QUALITY ASSURANCE SAMPLING PLAN
AIR SAMPLING AND MONITORING
FOR

DEEPWATER HORIZON INCIDENT

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

May 5, 2010

6069104

TABLE OF CONTENTS

Section **Page**

1. INTRODUCTION 1-1

1.1 PROJECT OBJECTIVES 1-1

1.2 PROJECT TEAM 1-2

2. SITE DESCRIPTION AND BACKGROUND 2-1

3. SAMPLING APPROACH AND PROCEDURES 3-1

3.1 OVERVIEW OF SAMPLING ACTIVITIES 3-1

3.1.1 Data Quality Objectives 3-1

3.1.2 Health and Safety Implementation 3-2

3.2 SAMPLING/MONITORING APPROACH 3-2

3.2.1 Fixed Location Particulate Air Monitoring 3-2

3.2.2 Trace Atmospheric Gas Analyzer (TAGA) Monitoring (ERT) 3-3

3.2.3 Fixed Location Air Sampling 3-4

3.2.4 Air Sampling and Monitoring Program for Oil at Landfall 3-4

3.2.5 Sampling and Field QC Procedures 3-5

3.2.6 Investigation-Derived Wastes 3-5

3.3 SAMPLE MANAGEMENT 3-6

3.4 SAMPLE PRESERVATION, CONTAINERS, AND HOLD TIMES 3-6

4. ANALYTICAL APPROACH 4-1

4.1 ON-SITE TEDLAR BAG VOC ANALYSIS 4-1

4.2 OFF-SITE ANALYSIS 4-2

4.3 DATA VALIDATION 4-2

5. QUALITY ASSURANCE 5-1

5.1 SAMPLE CUSTODY PROCEDURES 5-1

5.2 PROJECT DOCUMENTATION 5-2

5.2.1 Field Documentation 5-2

5.2.2 Report Preparation 5-3

5.2.3 Response Manager 5-3

ASPECT OPERATIONS AND SAMPLING PLAN FOR THE 5-2

DEEP WATER HORIZON OIL SPILL 5-2

28 APRIL 2010 5-2

LIST OF TABLES

Title **Page**

Table 3-1 Requirements for Containers, Preservation Techniques, Volumes, and Holding Times..... **3-7**

LIST OF APPENDICES

Title

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

APPENDIX B Draft Oil Spill Data Management Plan .....

APPENDIX C Laboratory TO-15 Compound List and Reporting Limits……

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, sampling and air monitoring for the Deepwater Horizon Incident also known as Mississippi Canyon Oil Spill off the coast of Louisiana near Venice, Plaquemines Parish, Louisiana. 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.

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.

1.1 PROJECT OBJECTIVES

1.1.1 Monitoring and Sampling Strategies

EPA Region 6 will assess the impacts of the Deepwater Horizon Incident on the air quality of southeast Louisiana. EPA will utilize PQ200 air samplers, DataRAM DR-4000 particulate monitors, Tedlar bags for VOC grab samples and AreaRAE air monitors for VOC, and MultiRAEs air monitors for hydrogen sulfide (H_2S), and carbon monoxide (CO) monitoring. Additionally, SUMMA® canisters with flow controllers will be used to sample for VOCs. Each monitoring instrument will be set up to log data. The SUMMA® canisters will be set up to collect one sample every 8 hours. The PQ200 air samplers will be set up to collect one sample every 24 hours.

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 EPAs/ERT TAGA Mobile Laboaratories. VOC 8-hour samples will be collected using

the SUMMA® canister and analyzed by method TO-15. DataRAMs will be used for real-time monitoring of PM_{10} or $PM_{2.5}$ particulate levels, AreaRAEs to monitor for VOCs, and MultiRAEs to monitor for H_2S and CO.

Air monitoring will be conducted along the Louisiana coastline in EPA Region 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.

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 personnel from Region 6 will have responsibility for sampling and monitoring in Louisiana.

EPA will coordinate with the Unified Command through EPA OSCs located in Houma, Louisiana and United States Coast Guard (USCG) Sector in Mobile, Alabama.

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 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.

2. SITE DESCRIPTION AND BACKGROUND

The Deepwater Horizon Incident 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 and a release of diesel fuel caused by damage from the sinking of the Transocean Deepwater Horizon drill rig at British Petroleum (BP) Canyon 252.

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 USCG, British Petroleum PLC (BP), the Responsible Party, through their Oil Spill Response Organization (OSRO) contractors are conducting several countermeasures, which will include burning the oil in sections when weather conditions are favorable.

3. SAMPLING APPROACH AND PROCEDURES

Samples collected by EPA 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 release and the in-situ burning process and the expected resulting smoke and particulate plume. Samples collected as part of this emergency response (ER) will be obtained in accordance with START Standard Operating Procedures (SOPs).

3.1 OVERVIEW OF SAMPLING ACTIVITIES

EPA will conduct air sampling of particulate matter ($PM_{2.5}$) as well as VOCs. Air sampling will be conducted at three air sampling locations in Plaquemines Parish and three locations in St. Bernard Parish. Additional locations may be added based upon future operations. At each air sampling location one BGI PQ200 air sampler collecting air samples for $PM_{2.5}$ and one SUMMA® canister with an 8-hour flow controller 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 sampling site will include one DataRAM DR-4000 to monitor the particulate levels, one AreaRAE PGM-5020 to collect readings for VOC using a 10.6 electron volt (eV) photoionization detector (PID) lamp, and one MultiRAE to monitor for H_2S and CO using chemical specific electrochemical sensors. This plan will be amended to include changes to 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), VOCs, H_2S and CO in air resulting from the off shore oil release and the in-situ burn of the oil on the Gulf of Mexico. The data will be used to evaluate the potential impact from inhalation by people responding to the spill and citizens living in the area affected by air quality impacts from the spill.

The most likely constituents of any airborne plume from the oil would be the aromatic hydrocarbons. As an action level for considering protective measures of public health at the point of exposure, the Agency for Toxic Substance and Disease Registry (ATSDR) recommends for toluene, 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 of (RFC) equivalent to 1ppm. 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. As an action level for considering protective measures for VOCs in air, ATSDR recommends the use of the Department of Energy's Temporary Emergency Exposure Limit (TEEL-0) of 50 ppm for a 1-hour average. As a screening level for occupancy, ATSDR recommends for –n-hexane 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 $PM_{2.5}$ and PM_{10} for air particulate monitoring 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 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-3 Emergency Response Air QASP and with START SOPs.

A field communication protocol based upon VOC air monitoring 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 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.

3.2.1 Fixed Location Particulate Air Monitoring

START will conduct particulate (dust) monitoring downwind of the in-situ burn using DataRAM instruments over a 24-hour period. The DataRAM will collect air monitoring readings for PM_{10} and the 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.

3.2.2 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., benzene, toluene, 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 ERT 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 milliliters per minute (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 parts per billion by volume (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.

3.2.3 Fixed Location Air Sampling

START will deploy PQ200 air samplers equipped with a filter cassette to measure $PM_{2.5}$ concentrations in ambient air at three locations in Plaquemines Parish and three locations in St. Bernard Parish, Louisiana. Additional sampling locations will be identified by EPA OSCs as necessary. 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 $PM_{2.5}$ sample 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. The list of volatiles and their reporting limits are included in Appendix C. Additional VOC grab samples will be collected using 1 liter (L) Tedlar bags each being allowed to collect ambient air using a low-flow air pump (SKC or equivalent) for approximately 10-15 seconds. The Tedlar bags will be held and analyzed for select VOCs (i.e., BTEX compounds) using an Agilent Gas Chromatography/Mass Spectrometry (GC/MS) system in an EPA/ERT TAGA Mobile Laboratory, two of which are currently staged in the operational area. Other VOCs may be identified using a library search in the scan mode, if requested.

3.2.4 Air Sampling and Monitoring Program for Oil at Landfall

The air sampling and monitoring program for Deepwater Horizon Incident 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 will be used 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 monitoring in downwind shore locations for BTEX and any other appropriate compounds (ERT).
- ASPECT if necessary and appropriate for oil spill delineation (NDT).
- Downwind DataRAM/miniRAM particulate monitors near potentially exposed populations (R6 START);
- SUMMA® canister capability for 8-hour composite samples for VOCs (R6 START).
- Tedlar Bag grab samples for VOCs on odor complaints and as necessary (R6 START).
- AreaRae and MultiRae detectors as appropriate for odor complaints (R6 START)
- Benzene/Toluene Colorimetric Tube Monitoring as necessary (R6 START)
- MultiRae detectors for Hydrogen Sulfide and Carbon Monoxide.

3.2.5 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.

3.2.6 Investigation-Derived Wastes

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.

Sampling personnel will change gloves between each sample collection/handling. All samples will be assembled and catalogued prior to shipping to the designated laboratory (following START SOPs 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 Data 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 – Sampling Location).
- Collection type (composite, grab, 8-Hour Composite, etc.).
- Date, Time (in Military Format)

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.

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.

Table 3-1

Requirements for Containers, Preservation Techniques, Volumes, and Holding Times
Deepwater Horizon Incident – Air Sampling
EPA Region 6

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 1-L Grabs for Tedlar Bags	30 days 24 hours for Tedlar Bags

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. Other VOCs may be identified using a library search in the scan mode, if requested.

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 reporting limit (RL) 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 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:

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 – TO-15 for VOCs
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.

4.3 DATA VALIDATION

START will validate the Level II data deliverables generated by the outside laboratories using EPA-approved validation procedures in accordance with the EPA CLP 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 quality assurance/quality/control (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 results of laboratory blank analyses.
- The results of laboratory control sample (LCS) analyses.
- Laboratory precision, by reviewing the results for blind field duplicates.
- Laboratory precision by the analysis of replicates ($\pm$ 25% RPD)

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. Field duplicate samples will be collected to assess precision of the sampling and analysis procedures and lot blanks to verify the absence of target compounds in the media. START will validate the data to assess compliance with the analytical methods.

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 COC procedures. 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 COC procedures are documented and will be made available to all personnel involved with the sampling. A typical COC record will be completed each time a sample or group of samples is prepared for shipment to the laboratory. The record will repeat the information on each sample label and will serve as documentation of handling during shipment. A copy of this record will remain with the shipped samples at all times, and another copy will be retained by the member of the sampling team who originally relinquished the samples. At the completion of the project, the data manager will export the SCRIBE COC documentation to the Analytical Service Tracking System (ANSETS) database.

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

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

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

- If sent by common carrier, a bill of lading or airbill will be used. Bill of lading and airbill receipts will be retained 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 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 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, including Latitude and Longitude.
- Subcontractor information and names of on-site personnel.
- Dates and times of sample collections and COC information.
- Records of photographs.
- Site sketches of sample location including identification of nearest roads and surrounding developments.
- Calibration results.
- Sampling changes

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 COC 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.
- Household Hazardous Waste (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, Pollution Reports (POLREPs) and/or Situation Reports (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

May 2010

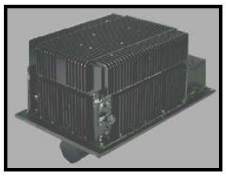
ASPECT OPERATIONS AND SAMPLING PLAN FOR THE DEEP WATER HORIZON OIL SPILL 28 APRIL 2010

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 achive 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
May 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	Author	Description of Changes
Initial Release (V1.0)	4/27/10	J. Schaefer, ERT	N/A
V1.1	4/28/10	D. Wainberg, R1	Added Scribe.NET, ASPECT information
V1.2	4/28/10	B. Morgan, Weston R6 START	Added GIS Mgmt, Reporting, and Photo Mgmt
V1.3	4/28/10	J. Schaefer, ERT	Added data elements
V1.4	5/3/10	J. Schaefer, ERT and B.	Data Processing SOPs, Scribe.NET,

		Morgan Region 6 START	Removed EventID/Desc information and added GIS Web Services information.

2) Overall Workflow

2a) Data Flow Diagram:

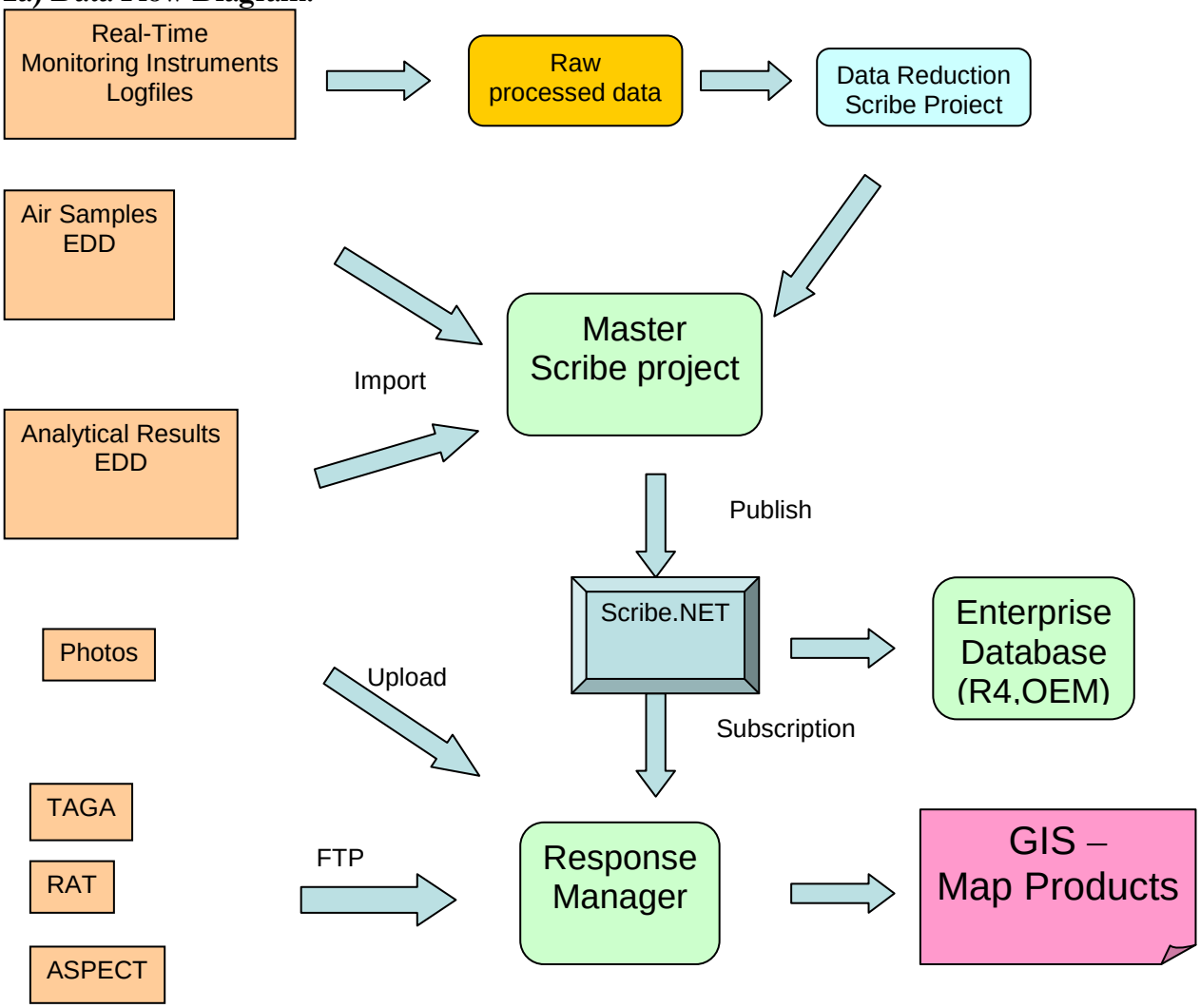


Figure 1. Data Flow Diagram

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 - Download monitoring file at a maximum frequency of once per hour, but up to 24 hours assuming sufficient battery life - 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 at a maximum frequency of once per hour, but up to 24 hours assuming sufficient battery life - Rename each file (see comments column) -Store in appropriate folder specific for that day or deliver to Data Manager	.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	
Water/Sediment Sampling		Scribe Water 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					
Mobile VOC and Particulate Data Collection	MultiaRae/ DataRAM	Rapid Assessment Tool (RAT)	Follow RAT Instructions/SOP	.shp	

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 & see comments	.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 See 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 - Follow Data Point Reduction Steps outlined below & see comments	.csv	See Appendix A
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	
Mobile VOC and Particulate Data	RAT	RAT .shp export	-Export from RAT using .shp option - 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	See Appendix A
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	See Appendix A
Water/Sediment Sampling		Scribe Water Sampling EDD Spreadsheet (electronic/hardcopy)	- Enter data into EDD if not done - Import EDD into Scribe using import wizard	Xls/ hardcopy	See Appendix A
Laboratory Analytical Data	TBD	IREDD and pdf	- Enter data into EDD if not done - Import EDD into Scribe using import wizard	xls/csv/ hardcopy	For R6 there will be a separate Scribe reporting project for analytical data
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

Data Point Reduction SOP

- For each reporting period a data reduction Scribe project should be created using the specified template (R06 Deep Water Horizon 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 a single set of 1-hr average data. The Mon_Source field will be used to designate the averaging period.
- The results of these queries will be used as the import source for the master Scribe project.

See Appendix A for detailed checklists

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 value is associated with	Text	50	No	No
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	Describes the averaging period of the result (ie 1-hr avg)	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. The ArcGIS Server Web Service will include the SCRIBE monitoring and sampling data as well as the TAGA data. The URL for the service is https://gis.westonproject.net/ags_ex22/rest/services you must have the secure login information to access these services. To gain access please route your request to Eric or Paige Delgado in Region 6 and Randy Nattis in Region 4.

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
Field Reportings Projects	Field Data Manager	Sample information, Average Stationary Monitoring Data, Analytical Data	Scribe.NET	At a minimum, published by noon each day	-Each organization (R4,R6, other) will use a unique site id for their reporting projects -It is possibl that an organization may have multiple reporting projects depending on their own unique operational and logistical requirements -No two reporting projects will contain the same information.
Master Reporting Scribe project	ERT Software Support	All field reporting Projects	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. ERT will subscribe to all reporting projects and republish as one complete dataset by 12:30pm	-The Master Reporting Scribe project will be the only project in the HQ data subscription service -Other aggregate reporting projects may be established if there is a need to have multiple , but not all, projects combined
TAGA	TAGA Operations Crew	TAGA Run	Email/Website Posting/SDE	After each TAGA run has gone through post-processing, data reduction and graphic display, it will be posted to ERT's ERT-IMS secure website	
Rapid Assessment Tool (RAT)	Field Operations Personnel	Mobile VOC/Particulate Data	FTP	After each completed route	-RAT data will be managed as a spatial object and not as tabular data -If necessary this data can be delivered to R6 so that it can be made available as an SDE layer
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 managed and distributed by the ASPECT team	

SDE	GIS Manager	Geospatial link between SCRIBE and Response Manager tabular data	Published ARCGIS Web Service	As Operational Periods requires.

6) Data Verification

6a) Verification SOPs & Checklists:
See Appendix A

6b) SQL Verification Queries:
To be developed

7) Data Reduction

7a) Reduction SOPs & Checklists:
See Appendix A

7b) SQL Reduction Queries:
Reducing Raw Monitoring data to 1-hour averages:

SELECT MonitoringDateTimeParts.Location, MonitoringDateTimeParts.Mon_Date, MonitoringDateTimeParts.Mon_Parameter, Avg(MonitoringDateTimeParts.Mon_Measurement) AS Mon_Measurement, MonitoringDateTimeParts.Mon_Meas_Units, '1-Hour Avg' AS Mon_Source, Right("0" & MonHour,2) & ":00" AS Mon_time, MonitoringDateTimeParts.MonHour, 'R06 START' AS Mon_Operator, MonitoringDateTimeParts.EventID, MonitoringDateTimeParts.InstrumentID

FROM MonitoringDateTimeParts

GROUP BY MonitoringDateTimeParts.Location, MonitoringDateTimeParts.Mon_Date, MonitoringDateTimeParts.Mon_Parameter, MonitoringDateTimeParts.Mon_Meas_Units, '1-Hour Avg', Right("0" & MonHour,2) & ":00", MonitoringDateTimeParts.MonHour, 'R06 START', MonitoringDateTimeParts.EventID, MonitoringDateTimeParts.InstrumentID

ORDER BY MonitoringDateTimeParts.Mon_Date, Right("0" & MonHour,2) & ":00";

8) Data Analysis & Reporting

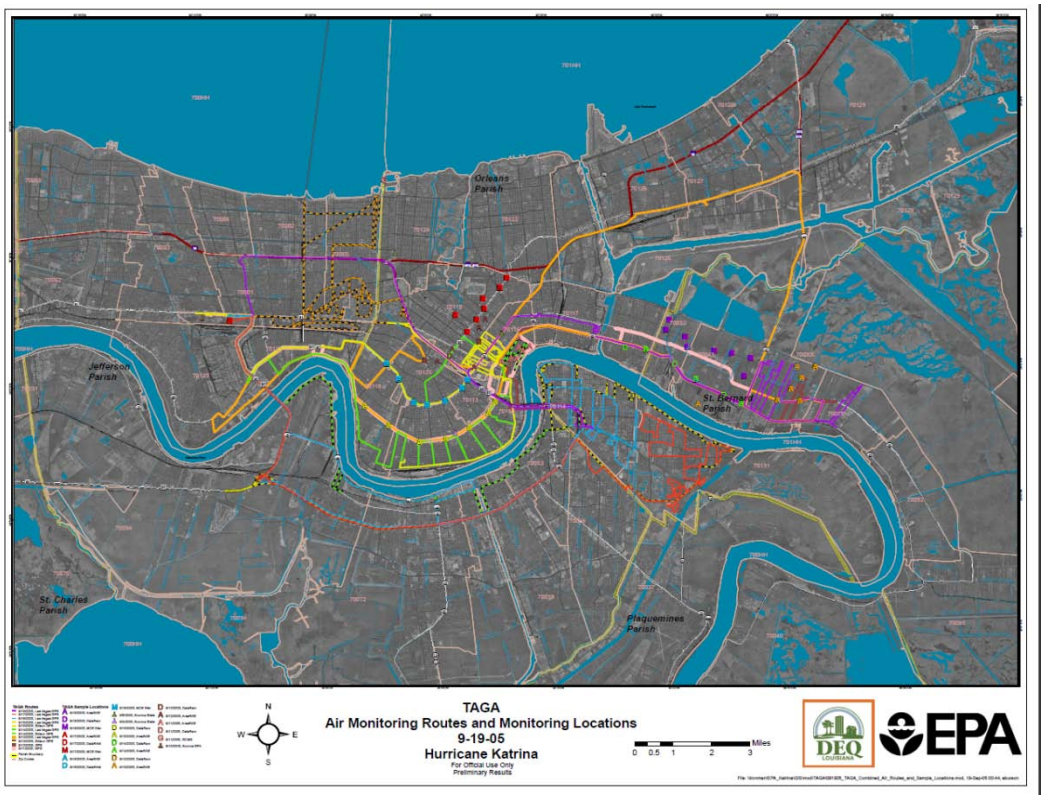
8a) Who is using the data being reported?
Unified Command (UC), Regional Emergency Operations Centers (REOCs)

8b) 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.

8c) Reporting SOPs & Procedures:
Developing these will be the responsibility of the initial site data manager and remote support personnel.

8d) SQL Reporting Queries:
Developing these will be the responsibility of the initial site data manager

8e) 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
-Scribe Water Sampling EDD Templae

-Scribe Data Reduction Template file

Appendix A

R06 DeepWater Horizon Scribe Coordinator Checklist

R06 DeepWater Horizon Scribe Coordinator Checklist

Date:	Collection Period: (i.e., 08:00, 16:00, 24:00)
Staging Database Name:	Scribe Coordinator Name

Monitoring Instruments

Process AreaRae files with Scribe's AreaRae Export Utility	Complete
Use Date Collected for EventID (for example - 2010-04-28) **Name Export File "Location_Date_TimeEnded_InstrumentID"** (for example V01_20100428_1500_RFW23713.csv) **When prompted, open the exported file and sort by Mon_Parameter** **Delete all NONE parameter rows** **Add a column called Mon_Operator and fill with R06 START** **Add a column called Instrument_Type and fill with AreaRae**	

Import AreaRae Files Into STAGING Database		
Current Number of Records in Staging DB Monitoring Table:		
File Import Custom Import Monitoring Data (data category – Monitoring Data) (import data file – Browse to exported file) (script name – Default) Add New Data Records	File Name:	# of Records
	File Name:	# of Records
	File Name:	# of Records
	File Name:	# of Records
	File Name:	# of Records
	File Name:	# of Records
	File Name:	# of Records
	File Name:	# of Records

Process DataRam Export files	
Import comma delimeted file into Excel **Delete First 20 or so Rows so column headings are row 1** **Rename Date Column – Mon_Date** **Rename Time Column – Mon_Time** **Rename (MASS)ug/m3 – Mon_Measurement** **Open the Blank DataRam spreadsheet & copy & paste all columns to data spreadsheet** **Complete remaining columns & make sure standard text is copied down all rows**	

Import DataRam Export files		
File Import Custom Import Monitoring Data (data category – Monitoring Data) (import data file – Browse to exported file) (script name – Default) Add New Data Records	File Name:	# of Records:
	File Name:	# of Records:
	File Name:	# of Records:
	File Name:	# of Records:
	File Name:	# of Records:

	File Name:	# of Records:
	File Name:	# of Records:

Import 1 Hour Averages from Staging DB into Reporting DB

Open Reporting Database – File, Open, R06 Deep H2O Horizon Reporting.MDB

Number of records currently in Monitoring table:

File ***Import*** ***Custom Import*** ***Backup Project with date/time in name*** ***Monitoring Data*** (data category – Monitoring Data) (import data file – Browse to Staging Database) (table name – _Mon 1 Hour Avg) (script name – 1 Hour Avg Monitoring Import) Add New Data Records	# of Records Imported:	Comments:
	# of Records Imported:	Comments:
	# of Records Imported:	Comments:

Create Summa and PQ200 Air Sample Import Spreadsheets

Use the Air Sampling Import.CSV for Summa and PQ200 Samples

Name Spreadsheet EDD Air Sampling_StBernard or Venice_date (yyyy-mm-dd)

Complete the following fields for Summa Canisters	Samp_No, Location, EventID, SampleMedia, SampleDate, SampleTime, SamplerID, SampleType, Matrix, Sampler, Start_Pressure, Stop_Pressure, Analyses, Volume, Volume_Units, Tag(Tag is always A)
Compoete the following fields for the PQ200	Samp_No, Location, EventID, SampleMedia, SampleDate, SamplerID, SampleType, Matrix, Sampler, Analyses, Volume, Volume_Units, Tag(Tag is always A), Volume, Volume_Units

Import Summa and PQ200 Air Samples

File ***Import*** ***Custom Import*** ***Backup Project with date/time in name*** (data category – Air Sampling) (import data file – Browse to import CSV) (script name – Default) Add New Data Records	File Name:	# Records:
	File Name:	# Records:
	File Name:	# Records

Create Air Sample Chain-of-Custodies

Create Water Sample Import Spreadsheets

Use the Water Sampling Import.CSV for Summa and PQ200 Samples

Name Spreadsheet EDD Water Sampling_StBernard or Venice_date (yyyy-mm-dd)

Complete the following fields for water samples	Samp_No, EventID, Location, SampleDate, SampleTime, SampleCollection, SampleType, Matrix, Sampler, Tag, Container, No_Container, Analyses, Coll_Method

Import Water Samples

File ***Import*** ***Custom Import*** ***Backup Project with date/time in name***	File Name:	# Records:
	File Name:	# Records:

(data category – Water Sampling) (import data file – Browse to import CSV) (script name – Default) Add New Data Records	File Name:	# Records:
Create Water Sample Chain-of-Custodies		

Publishing Log	
Date – Time & Files Included:	
Date – Time & Files Included:	
Date – Time & Files Included:	

APPENDIX C
Laboratory Compound List and Reporting Limits

Air Toxics LTD.

Laboratory Services Since 1989

Method : Modified TO-15-LL + Naph

Compound	Rpt. Limit (ppbv)
Freon 12	0.10
Freon 114	0.10
Chloromethane	0.10
Vinyl Chloride	0.10
1,3-Butadiene	0.10
Bromomethane	0.10
Chloroethane	0.10
Freon 11	0.10
Ethanol	0.50
Freon 113	0.10
1,1-Dichloroethene	0.10
Acetone	0.50
2-Propanol	0.50
Carbon Disulfide	0.50
3-Chloropropene	0.50
Methylene Chloride	0.20
Methyl tert-butyl ether	0.10
trans-1,2-Dichloroethene	0.10
Hexane	0.10
1,1-Dichloroethane	0.10
2-Butanone (Methyl Ethyl Ketone)	0.10
cis-1,2-Dichloroethene	0.10
Tetrahydrofuran	0.50
Chloroform	0.10
1,1,1-Trichloroethane	0.10
Cyclohexane	0.10
Carbon Tetrachloride	0.10
2,2,4-Trimethylpentane	0.50
Benzene	0.10
1,2-Dichloroethane	0.10
Heptane	0.10
Trichloroethene	0.10
1,2-Dichloropropane	0.10
1,4-Dioxane	0.10
Bromodichloromethane	0.10
cis-1,3-Dichloropropene	0.10
4-Methyl-2-pentanone	0.10
Toluene	0.10
trans-1,3-Dichloropropene	0.10
1,1,2-Trichloroethane	0.10
Tetrachloroethene	0.10

Reporting Limits cited do not take into account sample dilution due to canister pressurization.

Air Toxics LTD.
Laboratory Services Since 1989

Method : Modified TO-15-LL + Naph

Compound	Rpt. Limit (ppbv)
2-Hexanone	0.50
Dibromochloromethane	0.10
1,2-Dibromoethane (EDB)	0.10
Chlorobenzene	0.10
Ethyl Benzene	0.10
m,p-Xylene	0.10
o-Xylene	0.10
Styrene	0.10
Bromoform	0.10
Cumene	0.10
1,1,2,2-Tetrachloroethane	0.10
Propylbenzene	0.10
4-Ethyltoluene	0.10
1,3,5-Trimethylbenzene	0.10
1,2,4-Trimethylbenzene	0.10
1,3-Dichlorobenzene	0.10
1,4-Dichlorobenzene	0.10
alpha-Chlorotoluene	0.10
1,2-Dichlorobenzene	0.10
1,2,4-Trichlorobenzene	0.50
Hexachlorobutadiene	0.50
Naphthalene	0.50

Surrogate	Method Limits
1,2-Dichloroethane-d4	70-130
Toluene-d8	70-130
4-Bromofluorobenzene	70-130

Reporting Limits cited do not take into account sample dilution due to canister pressurization.

May 12, 2010

ADDENDUM 1.0 TO THE QUALITY ASSURANCE SAMPLING PLAN AIR SAMPLING AND MONITORING FOR THE DEEPWATER HORIZON INCIDENT

The purpose of this addendum is to modify the Quality Assurance Sampling Plan (QASP) for air monitoring and sampling for the Deepwater Horizon Incident. First, the QASP is being amended to change the frequency of samples collected with the SUMMA® canisters from 1 sample every 8 hours to one sample every 24 hours. Data from the 24-hour SUMMA® will be used by EPA for comparisons to intermediate (1 – 14 day exposure) air quality screening levels.

The remaining portions of the QASP continue to be in effect.