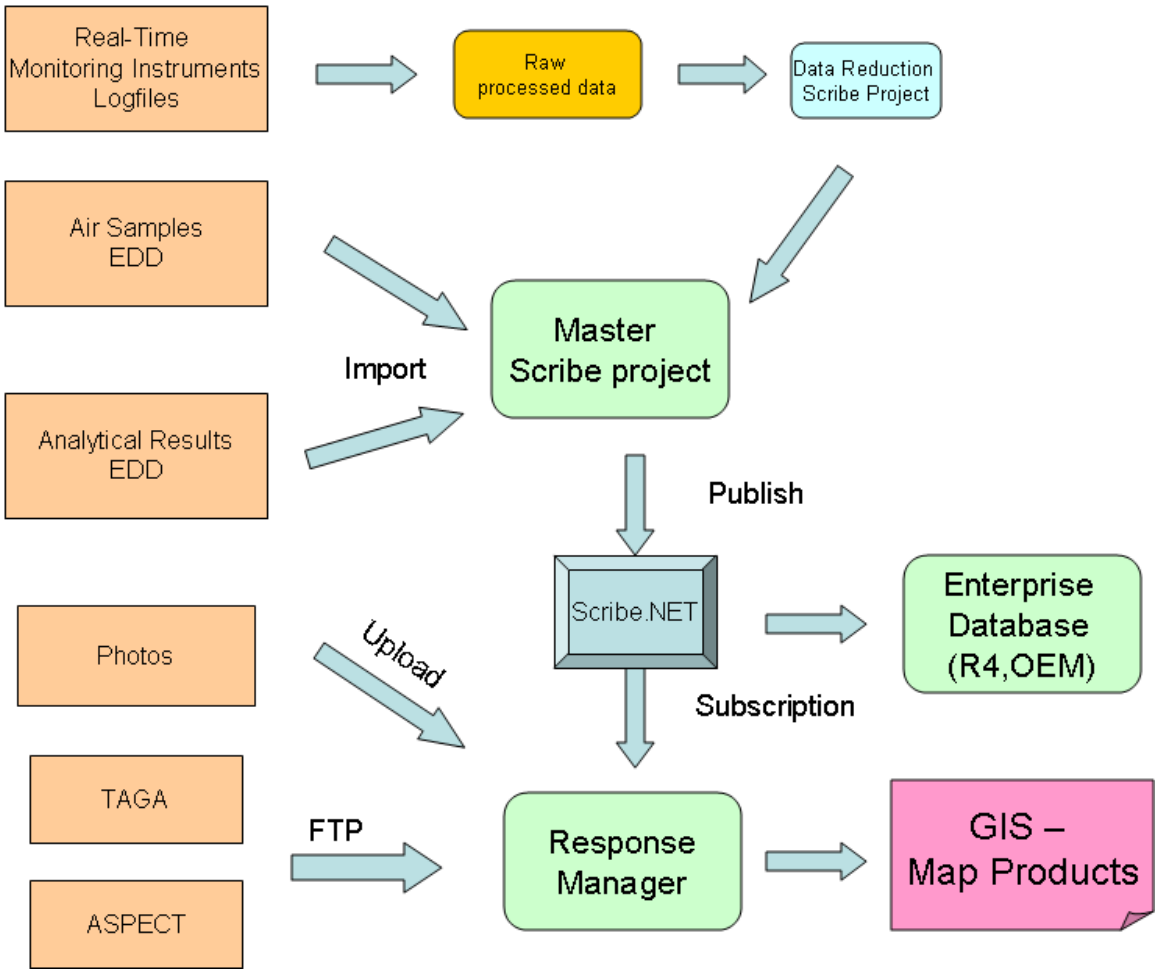


Figure 1. Data Flow Diagram

The flow diagram shown in Figure 1 involves three main types of data streams.

Real-Time Monitoring Data

-Field personnel retrieve the instrument logfile, process that data into a SCRIBE ready/compliant EDD format and load it into a data reduction Scribe project. Queries within the data reduction Scribe project create 8hr and max result records for each parameter, by location and day. This reduced data is then loaded to the master project

Sampling & Analytical Data

-This data stream is imported directly to the master scribe project

TAGA Data

-Due to the unique attributes of the TAGA data, results from the TAGA will be immediately transposed to a GIS environment so that every TAGA run has a corresponding map which uses a defined legend to display the results, as opposed to noting each individual reading. This data will be stored by Response Manager and be made available via SDE.

ASPECT Data

-Due to the unique attributes of the ASPECT data, results from the ASPECT are available as a raster data set, which can be stored as a file and viewed within a GIS environment. This data will be stored by Response Manager and be made available via SDE.

Photos

-Operational photos related to the incident will be uploaded to Response Manager

2b) Roles and Responsibilities:

Field Personnel: Operate and maintain the monitoring and sampling instrumentation, collect samples, download instrument log files, input air sample metadata into a spreadsheet EDD

Site Data Manager: Process instrument log files, reduce raw data if applicable to meet DQOs, maintain master site database

GIS Manager: Create TAGA route maps, create sample results maps, create stationary monitoring maps

Remote Support: Assist with data processing, verification, and reporting queries, provide Scribe support

3) Data Collection

3a) Field Data Collection Methodology and Data Deliverables:

Monitoring/ Sampling/Analytical Type	Instrument /Method	Data Collection Tool	Data Collection Instructions	File Type	Comments
Real-time Point Air Monitoring	AreaRae	Instrument Log File	- Set to data-logging mode - Set data-logging frequency per site DQOs - Data-logging frequency is XXX - Download monitoring file every XX hours/at the end of each operational period - Rename each file (see comments column) -Store in appropriate folder specific for that day or deliver to Data Manager -Prepare instrument for next operation period and/or put on charge	.rtf	**Filenaming nomenclature:** location_date_timeended_ instrumentID Ex: SE_20100427_1600_247

Real-time Point Air Monitoring	DataRam	Instrument Log File	- Set to data-logging mode - Set data-logging frequency per site DQOs - Data-logging frequency is XXX - Download monitoring file every XX hours/at the end of each operational period - Rename each file per specified nomenclature (see comments column) -Store in appropriate folder specific for that day or deliver to Data Manager -Prepare instrument for next operation period and/or put on charge	.csv	**Filenaming nomenclature:** location_date_timeended_ instrumentID Ex: SE_20100427_1600_247
Real-time TAGA Air Monitoring	TAGA	TAGA Instruments	ERT SOPs	.doc reports	Follow ERT SOPs
Real-Time ASPECT Air Monitoring	ASPECT	FTIR, aerial camera	NDT SOPs	.doc reports, kml,	Follow NDT SOPs
Air Sampling	Summa	Scribe Air sampling EDD spreadsheet (electronic/hardcopy)	- Enter data into EDD	xls./ hardcopy	
Air Sampling	Tedlar Bag	Scribe Air sampling EDD spreadsheet (electronic/hardcopy)	- Enter data into EDD	xls./ hardcopy	
Laboratory Analytical Data	TBD	IREDD and pdf	Result logging/reporting per lab SOPs	xls/csv/ hardcopy	
Logbooks					
Site Sketches					

3b) Data Collection SOPs & Checklists:

SOPs: See table in section 3a for Data Collection SOPs. Additional Data Streams will be added to the table above as they are identified

Checklists: TBD

4) Data Management

Tabular Data Management:

4a) Data Processing:

Monitoring/ Sampling/Analytical Type	Instrument /Method	Data Collection Tool	Data Processing Instructions	File Type	Comments

Real-time Point Air Monitoring	AreaRae	Instrument Log File	- Convert log file to normalized EDD format using the AreaRae import utility for Scribe - The AreaRAE Utility allows you to identify the location and the EventID for each file it processes -If an AreaRAE was deployed as a stationary monitor, then a single location ID should be used for all observations - Follow Data Point Reduction Steps outlined below	.csv	Area Import Utility can be found at: www/epaosc.org/scribe -An example of an RTF file that has been processed can be seen in Appendix A
Real-time Point Air Monitoring	DataRam	Instrument Log File	- Convert log file to normalized EDD format by opening the xls file and removing the header information - Once normalized, add Event ID Value field, units, location ID and coordinates, - Populate these 2 fields per table below - Follow Data Point Reduction Steps outlined below	.csv	
Real-time TAGA Air Monitoring	TAGA	TAGA Instruments	- ERT SOPs - Transfer to geospatial env when each run is completed	.shp	
Real-time ASPECT Air Monitoring	ASPECT	FTIR, aerial photography	-NDT SOPs, - Transfer to geospatial env when each run is completed	.shp	
Air Sampling	Summa	Scribe Air sampling EDD spreadsheet (electronic/hardcopy)	- Enter data into EDD if not done - Import into Scribe using import wizard	xls./ hardcopy	
Air Sampling	Tedlar Bag	Scribe Air sampling EDD spreadsheet (electronic/hardcopy)	- Enter data into EDD if not done - Import EDD into Scribe using import wizard	xls./ hardcopy	
Laboratory Analytical Data	TBD	IREDD and pdf	- Enter data into EDD if not done - Import EDD into Scribe using import wizard	xls/csv/ hardcopy	
Photo/GPS Data	Digital Camer/GPS enabled digital Video/Camers	Response Manager – Response and Recon Modules	- Enter photo data and upload photo information into Response Man-ager desktop or Web	.jpg	Response Manager photo report and/or export to kml functionality will be used Response Manager gps related record will go into

EventID Value and Reporting Period Field Valid Values

Each dataset (normalized EDD) will be augmented with two fields (see table above) that designates which 8 hour reporting period a result fell within. To do this add these two fields using the following valid values:

EventID Value	EventRemarks

mm/dd/yyyy-00-08	For each day, midnight to 8am
mm/dd/yyyy-08-16	For each day, 8am to 4pm
mm/dd/yyyy-16-24	For each day, 4pm to midnight

Data Point Reduction SOP

- For each reporting period a data reduction Scribe project should be created using the specified template. The file should be named and stored in a way that makes it apparent what reporting period the project represents. This project will hold the raw data
- All normalized instrument EDD files should be imported into the data reduction Scribe project using specific import scripts if necessary
- The data reduction Scribe project will contain data reduction SQL queries, these queries will create two sets of data, an 8 hour average dataset and a max result for each 8 hour period dataset
- The results of these queries will be used as the import source for the master Scribe project.

4b) Scribe Import Mappings:
There will be instrument specific mappings for each raw, normalized instrument EDD file. As these are developed they will be added to the data reduction template file. All other data streams will use standard Scribe EDD templates, so all the field names will be native to Scribe

4c) Data Element Dictionary:
A complete listing of all data elements in Scribe, by table, can be found at www.epaosc.org/scribe. The tables listed below identify what should be considered the minimum data requirements for the identified data source. These elements may increase or have their description changed as a result of a change in operational requirements.

Monitoring Data Elements

Scribe Fields	Description	Type	Length	Primary Key?	Req?
Mon_Time	Monitoring Time (hh:mm:ss)	Text	30	PK	Yes
Mon_Parameter	Pollutant	Text	30	PK	Yes
Mon_Date	Monitoring Date (Required)	DateTime	0	PK	Yes
Location	Monitoring Location Code (Required)	Text	30	PK	Yes
InstrumentID	Instrument ID (Required)	Text	50	PK	Yes
Mon_Operator	Organization That Collected th	Text	50	No	No
Mon_Measurement	Monitoring Measurement	Numeric	0	No	No
Mon_Meas_Units	Monitoring Measurement Units	Text	40	No	No
EventID	Identifies the date of the reporting period and the start/stop time a	Text	50	No	No

	value is associated with				
Latitude	Latitude	Numeric	0	No	No
Longitude	Longitude	Numeric	0	No	No
Mon_Qualifier	Monitoring Criteria such as detection limit; action limit or other criteria	Text	10	No	No
Mon_Remark	Monitoring Data Remark	Text	255	No	No
Mon_Source	Monitoring Source (i.e. Radiation Type/Energy)	Text	50	No	No

Air Sampling
Data Elements

Scribe Fields	Description	Type	Length	Primary Key?	Req?
Samp_No	Sample Number. Scribe requires a unique sample number (Required)	Text	25	PK	Yes
Location	Sampling Location Code (Required)	Text	30	No	Yes
EventID	EventID. Use to group data by sampling events. Defaults to 'Sampling' (i.e. EOC; Site Assessment)	Text	50	No	No
Latitude	Latitude	Numeric	0	No	No
Longitude	Longitude	Numeric	0	No	No
Matrix	Sample Matrix (i.e. Air; Vapor)	Text	40	No	No
SampleCollection	Sample Collection Method (i.e. Grab; Composite; Discrete Interval)	Text	30	No	No
SampleDate	Date Sample Taken	DateTime	0	No	No
SampleMedia	Sampling Media (i.e. Summa Cannnister)	Text	30	No	No
Sampler	Sampler Name	Text	30	No	No
SampleTime	Time Sample Taken (hh:mm)	Text	5	No	No
SampleType	Sample Type (i.e. Field Sample; Field Duplicate; Lab QC; Spike; Trip Blank)	Text	30	No	No
Total_Time	Total Sampling time	Numeric	0	No	No
Volume	Air Sampling Volume. Wipe Sampling Area.	Numeric	0	No	No
Volume_Units	Volume Units	Text	20	No	No

4d) Entity Relationship Diagram:
See Scribe documentation www.epaosc.org/scribe

Geospatial Data Management

Critical Linkages between Tabular and Spatial Data

-The Scribe dataset will contain only point data so there are no linkages required with GIS, having the latitude/longitude stored within the project as decimal degrees will suffice

-All TAGA routes will have the standard report information as well as a GIS .shp file

-SCRIBE data to be published through SCRIBE.net from all regions responding. For multi region data management consistency regional databases are to be combined and pushed back down for upload into one established SDE. Web mapping services and SQL views for analytical data will be established out of single SDE for consistent mapping purposes.

4) Data Management SOPs & Checklists:

Developing these will be the responsibility of the initial site data manager

5) Data Communication

Data Source	Owner	Contains	Communication Method	Data Release Frequency	Comments
Master Scribe project	Field Data Manager	All stationary monitoring data, sample information, analytical results	Scribe.NET	Data will be published after incoming dataset has gone through initial field QA to confirm parameter names, location IDs and sample information matches the field personnel's hardcopy information	
TAGA	TAGA Operations Crew	TAGA Run	FTP	After each TAGA run has gone through post-processing, data reduction and graphic display, it will be posted to ERT's FTP site	
Real-time ASPECT Air Monitoring	ASPECT Flight Crew	ASPECT	FTIR, aerial photography	After each ASPECT run has gone through post-processing, data reduction and graphic display, it will be posted to ERT's FTP site	
SDE	GIS Manager	Geospatial link between SCRIBE and Response Manager tabular data	Published ARCGIS Web Service	As Operational Periods requires.	

6) Data Verification

5a) Verification SOPs & Checklists:

To be developed

5b) SQL Verification Queries:
To be developed

7) Data Analysis & Reporting

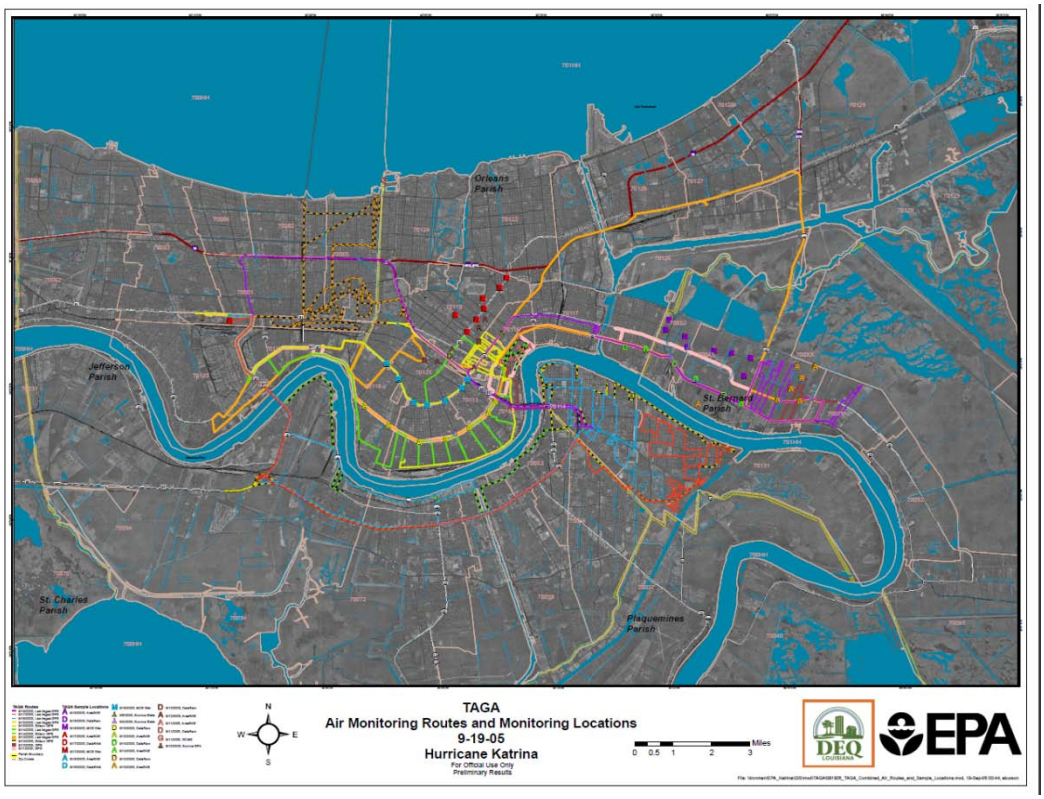
6a) Who is using the data being reported?
Unified Command (UC), Regional Emergency Operations Centers (REOCs)

6b) Reporting Requirements:
Data will be reduced so that defined 8 hour reporting periods will have an average value and a maximum value for each parameter. Sampling and analytical data will be stored in a normal fashion. All report and map products will identify exceedances of action levels on 8-hour average action levels, and instantaneous result action levels established by the UC.

6c) Reporting SOPs & Procedures:
Developing these will be the responsibility of the initial site data manager and remote support personnel.

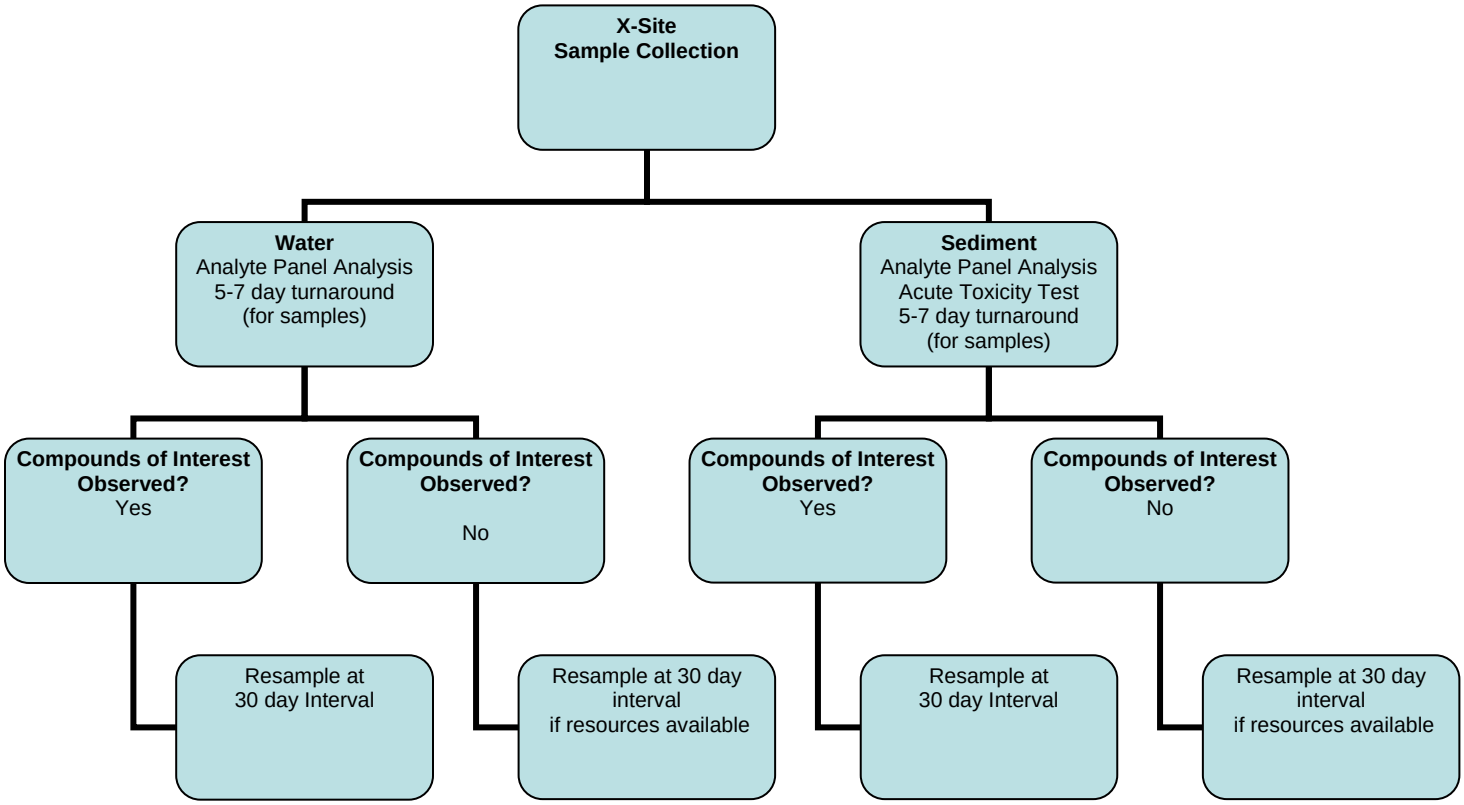
6d) SQL Reporting Queries:
Developing these will be the responsibility of the initial site data manager

6e) GIS / Spatial Data Visualization Requirements
The TAGA operations crew should establish the workflow for delivering TAGA monitoring observations and spatial coordinates to the GIS manager.



Site Specific Requirements:

Required Tools:
-Scribe
-AreaImport Utility
-ArcGIS
-Microsoft Excel

Reference Files:
-Scribe Air Sampling EDD Template
-Scribe Analytical Results EDD Template

APPENDIX C
Region 6 Water and Sediment Sampling Frequency/Design Decision Tree