Unified Area Command Plan

Deepwater Horizon Waste Management Quality Assurance Project Plan

6069532

Issue date	22 July 2010
Revision date	

Copyright © 2010 BP International Ltd. All rights reserved.
This document and any data or information generated from its use, are classified, as a minimum, BP Internal. Distribution is intended for BP authorized recipients only. The information contained in this document is subject to the terms and conditions of the agreement or contract under which this document was supplied to the recipient's organization. None of the information contained in this document shall be disclosed outside the recipient's own organization, unless the terms of such agreement or contract expressly allow, or unless disclosure is required by law.

TABLE OF CONTENTS

Page

1.0 DESCRIPTION 5
1.1 Introduction 5
1.2 Project Description and Objectives 6

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY 8
2.1 BP – Project Manager 8
2.2 Field Consultant Responsibilities 9
2.2.1 Field Consultant Project Manager 9
2.2.2 Field Team Leader 9
2.2.3 Field Teams 9
2.3 Quality Assurance Oversight Manager 9
2.3.1 Data Validation Task Manager 10
2.3.2 Data Validator 10
2.3.3 Field Auditor 10
2.3.4 Laboratory Auditor 10
2.4 Laboratory Organization and Responsibilities 10
2.4.1 Laboratory Project Manager 11
2.4.2 Laboratory QA Coordinator 11
2.4.3 Laboratory Sample Custodian 12

3.0 QUALITY ASSURANCE AND QUALITY CONTROL OBJECTIVES 12
3.1 Data Quality Objectives 12
3.2 Data Quality Indicators 14
3.2.1 Data Precision 14
3.2.2 Data Bias 14
3.2.3 Data Accuracy 14
3.2.4 Data Completeness 15
3.2.5 Data Representativeness 15
3.2.6 Data Comparability 15
3.3 Field and Laboratory Quality Control Samples 16
3.4 Schedule 18
3.5 Special Training/Certification 18

4.0 SAMPLING PROCEDURES 19
4.1 Sampling Rationale 19
4.2 Sample Containers and Equipment Decontamination 19
4.3 Sample Containers, Preservation, and Holding Times 20
4.4 Field Equipment 21
4.5 Sample Identification, Documentation, and Custody 22
4.5.1 Sample Identification 22
4.5.2 Sample Custody 23
4.5.3 Sample Custody in the Field 23
4.5.4 Sample Custody in the Laboratory 24

4.6 Sample Documentation and Records 25
4.6.1 Field Logbook and/or Field Forms 25
4.6.2 Corrections to Documentation 26

5.0 ANALYTICAL PROCEDURES 26
5.1 Laboratory Analysis 26
5.1.1 Analytical Methods 26

6.0 CALIBRATION PROCEDURES 26
6.1 Field Instrument Calibration and Procedures 27
6.2 Laboratory Instrument Calibration 27
6.2.1 Balances 27
6.2.2 Thermometers 28
6.3 Records 28

7.0 PREVENTIVE MAINTENANCE 28
7.1 Field Equipment 28
7.2 Laboratory Equipment 28
7.2.1 Instrument Maintenance Logbooks 28
7.2.2 Instrument Calibration and Maintenance 29

8.0 DATA REDUCTION, VALIDATION, AND REPORTING 29
8.1 Field and Technical Data 29
8.1.1 Data Reduction 29
8.1.2 Laboratory Data QA Review 30
8.2 Laboratory Data Documentation 30
8.2.1 Data Reduction 30
8.2.2 Laboratory Data Review 30
8.2.3 Data Reporting/Deliverable Package 31
8.3 Data Review and Validation 31
8.4 Data Management 32
8.5 Data Archival 33

9.0 PERFORMANCE AND SYSTEM AUDITS 33
9.1 Performance Audits 33
9.2 System Audits 33
9.3 Audit Report 34

10.0 INTERNAL QUALITY ASSURANCE/QUALITY CONTROL 34
10.1 Field Analysis 34
10.2 Laboratory Analysis 34
10.3 Reporting Checks 34

11.0 FEEDBACK AND CORRECTIVE ACTION 34
11.1 Feedback Mechanism 34
11.2 Corrective Action 35
11.2.1 Field Activities 35
11.2.2 Laboratory Corrective Action 35

12.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT 36
12.1 Field Quality Assurance Reports 36
12.2 Laboratory Quality Assurance Reports 37
12.3 Laboratory Data Submittals 37

13.0 REFERENCES 37

Figures

Figure 2-1 Project Organization Chart

Tables

Table 3-1 Waste and TCLP Leachate Sample Analytical Methods, Reporting Limits, Accuracy, and Precision Goals
Table 3-2 Analytical Methods and Surrogate Recovery Goals
Table 4-1 Waste Sample – Containers, Preservation, and Holding Times

Attachment

Attachment 1 Waste Sampling SOP

Attachment 2 MC252-SOP-07 - SOP for Analytical Request Form Process

Attachment 3 MC252-SOP-01 - SOP for Standard Operating Procedure for Sample Labeling, Packing, and Transport

Attachment 4 MC252-SOP-03 - SOP for Sample Management Program.

Attachment 5 Data Package Deliverable Specifications

Attachment 6 Electronic Data Deliverable Specifications

Attachment 7 Data Elements and Valid Values Required by US EPA Region IV

Appendix

Appendix A: Exempt E&P Wastes

1.0 DESCRIPTION

This Waste Management Quality Assurance Project Plan (QAPP) is designed to guide sampling and characterization activities of waste for disposal purposes. These wastes are encountered as part of activities associated with the Deepwater Horizon response. This document summarizes the methods that shall be used for the sampling and analysis of liquid and solid waste samples.

The waste sampling that will be applied consists of, but not limited to:

- Oil-impacted material that may include debris, soil, sand, pebbles, vegetation; solid weathered oil (e.g., tar balls); PPE; disposal equipment; sorbents; etc. Material shall be drained of recoverable oil, as practicable (oil shall be collected for potential re-processing or other use).

- Non-oily solids that may include municipal waste material that has been recovered from support operations of the cleanup activities, including trash and garbage.

- Water, oil and emulsion collected during skimming operations, by vacuum truck from decontamination facilities, management of storm water at land-based decontamination sites, etc. This category also includes excess decontamination water that accumulates during the closed loop decontamination process.

The sampling methods, locations, quality assurance (QA) procedures, and the analytical approach and methods that shall be used to support the Deepwater Horizon cleanup are discussed in this document.

The QAPP has been developed to ensure data quality by detailing specific methods and procedures. The goal of the QAPP is to achieve complete and accurate environmental data sets. To compliment this QAPP, a standard operating procedure (SOP) for the collection of representative waste samples is provided as Attachment 1.

The QAPP portion of this document was designed to be consistent with US Environmental Protection Agency (US EPA) *Guidance for Quality Assurance Project Plans* (US EPA, 2002a) as well as US EPA Document No. RCRA-09-89-0018 (US EPA, 1991a). This document has been developed as a companion to the Unified Command Deepwater Horizon Quality Assurance Project Plan for the BP MC252 Incident (BP-MC252-QAPP, June 14, 2010).

1.1 Introduction

This QAPP portion of this document has been prepared to ensure that the quality of work performed during the sampling and characterization of liquid and solid wastes meets the project objectives as presented herein.

1.2 Project Description and Objectives

Under the Deepwater Horizon response activities, a variety of materials will be encountered that will require management by recycling or disposal. These materials must be evaluated to determine if they are exempt E & P wastes (see Appendix A), recoverable oil/water mixtures or solid wastes destined for disposal. Analyses of non-exempt E&P solid wastes will be used to properly classify the wastes as hazardous or non-hazardous. The sampling that will be performed, may include, but is not limited to:

- Oil-impacted material such as debris, soil, sand, vegetation; solid weathered oil (e.g., tar balls); PPE; disposal equipment; sorbents; etc. Material shall be drained of recoverable oil, as practicable (oil shall be collected for potential re-processing or other use).

- Non-oily solids that may include municipal waste material which has been recovered from support operations related to the cleanup activities, including trash and garbage.

- Water, oil and emulsion collected during skimming operations, by vacuum truck from decontamination facilities, management of storm water at land-based decontamination sites, etc. This category also includes excess decontamination water that accumulates during the closed loop decontamination process.

The Field Consultant shall determine the exact number and location of samples to be collected and shall execute the sampling in accordance with their specific Analytical Request Form (ARF) planning tool as described in Attachment 2. Samples may be collected from any number of staging areas by the Field Consultant. Samples shall be thoroughly mixed before transfer to an appropriate sample container. Sample analysis shall be performed by BP-contracted laboratories. Each of those BP-contracted laboratories also possesses accreditation through the National Environmental Laboratory Accreditation Conference (NELAC).

State and Federal regulations and guidance provide a process for determining if a material is a solid waste and subject to hazardous waste regulations. This process will be applied to characterize spill related materials for appropriate waste classification and subsequent management as follows:

- Oil/water mixtures – Not a solid waste when recovered. Wastes generated from oil recovery will be managed as E&P wastes or be evaluated for RCRA characteristics as appropriate

- Oil/water mixtures – Managed as E&P wastes if disposed

- Used boom and oily solids are classified as solid wastes or exempt E&P as specified in Appendix B of the May 17th Declaration of Emergency from Louisiana

- Wastes generated by spill related activities (aerosol cans, batteries, etc) are typically solid wastes and must be characterized

Except for laboratory wastes, no listed wastes are expected from cleanup activities. Therefore, non-exempt E&P solid wastes will be evaluated for RCRA characteristics of hazardous waste.

Based on generator knowledge wastes from spill cleanup activities will be characterized under this QAPP as follows:

- Toxicity Characteristic Leaching Procedure/TCLP Volatile Organics by SW846 Method 1311/8260C.
- Toxicity Characteristic Leaching Procedure/TCLP Semivolatile Organics by SW846 Method 1311/8270D.
- Toxicity Characteristic Leaching Procedure/TCLP Metals by SW846 Method 1311/6010C/7470A.
- Ignitability by SW846 Chapter 7 (liquid wastes only).
- Paint Filter Test by SW846 Method 9095B (solid wastes only)
- TNRCC Method 1005, Rev 03 (for disposal in Texas only)

Previous sampling of spill cleanup materials has shown the materials do not exhibit hazardous waste characteristics. Based on this knowledge, BP will sample and analyze selected waste streams weekly to verify the consistency of the waste materials. Staging locations for sampling will be selected based on availability of waste for sampling. After six weeks of sampling the waste, BP shall review the results of the testing. If the test results are consistently indicating the waste as non hazardous, BP will propose a revised schedule and sampling plan to analyze for TCLP constituents consistent with those found in the spill-related wastes.

Sampling tasks shall be performed in accordance with the requirements set forth in this QAPP and the sampling solid waste and liquid sampling SOPs (Attachments 1 and 2, respectively). If the US EPA or other governing body collects characteristics and analyses for liquid or solid waste samples, the Field Consultant shall perform split sampling and mirror the characteristics and analyses selected by the US EPA or other governing body.

To achieve the project data quality objectives (DQOs) as presented in Section 3, QA measures shall be implemented to ensure that the data meet known and appropriate data quality criteria such as accuracy, precision, representativeness, comparability, sensitivity, bias, and completeness. The sampling data shall be quality-controlled through the collection of field QC samples. Implementation of QA/QC measures shall allow project personnel to assess data quality relative to the established DQOs.

Data will be managed in accordance with the Unified Command Deepwater Horizon Data Management Plan for the BP MC252 Incident (BP-MC252-DMP, June 14, 2010).

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

This section describes the organizational structure, lines of authority, and responsibilities of key project individuals. Project activities shall be performed within the framework of the organization and functions presented in this section. The sample collection events shall be project specific, a general project organization chart is provided as Figure 2-1. Emphasis is placed on the organization and entities responsible for implementation and administration of this QAPP.

The organizational structure is designed to provide clear lines of responsibility and authority. This control structure encompasses the following activities:

- Identifying lines of communication and coordination.
- Monitoring project schedules and performance.
- Managing key technical resources.
- Providing periodic progress reports.
- Coordinating support functions such as laboratory analysis and data management.
- Rectifying deficiencies.

Contractor and laboratory personnel providing services in support of this work shall perform work in strict compliance with the appropriate contract specifications and this QAPP for the activity. In addition to project QA, contractor corporate-level QA personnel shall review and audit project procedures, document compliance, identify deficiencies, and recommend corrective action, if required.

QA personnel shall have sufficient authority, organizational freedom, and ability to perform the following tasks:

- Identify QA problems.
- Initiate, recommend, or provide solutions to QA problems through designated channels.
- Ensure that project activities, including processing of information, delivery of deliverables, and installation or use of equipment, are reviewed in accordance with QA objectives.
- Ensure that deficiencies/non-conformances are corrected.
- Ensure that further processing, delivery, or use of data is controlled until the proper disposition of a nonconformance, deficiency, or unsatisfactory condition.

2.1 BP – Project Manager

The BP Project Manager is responsible for defining project objectives and establishing project policy and procedures to address the specific needs of the waste sampling and analysis. In addition, the BP Project Manager shall review and analyze overall task performance with respect to planned requirements and authorization and represent BP at meetings. The BP Project Manager is the person that is the Analytical Data Requester (ADR) but delegates this responsibility to a field team member. The ADR initiates the ARF process to collect samples to support project needs.

2.2 Field Consultant Responsibilities

Under the direction of the BP Project Manager, the field consultants (non-BP employees) shall be responsible for sample collection. The firms utilized for sample collection shall be determined at the initiation of the waste sample collection project. The field consultant is primarily responsible for preparing and implementing the attached SOPs; sample collection and the QA procedures and QC measures in accordance with this QAPP.

2.2.1 Field Consultant Project Manager

The Field Consultant Project Manager shall assist the BP Project Manager with the overall project, including scope, schedule, and submittals as necessary. Other responsibilities include promoting continuity, reporting to the BP Project Manager, and providing support and guidance for all activities for the project. The Field Consultant Project Manager shall have oversight responsibility for field activities. Most often, a Field Consultant Project Manager is also the analytical data interpreter (ADR) responsible for receiving and assessing the analytical data reported by the designated laboratory.

2.2.2 Field Team Leader

The Field Team Leader shall be the primary contact in the field and shall be responsible for all field activities, as listed below.

- Completion of the Analytical Request Form (ARF)
- Coordination and management of all field personnel and subcontractors.
- Oversight of ordering and delivery of supplies.
- Ensuring field procedures are followed to achieve the DQOs.
- Review of hardcopy or electronic notebooks with respect to completeness, consistency, and accuracy.
- Daily reporting to the Field Consultant Project Manager.
- Ensuring a complete and correct Chain-of-Custody record is produced by the field team.
- Report generation.

2.2.3 Field Teams

The Field Teams are responsible for the performance of field activities as required by this QAPP and the attached SOPs. Field Teams shall document compliance with project documents through recording activities/observations in the field in a hardcopy or electronic field logbook. In addition, field teams shall be responsible for collection of samples, submission of samples to the laboratory, and completion of the Chain-of-Custody records.

2.3 Quality Assurance Oversight Manager

The designated Quality Assurance Oversight Manager (QAOM), who is not a part of the field sample collection team, will oversee all quality assurance aspects of the project relative to conformance with this QAPP, the attached SOPs, and applicable US EPA requirements. Specific tasks are listed below.

- Review and approval of project planning documents (*i.e.*, ARFs).
- Oversight of laboratory and field audits.
- Oversight of performance evaluation studies.
- Oversight of analytical data validation.
- Support the analytical laboratories with sample preparation and analysis issues.
- Support the Field Teams with sample collection and data issues.
- Resolve compliance issues originating from the field, laboratory, or data validation.

2.3.1 Data Validation Task Manager

The Data Validation Task Manager shall be responsible for the validation of the laboratory-produced data. The Data Validation Task Manager is responsible for notifying the QAOM of issues relating to the quality or validity of the data and reporting with respect to project objectives and requirements.

2.3.2 Data Validator

The Data Validator is responsible for performing review and validation of all project data generated by the laboratories in accordance with this QAPP production of the data validation reports, and notification of issues to the Data Validation Task Manager.

2.3.3 Field Auditor

The Field Auditor shall be responsible for performing an audit of the field team during the collection of samples for this project. The Field Auditor shall assess the procedures and performance of the field team relative to the requirements detailed in this QAPP and the attached SOPs. The Field Auditor shall generate a report of findings to be distributed to the QAOM, Field Consultant Project Manager, and BP Project Manager. The Field Auditor may participate in follow-up with corrective actions.

2.3.4 Laboratory Auditor

The Laboratory Auditor is responsible for auditing the BP-contracted laboratories and for notifying the QAOM and BP Project Manager of issues relating to quality or validity of the laboratory procedures. On-site laboratory audits shall be performed at the discretion of the BP Project Manager. For each facility, the Laboratory Auditor shall generate a report that details the findings of the audit. The completed audit report shall be submitted to the BP Project Manager, the QAOM, and the Laboratory QA Officer.

2.4 Laboratory Organization and Responsibilities

For the characterization of samples, the designated laboratory shall support the effort described in this QAPP. Processes shall be arranged with the designated laboratory to facilitate information exchange among BP, the field consultants, the laboratory and QA personnel. This exchange includes planning, technical requirements, schedules, and QA/QC measures.

The functional roles for the laboratory are described in this subsection. Project information exchange specifically includes sample identification; preservation procedures; sample container requirements; sample collection procedures; decontamination protocols; and sample labeling, packing, holding times, and shipping.

2.4.1 Laboratory Project Manager

The Laboratory Project Manager shall be the primary contact for the Project Team. The Laboratory Project Manager shall schedule project analytical requirements, monitor analytical status/deadlines, approve laboratory reports, coordinate data revisions/corrections and submittal of packages, and communicate sample preparation and analyses issues to the QAOM and Field Consultant Project Manager on a real-time basis. The Laboratory Project Manager shall provide direction/support for administrative and technical project staff, interface with laboratory project staff on technical issues, and QA oversight of analytical data. The Laboratory Project Manager shall contact QAOM if at any point there is a need to deviate from the QAPP or other sited published materials.

2.4.2 Laboratory QA Coordinator

The Laboratory QA Coordinator shall ensure conformance with authorized policies, procedures, and sound laboratory practices as necessary. The Laboratory QA Coordinator shall inform the Laboratory Project Manager of any non-conformances, introduce control samples into the sample train, and establish testing lots. In addition, the Laboratory QA Coordinator shall approve laboratory data before reporting or transmittal to permanent storage and shall be responsible for retention of supporting information such as control charts and other performance indicators to demonstrate that the systems that produced the data were in control. The Laboratory QA Coordinator shall also review results of internal QA audits and recommend corrective actions and schedules for their implementation.

The responsibilities of the Laboratory QA Coordinator shall include, but not be limited to, the following:

- Administering the laboratory QA/QC program.
- Implementing QC procedures for each test parameter.
- Reviewing analytical results, including raw data, calculations, and laboratory log books.
- Monitoring proper documentation and maintenance of the records.
- Identifying and implementing training requirements for the laboratory analytical personnel.
- Overseeing QA/QC implementation at the laboratory on a daily basis.
- Identifying QA/QC problems and recommending appropriate corrective action.
- Preparing status reports (progress, problems, and recommended solutions).
- Preparing reports documenting completion of corrective actions.

2.4.3 Laboratory Sample Custodian

The Laboratory Sample Custodian (LSC) shall receive samples from the field, sign and date Chain-of-Custody forms, record the date and time of receipt, and record the condition of shipping containers and sample containers.

The LSC shall verify and record agreement or non-agreement of information on sample documents. If there is non-agreement, the Sample Custodian shall record the problems/inconsistencies for the case file and shall inform the Laboratory Project Manager.

The LSC shall also label samples with laboratory sample numbers, place samples and spent samples into appropriate storage and/or secure areas, and monitor storage conditions.

3.0 QUALITY ASSURANCE AND QUALITY CONTROL OBJECTIVES

This section describes the data quality objectives and associated data quality indicators used for the project. QA/QC procedures are designed to ensure high quality for all environmental data collected on behalf of BP.

3.1 Data Quality Objectives

Data Quality Objectives (DQO) define the purpose of the data collection effort, clarify what the data should represent to satisfy this purpose, and specify the performance requirements for the quality of information to be obtained from the data. The DQO process is a seven-step iterative planning approach used to prepare plans for environmental data collection activities. DQO formulation for waste sampling and analysis are as follows:

In general, DQOs provide a qualitative and quantitative framework around which data collection programs can be designed. The qualitative aspect of DQOs seeks to encourage proper planning through the effective QA processes established by the Quality Assurance Oversight, including but not limited to the use of the Analytical Request Form (ARF) process. The ARF is a planning tool designed to ensure proper planning and schedule between the field sampling and project laboratory personnel. The quantitative aspect of DQOs involves designing an efficient field investigation that controls the possibility of making an incorrect decision.

Step 1: State the Problem

During various activities associated with response activities, liquid and solid materials shall be encountered that need to be properly disposed. These liquid and solid materials must be characterized for proper disposal.

Step 2: Identify the Decision

Are the various liquid and solid materials that are collected hazardous or non-hazardous for disposal purposes?

Step 3: Identify Inputs to the Decision

The manner in which samples are collected must be representative of the conditions observed in the environment. QC samples need to be collected to provide information on accuracy and precision. A NELAC accredited BP-contracted laboratory must be used for the characterization.

Step 4: Define the Project Boundaries

The project boundaries extend to wherever materials have come into contact or potentially have come into contact with oil from the MC252 incident.

Step 5: Develop a Decision Rule

If solid materials are characterized as hazardous, shipment and disposal methods must be in accordance with the applicable regulatory requirements. If materials are characterized as non-hazardous, proper disposal can be performed with fewer restrictions.

Step 6: Specify Limits on the Decision

The US EPA hazardous characteristics rule defines the TCLP and hazardous characteristics as published in the US EPA SW-846. These applicable characteristics include the hazardous criteria listed for TCLP volatiles, TCLP semivolatiles, TCLP metals and ignitability. If laboratory results are above the hazardous criteria for any single analyte, the sample shall be designated hazardous for disposal purposes. If laboratory results are below the hazardous criteria for all analytes and characteristics, the sample shall be designated as non-hazardous for disposal purposes. Solid wastes will also be evaluated for Paint filter testing.

Step 7: Optimize Sampling Design

Based on the results of QC samples that are collected (blanks, duplicates and matrix spikes), if results are outside the accuracy and precision DQOs, the sampling design shall be evaluated for further optimizing.

Table 3-1 presents the analytical methods, regulatory limits, the laboratory reporting limits (reporting limits), and accuracy and precision data quality indicators (DQIs) for waste samples (*e.g.*, leachate samples). These limits and goals, as well as the data quality indicators described below, serve to limit decision errors. The actual laboratory reporting limits shall vary depending upon the sample matrix and the sample dilution factors. Corrective actions associated with the accuracy and precision goals are presented in Section 11.0. The Code of Federal Regulations (CFR) Title 40 Parts 261.21, 261.22, and 261.24 specify the regulatory limits which are provided on Table 3-1 to be used for evaluation of analytical data generated under this QAPP.

3.2 Data Quality Indicators

Data quality shall be assessed using the DQIs described below and obtained from US EPA *Guidance for Quality Assurance Project* (US EPA, 2002a).

3.2.1 Data Precision

Precision is the degree of agreement between repeated, independent measurements. Field measurement precision is determined by replicate sample measurements. The precision of laboratory analyses is determined by replicate sample analyses and/or replicate matrix spike sample analyses. Precision, as relative percent difference (RPD), is calculated by dividing the difference of the replicate analytical results by the mean of the replicate analytical results, as shown below.

$$RPD = \frac{X_a - X_b}{X_a + X_b} \times 200$$

Where X_a is the larger of the replicate analytical results and X_b is the smaller of the replicate analytical results. When both replicates are within a factor of five-times the reporting limit, the calculated precision may not be significant.

3.2.2 Data Bias

Data bias is the systematic distortion of a measurement process that causes errors to skew the data in one direction.

3.2.3 Data Accuracy

Accuracy is the degree to which the sample result agrees with the actual concentration of a parameter. The accuracy of laboratory measurements is determined by analyses of matrix spike samples. Accuracy, as percent recovery, for a matrix spike sample is calculated by subtracting the sample result from the matrix spike sample result and then dividing the outcome by the amount of spike added to the matrix spike sample, as shown below.

$$MSAccuracy = \frac{X_c - X_a}{S} \times 100$$

Where X_a is the sample result, X_c is the matrix spike sample result, and S is the amount of the spike added to the matrix spike sample.

Accuracy, as percent recovery, for a laboratory control sample is calculated by dividing the sample result by the amount of spike added to the laboratory control sample, as shown below.

$$LCSAccuracy = \frac{X_c}{S} \times 100$$

Where X_c is the laboratory control sample result and S is the amount of the spike added to the laboratory control sample.

Accuracy, as percent recovery, for a surrogate is calculated by dividing the sample surrogate result by the amount of surrogate spike added to the sample, as shown below.

$$SurrogateAccuracy = \frac{X_c}{S} \times 100$$

Where X_c is the surrogate compound result in the sample and S is the amount of the surrogate spike added to the sample.

3.2.4 Data Completeness

Completeness is the degree to which the proposed sampling locations yield usable data of the type requested. Proposed sample collection points may fail to produce usable data for many reasons (*e.g.*, field conditions that prevent collection of samples, sample container breakage, elevated storage temperature, exceeded sample holding time, or data loss). Percent completeness is calculated by dividing the number of usable data points by the number of proposed sample collection points, as shown below.

$$Completeness = \frac{U}{P} \times 100$$

Where U is the number of usable data points and P is the number of proposed sample collection points. In general, the completeness goal for waste characterization is 90%.

3.2.5 Data Representativeness

Data representativeness is “the degree to which a data set can accurately and precisely characterize the environment and the parameter conditions at the point of sample” (American National Standards Institute/American Society for Quality Control [ANSI/ASQC], 1995). Data representativeness is attained through the proper design of the sampling program and should be in a constant state of assessment.

3.2.6 Data Comparability

Data comparability is the confidence with which one data set can be compared to another data set. Data comparability shall be achieved by using standard sampling and analytical techniques and by documenting all QA/QC measures and procedures. QA/QC procedures shall be considered when comparing data sets.

The laboratory shall be responsible for enhancing comparability by using the controls listed below.

3.3 Field and Laboratory Quality Control Samples

The quality of data shall be controlled, monitored, and verified by maintaining field notes, documenting field activities, and collecting and analyzing QC samples concurrently with investigative samples. Field and laboratory QC samples shall be used to assess accuracy and precision to gauge both field and laboratory activities. QC samples shall be collected and analyzed in conjunction with samples designated for laboratory analysis.

Standard analytical QC checks that may be instituted by field and laboratory personnel include, but are not limited to, the following:

- Temperature Blanks.
- Leachate Blanks.
- Field Duplicate Samples.
- Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Samples.
- Method Blanks.
- Laboratory Control Samples (LCSs).
- Laboratory Duplicate (LD) Samples.
- Surrogate Spiking.
- Internal Standard Spiking.

These above-cited QC checks are discussed in the following subsections. Table 3-1 provides a summary of the QC checks associated with the projects. Field QC samples shall be submitted to the laboratory using the same information as that submitted for the associated investigative samples. Quality assurance/quality control (QA/QC) samples shall be collected according to the following:

- Temperature blanks shall consist of a container filled with water and clearly labeled as “temperature blank.” The temperature blank shall be packaged along with the field samples in the shipping cooler and shall 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.

- Leachate blanks consist of analyte-free leachate fluid (same lot as used to prepare samples) that undergoes the TCLP tumble and subsequent preparation (i.e., extraction), analyzed, and reported in the same manner as the associate investigative samples. A leachate blank shall be generated with each TCLP tumble event of up to 20 investigative samples. For the leachate blank analysis to be considered acceptable, the following conditions must be met: concentration of target analyte in the leachate blank does not exceed the reporting limit of the analyte; the associated sample concentration is ≥ 10× the leachate blank concentrations; or the sample displays a “not-detected” result for the analyte.

- Field duplicate samples shall be collected during sampling activities to assess sample representativeness. The data obtained from these samples shall be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. Field duplicate samples shall be collected at the rate of one duplicate sample for every 10 samples collected.

The DQI for TCLP field duplicate results is as follows: if the sample result for each sample is equal to or greater than five-times the reporting limit, the RPD between sample results should be less than or equal to 20%; if at least one of the sample results is less than five-times the reporting limit, the absolute difference between the results should be less than or equal to the higher of the reporting limits. If a result is reported as "not-detected," the value of the reporting limit shall be utilized to calculate the difference.

- Matrix spike/matrix spike duplicate (MS/MSD) samples are investigative samples to which known amounts of analytes are added to the TCLP leachate after leachate generation but before solvent extraction/acid digestion and analysis. Data obtained from these samples shall be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. The laboratory shall prepare and analyze one set of MS/MSD with every batch of samples up to 20 samples. Table 3-1 provides the recovery limits and RPD limits for the MS/MSD compounds and analytes.

- Method blanks consist of analyte-free materials (*e.g.*, reagent water) that are prepared (i.e., digested) and analyzed and reported in the same manner as the associated investigative sample leachates. The method blank shall not undergo TCLP preparation. For the method blank analysis to be considered acceptable, the following conditions must be met: concentration of target analyte in the method blank does not exceed the reporting limit of the analyte; the associated sample concentration is $\geq 10 \times$ the method blank concentration; or samples display "not-detected" results for the analyte.

- Laboratory control samples (LCS) consist of laboratory-certified reagent-grade water fortified (spiked) with the analytes of interest or a certified reference material that is prepared and analyzed. The LCS must be from a source that is different from the source of the initial calibration standards (i.e., second-source). The LCS shall not undergo TCLP preparation. LCS data are used to monitor analytical accuracy and laboratory performance. LCSs shall be prepared and analyzed with each preparation batch of 20 (or less) investigative samples. Table 3-1 provides the recovery limits for the LCS compounds and analytes.

- A laboratory duplicate sample shall be obtained by splitting an investigative sample leachate into two separate aliquots and performing separate preparation and analysis of the aliquots. The laboratory duplicate sample analyses monitor precision of the preparation and analysis. Laboratory duplicates shall be prepared and analyzed for samples that require metals, mercury analyses. A laboratory duplicate sample shall be prepared and analyzed with each preparation batch of 20 (or less) investigative samples.

- Surrogate spiking consists of adding reference compounds to samples before sample preparation for analysis. Surrogate compound recovery can be used to assess method accuracy on a sample-specific basis. Surrogate compounds shall be added to investigative and QA/QC sample analyses as appropriate to the analytical method. Table 3-2 provides the recovery limits for the surrogate compounds.

- Internal standard spiking consists of adding reference compounds to samples immediately prior to analysis. Internal standards will be used to perform quantification of all target analytes analyzed by SW-846 Methods 8260C and 8270D. Internal standard compounds will be added to all investigative and QA/QC samples. SW-846 Methods 8260C and 8270D specify the acceptance criteria for internal standard compounds.

3.4 Schedule

Each sample collection event shall be addressed as a separate project. The project schedule is contingent on each project. The schedule of activities is detailed below.

- Waste sample characterization is identified as a requirement.
- The Field Consultant Project Manager or designate shall evaluate the waste to be characterized for disposal.
- The BP Project Manager or designate shall approve initiation of the field work.
- The Field Team shall complete the sample collection.
- Samples shall be delivered to the laboratory.
- The laboratory shall provide a BP Limited Data Package and EDD to BP no later than 5 calendar days after sample receipt.
- The laboratory shall provide BP Full Data Package Deliverable to BP within 28 business days of sample receipt.
- Perform a Stage 2A validation within 1 calendar day of each data package receipt to posting data on bp.com.
- Perform a Stage 4 validation of 20% of the total waste characterization data and generate reports within 28 calendar days of the identification of the data package for Stage 4 validation.

3.5 Special Training/Certification

All Field Team personnel shall have completed a training course of at least 40 hours that meets the requirements specified in 29 CFR Part 1910.120(e) on safety and health at hazardous waste operations and a refresher course of at least 8 hours that meets the requirements of 29 CFR Part 1910.120(e) on safety and health at hazardous waste operations within the last 12 months.

All individuals who plan to participate in field activities shall notify the Field Team Leader of their intent to participate and provide evidence of current health and safety training prior to commencement of sample collection activities. The Field Team Leader shall ensure all participants who arrive on-site have provided evidence of health and safety training.

Field personnel performing sample collection activities shall be properly trained in equipment use and procedures necessary for each task prior to entering the field. The Field Consultant shall employ internal processes/procedures for establishing that personnel are adequately experienced in the duties they are expected to carry out and are receiving any needed training. Training courses or workshops on specific equipment, techniques, or procedures shall be documented. It shall be the responsibility of the Field Team Leader to ensure that field personnel understand and comply with the applicable QAPP and the attached SOP requirements for their individual tasks.

Personnel who are responsible for performing laboratory analyses shall be properly trained by the Laboratory Director or her/his designee to conduct the various laboratory analyses described in this QAPP. The laboratories participating in this project shall have training programs that are equivalent to those requirements in the National Environmental Laboratory Accreditation Conference (NELAC) Standards, Section 5.0 Quality Systems. The laboratory shall have sufficient personnel with the necessary education, training, technical knowledge, and experience for their assigned functions. Data validation shall be under the direction of the Data Validation Task Manager who is experienced with the production, reporting, verification and validation of analytical data.

4.0 SAMPLING PROCEDURES

This section presents sampling rationales, documentation methods, and sampling procedures, including sample labeling, sample preservation holding times, sample custody tracking, and decontamination.

4.1 Sampling Rationale

Sampling will be performed on solid materials such as:

- Used Sorbent Boom
- Oily Solids
- Oil/water mixtures
- Wastes generated by spill related activities

Samples shall be collected from various liquid and solid materials. Sampling procedures shall be conducted so that samples are representative of the media sampled and the resultant data can be compared to other data sets. The attached SOP (Attachment 1) should provide a statistically meaningful number of field sampling points and the rationale for the collection of these samples. Where chemical levels may vary with location, enough samples should be collected to characterize the area. The attached SOP (Attachment 1) shall be employed to implement the field investigation and sampling methods, including equipment requirements and decontamination procedures.

The weight/volume of the sample collected shall be sufficient to perform the analysis requested. Samples shall be stored in the proper types of containers and preserved in a manner for the analysis to be performed per laboratory guidelines. Personnel shall change gloves between each sample collected.

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

4.2 Sample Containers and Equipment Decontamination

Each sample shall be collected with single-use or clean decontaminated equipment. To the maximum extent possible, BP field consultants shall utilize one-time use/dedicated equipment in order to avoid equipment decontamination during sample collection activities. If equipment reuse is necessary, decontamination shall be required to prevent contamination of clean areas

and cross-contamination of samples and to maintain the health and safety of field personnel. Decontamination of all sampling equipment shall occur prior to sampling and between each sample location. Decontaminated sampling equipment and sample containers shall be maintained in a clean, segregated area. Equipment decontamination shall be completed in the following steps:

- Tap water and Alconox rinse with soft scrub brush
- Deionized water rinse
- Methanol rinse
- Deionized water rinse, three times
- Air dry

Proper decontamination of sampling equipment is critical.

4.3 Sample Containers, Preservation, and Holding Times

Samples for chemical analyses shall be containerized and preserved in accordance with appropriate US EPA specifications. For each parameter, the required type of container, volume of sample, sample temperature, preservation, preparation holding times, and analytical holding times are specified on Table 4-1. Sampling containers shall be provided by the laboratory. The sample containers provided shall be new, pre-cleaned I-Chem Series 300 or equivalent. Sample containers shall be shipped to the field team in custody-sealed containers under a Chain-of-Custody. Any shipping container with broken custody seals shall be considered potentially compromised and shall not be used. Samples shall be placed in individual pre-cleaned containers for shipment to the laboratory according to Attachment 3.

Sample containers provided by the laboratory shall be shipped with a packing list that details the number and type of bottles, the associated bottle lot numbers, and the packer's signature. The Chain-of-Custody records shall be completed by field sampling personnel and returned to the laboratory with the samples. After the cooler is sealed, sampling personnel shall attach two signed/dated custody seals to the outside of the cooler. One seal shall be placed on the right front of the cooler and the second seal shall be placed on the rear left side of the cooler.

Applicable samples shall be kept chilled from the time of collection until the time of analysis by the field team and the laboratory. Field teams shall keep samples cold using ice and coolers, in which samples shall be stored until delivery to the analytical laboratory personnel. The laboratory shall supply a temperature blank bottle for each shipping container to determine if the temperature of the samples was maintained properly during transit. After receipt of the samples, it is the laboratory's responsibility to store the applicable samples (see Table 4-1) at $\leq 6°C$ until preparation and analysis has been initiated.

Sample holding times specified on Tables 4-1 must be met or data will be qualified as estimated or rejected depending on the magnitude of the holding time exceedance. The holding times for required analyses are measured from the verified time of sample collection. When possible, samples shall be shipped by overnight carrier or delivered by same-day carrier to minimize the time between collection and laboratory receipt.

Upon sample receipt at the designated laboratory, the condition of the custody seals, sample collection dates, and sample temperature shall be noted by the Laboratory Sample Custodian. In addition, the laboratory shall document whether or not wet ice was present when samples

were received. The required date for completion of analysis (or extraction) shall be noted and keyed to the holding time. The Laboratory Project Manager shall be responsible for ensuring proper execution of required analyses. The Field Consultant shall be responsible for ensuring that laboratory personnel are kept informed of any schedule changes that affect the number of samples and expected receipt of samples at the laboratory.

4.4 Field Equipment

A variety of field equipment shall be utilized for the screening activities addressed in this QAPP. A summary of the sampling equipment follows.

General Sampling equipment and supplies:

- QAPP.
- Applicable project-specific SOPs.
- Field Consultant HASP.
- Contact numbers, addresses.
- Personal protective equipment.
- Work gloves.
- Disposable gloves.
- First-aid kit.
- Camera.
- Hand-held GPS.
- Field logbook.
- Indelible-ink pens.
- Calculator.
- Tools.
- Decontamination equipment.
- Alconox or equivalent phosphate-free detergent.
- Reagent grade methanol.
- Deionized water.
- Cooler.
- Ice.
- Chain-of-Custody forms and custody seals.
- Appropriate packaging materials (*e.g.*, bubble wrap and tape).
- Sealable plastic storage bags.
- Plastic sheeting.
- Buckets.
- Trash bags.
- Paper towels.

Waste sample collection equipment and supplies:

- Shovels.
- Stainless steel scoops, spatulas, knives.
- Stainless steel mixing bowls.
- Sample containers.
- Drum thief, or equivalent.

The Field Consultant shall inspect equipment to ensure its proper working condition prior to the start of each working day. Field equipment shall be properly protected against inclement weather conditions during the field work. At the end of each working day, field equipment shall be properly decontaminated, taken out of the field, and appropriately placed for overnight storage. To the extent possible, the field team shall utilize single-use disposable sample collection equipment.

4.5 Sample Identification, Documentation, and Custody

Field sampling personnel are responsible for the collection, description, documentation, labeling, packaging, storage, management, and shipping of samples obtained in the field (Attachment 3 and Attachment 4). Appropriate practices are necessary to ensure sample integrity from collection through laboratory analysis and data reporting.

4.5.1 Sample Identification

Sample labeling and identity establishment are of critical importance in the collection of samples. Data for a sample shall be keyed to the sample's unique sample designation. This sample designation, which shall be used on sample containers and associated field data forms, shall be used for data recall from the database system. Individual samples are assigned a unique date-referenced identification number as defined below and detailed in Attachment 4.

- (Matrix Code)-(Date)-(Team Code or Vessel Code)-(Sequential #)
- (Matrix Code) – Field sample matrix code as identified in the Project Nomenclature Codes Table
- (Date) – The date the sample was collected in YYYYMMDD format.
- (Team Code or Vessel Code) – An alphanumeric string consisting of team identification code or the cruising vessels description code. (The length of the string should be succinct so that the string is both descriptive and is able to fit on the COC form and the bottleware label).
- (Sequential #) – A number which is advanced when the same team (or vessel code) collects samples on the same day, going to separate laboratories.
- Example: "SW-20100608-RAT2-01

Each sample container shall be clearly labeled, as soon as possible, after collection. At a minimum, the following information shall be written, using permanent ink, on a waterproof sample label:

- The unique sample identification number.
- Time and date of collection.
- Deepwater Horizon Response Waste Sample.
- Project number.
- Analytical Request Form (ARF) number.
- Chain-of-Custody number.
- Required analysis.

4.5.2 Sample Custody

Chain-of-Custody (COC) procedures shall be used to ensure proper management of samples during sampling and analysis and to provide sample tracking (Attachment 4). Samples and sample documentation shall be maintained in the physical possession of authorized personnel or under control in a secure area. The purpose of sample custody procedures is to document the history of samples from the time of sample collection through shipment, analysis, and disposal. A sample is considered to be in one's custody if one or more of the following conditions apply:

- The sample is in an individual's actual possession.
- The sample is in view after being in an individual's physical possession.
- The sample is locked up so that no one can tamper with it after having been in an individual's physical possession.

4.5.3 Sample Custody in the Field

A Chain-of-Custody form shall be filled out upon sample collection. At a minimum, the following information shall be written on the COC form:

- Sample identification number.
- Time and date of collection.
- Sample matrix.
- Number of sample containers.
- COC number.
- ARF number,
- Required analyses.
- Requested analytical turn-around-time.
- Any additional information the laboratory must know to perform the requested analysis, such as holding time, filtering required, *etc*.

The following Chain-of-Custody procedures shall be followed for samples submitted to the laboratory for chemical and physical properties analyses:

- Each individual field sampler is responsible for the care and custody of samples he/she collects until the samples are properly transferred to temporary storage or are shipped to the laboratory.
- A Chain-of-Custody form shall be completed by the sampler for samples collected and submitted to the laboratory.
- After the cooler is sealed, two custody tape seals shall be affixed to the cooler (as described in Section 4.3) prior to delivery pickup by the overnight courier.
- Each time the samples are transferred, the signatures of the person relinquishing and the person receiving the samples, as well as the date and time of transfer, shall be documented.
- A copy of any carrier air bill shall be retained as part of the permanent Chain-of-Custody documentation.
- Laboratory personnel shall record the condition of the sample containers and the temperature upon receipt.
- Changes or corrections to the information documented by the Chain-of-Custody form (including, but not limited to, field sample identity or requested analyses) must be dated and

initialed by the person requesting the change. If the request is by the Field Consultant, a copy of the Chain-of-Custody form shall be revised, initialed, and forwarded to the laboratory and shall supersede the original Chain-of-Custody form.

- The original Chain-of-Custody form and any documented changes to the original shall be included as part of the final analytical report. This record shall be used to document sample custody transfer from the sampler to the laboratory and shall become a permanent part of the project file.

4.5.4 Sample Custody in the Laboratory

The following subsections describe the Chain-of-Custody procedures associated with sample receipt, storage, tracking, and documentation to be followed by the laboratory.

4.5.4.1 Sample Receipt

The Laboratory Sample Custodian shall be responsible for samples received at the laboratory. The Laboratory Sample Custodian shall be familiar with custody requirements and the potential hazards associated with environmental samples. In addition to receiving samples, the Laboratory Sample Custodian shall also be responsible for documenting sample receipt, storage before and after sample analysis, and the proper disposal of samples. Upon sample receipt, the Laboratory Sample Custodian is responsible for the following activities:

- Inspect the sample containers for integrity and ensure that custody seals are intact on the shipping coolers. The temperature of the samples upon receipt and presence of leaking or broken containers shall be noted on the Chain-of-Custody/sample analysis request forms.
- Sign (with date and time of receipt) the Chain-of-Custody/sample analysis request forms, thereby assuming custody of the samples, and assign the laboratory sample identification numbers.
- Compare the information on the Chain-of-Custody/sample analysis request forms with the sample labels to verify sample identity. Any inconsistencies shall be resolved with a field sampling representative before sample analysis proceeds.

4.5.4.2 Sample Storage

Analytical samples shall be stored in a locked refrigerator maintained at $\leq 6°$ C. The temperature shall be monitored and recorded daily, at a minimum; temperatures shall be recorded in a bound logbook that is archived by laboratory personnel.

4.5.4.3 Sample Tracking

Each sample shall receive a unique laboratory sample identification number at the laboratory when the sample is logged into the laboratory computer system.

The laboratory shall utilize a sample TCLP preparation, extraction, and digestion record to document procedures being performed. Laboratory data shall be entered on the sample extraction form and permanently recorded in a laboratory logbook.

Laboratory personnel shall maintain a sample tracking system that documents the following:

- Organization/individual who performed sample analyses.
- Date of sample receipt, extraction (if applicable), and analysis.
- Sample holding times.
- Names of analysts.
- Sample preparation procedures.
- Analytical methods used to analyze the samples.
- Calibration and maintenance of instruments.
- Deviations from established analytical procedures, if applicable.
- QC procedures used to ensure that analyses were in control during data generation (instrument calibration, precision checks, method standards, method blanks, *etc.*).
- Procedures used for the calculation of precision, accuracy, and method detection limits (MDLs) for the reported data.
- Statement of quality of analytical results.

4.6 Sample Documentation and Records

After sample collection and before proceeding to the next sampling point, field sampling personnel shall complete the Chain-of-Custody record and all appropriate forms and/or logbook entries.

A field logbook shall be maintained by a field team member to record information pertinent to daily activities, the field sampling program, and the equipment preparation efforts. Field logbooks shall be bound, with pages sequentially numbered. Entries shall be made in permanent, waterproof ink. The Field Team Leader shall review field log entries daily and shall initial each page of entries. Field logbooks shall be transferred to the project files at the end of field activities to provide a record of sampling. The following sections describe the documentation of field records.

4.6.1 Field Logbook and/or Field Forms

Field logbooks may be in hardcopy or electronic form. A separate entry shall be made for each sample collected. At a minimum, the following information shall be recorded in a field logbook or on the Chain-of-Custody using indelible ink.

- Sample identification number.
- Time and date of collection.
- Sample matrix.
- Number of sample bottles.
- Project name.
- Required analyses.
- Odors or visual observations
- Any deviations from QAPP and/or the attached SOPs.
- Sample location and coordinates (as appropriate).
- Method of sample collection.
- General comments (*e.g.*, weather conditions).
- Names of all sampling personnel.
- Any deviations from established protocols or work instructions during sample collection.

4.6.2 Corrections to Documentation

Corrections to the Field Logbook shall be made by drawing a line through the incorrect entry and writing the correct entry. The person making the correction shall date and initial the correction. There shall be no erasures or obliterated entries in the field logbooks.

5.0 ANALYTICAL PROCEDURES

Routine analytical services are performed using standard US EPA-approved methodology. Non-standard methods are not anticipated for the scope-of-work described in this QAPP.

Table 3-1 present the analytical methods, reporting limits, accuracy and precision goals for aqueous samples and soil samples, respectively. The reporting limits on Tables 3-1 are presented for reference only and represent approximate reporting limits for relatively clean samples without matrix interferences. The US EPA methods listed on Tables 3-1 and 3-2 are contained in the most current versions of the *Test Methods for Evaluating Solid Waste* (SW-846).

5.1 Laboratory Analysis

To maintain a consistent data-reporting technique, non-detected results shall be presented with a “U” qualifier after the applicable laboratory reporting limit.

BP has established a standard turn-around-time for samples from BP of 5 calendar days after the date of sample collection.

5.1.1 Analytical Methods

As part of the characterization, solid waste samples shall be characterized for disposal. Samples collected per this QAPP shall be analyzed for the constituents specified on Tables 3-1.

6.0 CALIBRATION PROCEDURES

This section provides the requirements for calibration of measuring and test equipment/instruments used in laboratory analysis. The calibration procedures stipulated in this QAPP are designed to ensure that laboratory instrumentation is calibrated to operate within manufacturer specifications and that the required traceability, sensitivity, and precision of the equipment/instruments are maintained. Measurements that affect the quality of an item or activity shall be taken only with instruments, tools, gauges, or other measuring devices that are accurate, controlled, calibrated, adjusted, and maintained at predetermined intervals to ensure the specified level of precision and accuracy.

All calibration measurements and maintenance records shall be documented so that data can be verified and validated during an audit. All documentation shall be maintained for the duration of activities associated with this QAPP.

6.1 Field Instrument Calibration and Procedures

It is anticipated that the field team shall not be utilizing instruments that require calibration for the collection of liquid and solid waste samples.

If field instruments are utilized, they shall be properly protected against inclement weather conditions during the field investigations. At the beginning of each working day, field instruments shall be fully charged and calibrated according to method and manufacturer specifications. At the end of each working day, field instrument probes shall be properly decontaminated, taken out of the field, and placed in a cool, dry room for overnight storage and charging.

6.2 Laboratory Instrument Calibration

Instruments and equipment used in the laboratory shall be controlled by a formal calibration program. The program shall verify that the equipment has the proper calibration range, accuracy, and precision to generate data comparable with specific requirements. All calibration shall be performed by laboratory personnel experienced in the referenced methods for the analysis of project samples for the constituents of concern.

The laboratory shall provide all data and information to demonstrate that the analytical system was properly calibrated at the time of analysis, including calibration method, required frequency, and source of standards, response factors, linear range, check standards and applicable control limits, as part of the data deliverables.

Before any instrument is used as a measuring device, the instrument's response to reference materials must be determined. The manner in which various instruments are calibrated is dependent on the particular type of instrument and its intended use. Preparation of reference materials used for calibration shall be documented in a laboratory notebook.

The two types of laboratory instrument calibration are initial calibration (including a second source initial calibration verification) and continuing calibration verification. Initial calibration procedures establish the calibration range of the instrument. Typically, multiple analyte concentrations are used to establish the initial calibration range and calibration data. The laboratory evaluates the resulting calibration data as detailed in the analytical methods.

Continuing calibration verification usually measures the instrument's response to fewer calibration standards and requires instrument response to fall within certain limits (*e.g.,* 20%) of the initial measured instrument response. Continuing calibration verification may be used within an analytical sequence to verify stable calibration throughout the sequence and/or to demonstrate that instrument response did not drift during a period of non-use of the instrument. The laboratory evaluates the resulting continuing calibration data as detailed in the analytical methods.

6.2.1 Balances

Laboratory balances shall be calibrated and serviced annually by a certified external contractor. In addition, the analyst shall check the balance daily before use. A record of calibrations and daily checks shall be maintained in the balance log.

6.2.2 Thermometers

Oven and refrigerator thermometers shall be calibrated annually against a NIST-certified thermometer in the range of interest. Annual calibrations shall be recorded in a calibration notebook. Daily oven and refrigerator readings shall be recorded.

6.3 Records

Records shall be maintained as evidence of required calibration frequencies, and equipment shall be marked suitably to indicate calibration status. If marking on the equipment is not possible, records traceable to the instrument shall be readily available for reference.

7.0 PREVENTIVE MAINTENANCE

7.1 Field Equipment

As discussed in Section 6.0 of this QAPP, it is anticipated that field instruments shall not be required. If field instruments are utilized, the field instruments shall be properly protected against inclement weather conditions during the field investigation. At the end of each working day, field equipment shall be taken from the field and appropriately stored overnight. Field instrumentation and equipment maintenance repair, and calibration procedures shall be in accordance with manufacturer specifications.

7.2 Laboratory Equipment

The ability to generate valid analytical data requires that analytical instrumentation be properly maintained. The laboratory shall be responsible for appropriate maintenance of major instruments. The following four elements of an effective maintenance program are identified and discussed in the following subsection:

- Instrument maintenance logbooks.
- Instrument maintenance and repair.
- Available spare parts.
- Contingency plans.

7.2.1 Instrument Maintenance Logbooks

Each analytical instrument shall be assigned an instrument logbook. Maintenance activities shall be recorded in the instrument logbook and the information entered shall include:

- Date of service
- Person performing
- Type of service performed and reason for service
- Replacement parts installed (if applicable)
- Miscellaneous information

If service is performed by the manufacturer or its representative, a copy of the service record shall be inserted into the page facing the logbook page where the above cited-information has been entered.

7.2.2 Instrument Calibration and Maintenance

An overview of the routine calibration procedures used for analytical instrumentation is presented in Section 6.0. Preventive maintenance and calibration by manufacturer service representatives shall be provided on a routine basis as required based on the instrument type.

In addition to maintenance by manufacturer service representatives, procedures for routine maintenance in accordance with manufacturer specifications for each analytical instrument shall be followed by the laboratory. This shall include maintaining inventories of spare parts used routinely (*e.g.*, vacuum pumps and filaments for GC/MS and spare torches for ICP/MS). Instrument operators have the responsibility to ensure that an acceptable inventory of spare parts is maintained.

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

Data validation is a process used to determine if data are accurate, complete, or meet specified criteria (ANSI, 2000). Data validation objectives are as follow:

- Produce data with values that are validated and of a known quality.
- Evaluate the internal, spatial, temporal, and physical consistency of the data.
- Inter-compare data to identify errors, biases, or outliers.

The data validation process shall consist of data generation, reduction, and review of both field data and laboratory analytical data. The results of the validation shall be included with the original hardcopies of the data and shall be maintained in the project file. The data shall be included in the BP EQuIS® database.

8.1 Field and Technical Data

The field (non-laboratory) data that shall be collected during the field effort can generally be characterized as either “objective” or “subjective” data. Objective data include direct measurements of field data such as field screening/analytical parameters and water-level measurements. Subjective data include descriptions and observations such as descriptions of sampling locations and conditions and physical descriptions of solid samples.

8.1.1 Data Reduction

Data shall undergo field QA review and a subsequent technical review after entry into the data management system. Subjective data shall be filed as hardcopies for subsequent review and incorporation into technical reports, as appropriate.

The subjective data shall be formatted into a usable medium, such as a BP EQuIS® database program. The database shall allow for the generation of summary tables, graphs, and figures while maintaining the integrity and accountability of the original data.

8.1.2 Laboratory Data QA Review

The QA review for usability of objective field and technical data shall be performed at two levels. For the first level, data shall be reviewed at the time of collection by following standard procedures and QC checks. For the second level, after data reduction to table format or arrays, the data shall be reviewed for anomalous values. Any inconsistencies or anomalies identified by this review shall be immediately resolved, if possible, by seeking clarification from the field personnel responsible for collecting the data. Inconsistencies and anomalies shall be documented during the validation process.

Subjective field and technical data shall be approved for use by review of field reports for reasonableness and completeness. In addition, random checks of sampling and field conditions shall be made to check recorded data at that time to confirm the recorded observations. When possible, peer review also shall be incorporated into the data QA review process, particularly for subjective data, to maximize consistency among field personnel.

8.2 Laboratory Data Documentation

The laboratory shall retain records of the analytical data and project files for a minimum of 7 years from the date of the report (as required by NELAC). BP must be advised 3 months before any data is purged and given the opportunity to take custody of said document.

8.2.1 Data Reduction

Data reduction is performed by the individual analysts and consists of calculating concentrations in samples from the raw data obtained from the measuring instruments. The complexity of the data reduction shall be dependent upon the specific analytical method and the number of discrete operations (*i.e.*, digestions, dilutions, and levels/concentrations) involved in obtaining a sample that can be measured.

For those methods using a calibration curve, sample response shall be applied to the linear regression line to obtain an initial raw result, which shall then be factored into equations to obtain the estimate of the concentration in the original sample. Rounding shall not be performed until after the final result has been obtained to minimize rounding errors; results shall not normally be expressed in more than three significant figures.

Copies of raw data and calculations used to generate the final results shall be retained on file to allow reconstruction of the data reduction process at a later date.

8.2.2 Laboratory Data Review

System reviews are performed at all levels. The individual analyst constantly reviews the quality of data through calibration checks, QC sample results, and performance evaluation samples. These reviews are performed prior to submission to the Laboratory Project Manager.

Criteria for analytical data review/verification include checks for internal consistency, transmittal errors, laboratory protocol, and laboratory QC. QC sample results and information documented in field notes shall be used to interpret and evaluate laboratory data. The laboratory QA personnel shall independently conduct a complete review of selected reports to confirm analytical results.

The laboratory shall complete data verification procedures, including:

- Verifying analyses requested were adequately performed.
- Preliminary data proofing for anomalies - investigation and corrections, where possible.
- Reviewing laboratory data sheets for detection limits, holding times, surrogate recovery performance, and spike recovery performance.
- Double-checking computerized data entry, if applicable.

The Laboratory Project Manager shall review data for consistency and reasonableness with other generated data and determine whether project requirements have been satisfied. Selected hardcopy output of data (chromatograms, spectra, integrations, *etc.*) shall be reviewed to ensure that results are interpreted correctly. Unusual or unexpected results shall be reviewed, and a determination shall be made as to whether the analyses should be repeated. In addition, the Laboratory Project Manager may recalculate selected results to verify the calculation procedure.

The Laboratory QA Coordinator shall independently conduct a complete review of the Project data to determine whether laboratory and this QAPP's analytical requirements have been met. Discrepancies shall be reported to the Laboratory Project Manager for resolution.

Prior to final review/signoff by the Laboratory Project Manager, the laboratory personnel shall verify that the report deliverable is complete and in proper format, screen the report for compliance to laboratory and QAPP requirements, and ensure that the Case Narrative addresses any noted deficiencies. The Laboratory Project Manager shall perform the final laboratory review prior to reporting the results to Field Consultant Project Manager.

8.2.3 Data Reporting/Deliverable Package

The laboratory shall be responsible for providing an approved electronic data deliverable (EDD) as well as analytical reports in hardcopy format. The deliverable package shall contain final results (uncorrected for blanks and recoveries), analytical methods, reporting limits, surrogate recovery data, method blank data, and results of QC samples (where applicable). In addition, special analytical problems and/or any modifications of referenced methods shall be noted. The number of significant figures reported shall be consistent with the limits of uncertainty inherent in the analytical method. Data are normally reported in units commonly used for the analyses performed. The data shall be reported in the data package formats specified in Attachment 5 and in the EDD format specified in Attachment 6.

QC results reported shall include a method blank, MS samples, laboratory duplicate samples, and field QC samples, in addition to LCSs. Sample data results (including QC sample results) shall also be entered into the program data management system. The laboratory is responsible for reviewing the electronic data to ensure that these data are consistent with the hardcopy reports.

8.3 Data Review and Validation

The purpose of analytical data validation is to qualify data due to data quality limitations and to identify data reduction errors. In addition to the laboratory QA review, the fully documented data packages shall be evaluated by the Data Validator for the following:

- Compliance, including attaining proper laboratory reporting limits as listed on Table 3-1.
- Completeness.
- Confirmation of receipt of requested items.

Data verification and validation shall be performed in accordance with the Guidelines for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA, January 2009). Data shall be evaluated and qualified as necessary if all identification criteria were not met and if the QC acceptance criteria outlined in the specific analytical methods or laboratory-generated performance-based control limits are not met. Current performance-based control limits shall be provided as part of the analytical deliverables. Data may also be qualified as "not-detected" based on concentrations of target analytes detected in the associated blank analyses. A maximum of 80% of the data shall undergo a Stage 2A validation and a minimum of 20% of the data shall undergo a Stage 4 validation with guidance from the National Functional Guidelines for Organic Data Review (US EPA, October 1999) and National Functional Guidelines for Inorganic Data Review (US EPA, July 2002). The data validation qualifiers presented below shall be used for all project samples.

- Organic Data Qualifiers

U	This compound should be considered "not detected" because it was detected in the field/equipment blank, trip blank, or laboratory method blank at a similar level.
J	Quantitation is approximate due to limitations identified during data validation.
R	Unusable result; analyte may or may not be present in sample.
UJ	This analyte was not detected, but the reporting limit may or may not be higher due to a bias identified during data validation.

- Inorganic Data Validation Qualifiers

U	This result should be considered "not detected" because it was detected in a rinsate blank or laboratory blank at a similar level.
R	Unusable result; analyte may or may not be present in sample.
J	Quantitation is approximate due to limitations identified during data validation.
UJ	This analyte was not detected, but the reporting limit may or may not be higher due to a bias identified during data validation.

8.4 Data Management

Data will be managed in accordance with the Unified Command Deepwater Horizon Data Management Plan for the BP MC252 Incident (BP-MC252-DMP, June 14, 2010). A copy of the Chain-of-Custody shall be delivered to the Field Consultant for inclusion in project files. Upon receipt and log-in of the samples at the laboratory, the remaining sections of the field Chain-of-Custody (*e.g.*, description of the sample condition at the time of receipt, assigned laboratory batch number, laboratory identification number, and any special conditions) shall be noted on the field Chain-of-Custody. The laboratory shall document discrepancies, and the field BP Project Manager shall be notified. The Chain-of-Custody and ARF information shall be initially keyed into and maintained in the laboratory's database. A copy of the laboratory's Chain-of-Custody information, referred to as a sample receipt confirmation (SRC), shall be sent to the BP Project Manager following sample log-in for verification of properly entered handwritten Chain-

of-Custody requests and information such as sample identification numbers, analyses requested, and the quantity of samples. In cases of discrepancies between the field Chain-of-Custody and the SRC, the appropriate revisions shall be communicated to the laboratory for the Chain-of-Custody corrections. Corrected information on the field Chain-of-Custody shall be recorded into the program data management system.

The samples received by the designated laboratory shall be analyzed following internal laboratory QC procedures. The laboratory EDD shall be provided following sample analysis. If any required information is missing or if database fields are inappropriately filled, the laboratory shall be notified and shall provide a corrected EDD.

Data provided by the laboratory in the format specified in Attachment 6 and maintained in the BP EQuIS® database will be uploaded to SCRIBE.NET and will include the data elements and valid values as listed in Attachment 7.

8.5 Data Archival

Applicable electronic field and laboratory data collected from the Sites during sampling shall be archived electronically for a period of 7 years at the laboratory. BP must be advised a minimum of 3 months prior to any data being purged and given an opportunity to take custody of said data. Backup tapes containing databases and programs or software utilities shall be maintained in a secure location. Both the field consultant and laboratory shall perform daily and weekly tape backups of electronic media.

9.0 PERFORMANCE AND SYSTEM AUDITS

The primary objective of performance and system audits is to ensure that the established QA/QC procedures are properly implemented. Audit documentation shall be maintained in the project file.

9.1 Performance Audits

Performance audits are quantitative evaluations of data quality produced by a particular activity or function. At the direction of the BP Project Manager, performance audits of the laboratories shall be conducted through the submission and analysis of single- or double-blind performance evaluation samples. The QAOM shall coordinate the manufacture and submission of performance audit samples to the laboratories. A US EPA-approved performance test provider shall be used to obtain the performance evaluation samples.

9.2 System Audits

A systems audit entails an on-site evaluation of the designated laboratory and/or on-site evaluation of the field sampling activities of the field consultant for compliance with the QAPP and SOPs. At the direction of the BP Project Manager, system audits shall be conducted. Prior to conducting an on-site audit, the auditor should review the findings of previous audits and examine procedures and records. These on-site audits shall also include verification of effectiveness of implemented corrective actions. On-site audits shall be performed by the Laboratory Auditors or Field Auditors.

The system audits shall address both field and laboratory activities, including a review of personnel qualifications, equipment, documentation, sampling techniques, analytical methods, and adherence to QA/QC procedures. The laboratory has its own Quality Assurance Plan; therefore, the laboratory audit activities under this QAPP shall entail a general review of laboratory quality assurance practices. The Field Auditor shall witness field operations during an audit; however, witnessing laboratory operations on specific field samples is not required.

9.3 Audit Report

Audit findings shall be submitted, in writing, to the BP Project Manager for review. Each audit report should summarize scope and results of the audit. In the event that inadequacies are identified, corrective actions shall be described.

10.0 INTERNAL QUALITY ASSURANCE/QUALITY CONTROL

10.1 Field Analysis

The Field Team shall not be performing field analysis for this project.

10.2 Laboratory Analysis

Internal laboratory QC checks shall consist of the following:

- Instrument performance checks.
- Instrument calibration.
- Retrieval of documentation pertaining to instrument standards, samples, and data.
- Documentation of sample preservation, transport and analytical methodology.
- Analysis of QC samples (discussed in Subsection 3.3).
- Meeting the specific method requirements.

10.3 Reporting Checks

After validated laboratory data have been made available, the data shall be compiled into tables to facilitate the assessment of results. An independent check of the data entered into these tables shall be performed for accuracy and completeness, and corrections shall be made as addressed and discussed in Subsections 3.0 and 8.0.

11.0 FEEDBACK AND CORRECTIVE ACTION

11.1 Feedback Mechanism

There are mechanisms within the project structure that allow for the identification, feedback, and control of any nonconformance or deficiency. In general, the technical personnel involved with the project are responsible for reporting suspected technical nonconformance through standard communication channels established by the organizational structure. In the same manner, project personnel are responsible for reporting suspected QA nonconformance.

11.2 Corrective Action

Corrective action may be initiated under several situations. All personnel involved in the environmental project are responsible for identifying the need for corrective actions. The person who identifies the problem shall immediately notify the person who is responsible for the activity.

Before re-sampling is initiated to correct a problem, the data user should evaluate the project completeness goals. If the goals are met and a sufficient amount of data was obtained, then re-sampling may not be necessary and improper/inconsistent data may be rejected.

When a problem is not quickly resolved or has a cost effect, the BP Project Manager, Field Consultant Project Manager, and QAOM should be notified. Data quality problems that cannot be resolved may need to be reported with qualifying statements.

During performance and systems audits, the Laboratory or Field Auditor may find deficiencies in personnel qualifications, instrumentation, or documentation. Problems with existing procedures may be identified through audits or field observations. The Laboratory or Field Auditor should review documented QA problems and verify that corrective actions were completed. Existing deficiencies shall be documented by the Auditor and resolved by the personnel responsible for the activity.

11.2.1 Field Activities

Field personnel have the initial responsibility to monitor the quality of field measurements and observations. The Field Consultant is responsible for verifying that QC procedures are followed. This responsibility requires the Field Consultant to assess the correctness of field methods and the ability to meet QA objectives. If a problem occurs that might jeopardize the integrity of the project or that might cause a specific QA objective to not be met, the Field Consultant shall notify the QAOM. An appropriate corrective action shall then be determined and implemented. The Field Consultant shall document the problem, the corrective action, and the results. Copies of the documentation form shall be provided to the Field Consultant, QAOM, and BP Project Manager.

Field auditing is a recognized technique for evaluating the performance of field teams and assessing how field team performance may affect data quality. At the direction of the BP Project Manager, a field audit during the collection of samples shall be conducted by the Field Auditor to ensure that sampling, management, and transportation to the laboratory meet QA/QC protocols and that field documentation is sufficient to produce data of satisfactory quality as well as to provide a “defense” in the event that field procedures are called into question.

11.2.2 Laboratory Corrective Action

The laboratory has the responsibility to monitor the quality of the analytical system. The laboratory shall verify that QC procedures are followed and that the results of QC samples are within the acceptance criteria. This verification requires that the laboratory assess the correctness of the following items:

- Sample preparation procedure.
- Initial calibration and initial calibration verification (ICV).
- Continuing calibration verification.

- Method blank result.
- LCS/LCSD samples.
- Surrogate recoveries.
- Internal standard performance.

If the assessment reveals that the QC acceptance criteria are not met, the laboratory must immediately evaluate the analytical system and correct the problem. The analyst shall notify the Laboratory QA Coordinator of the problem and, if possible, shall identify potential causes and suggest corrective action.

The nature of the corrective action obviously depends on the nature of the problem. For example, if a continuing calibration verification is determined to be out-of-control, the corrective action may require recalibration of the analytical system and reanalysis of all samples analyzed since the last acceptable continuing calibration standard.

When the appropriate corrective action measures have been defined and the analytical system is determined to be "in control," the analyst shall document the problem, the corrective action, and the data demonstrating that the analytical system is in control. Copies of the documentation shall be provided to the Laboratory QA Coordinator.

Data generated concurrently with an out-of-control system shall be evaluated for usability relative to the nature of the deficiency. If the deficiency does not impair the usability of the results, data shall be reported and the deficiency shall be addressed in the Case Narrative. If sample results are impaired, the Laboratory Project Manager shall be notified and appropriate corrective action (*e.g.*, reanalysis) shall be taken

12.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Communication among BP, the laboratory, Field Consultants, and personnel is important to ensure that problems are remedied and that solutions are documented in an informed and timely manner.

At least once a year, the QAOM should assess and prepare a QA report for the BP Project Manager. This QA report shall include significant unresolved QA problems and recommended solutions. The report should also discuss resolved problems and the corrective actions taken since the last management report. The BP Project Manager is responsible for ensuring that QA problems identified in the QA reports are resolved.

Upon completion of a performance and systems audit, the QAOM shall submit an audit report to the BP Project Manager. This audit report should include a list of observed field activities, a list of reviewed documents, and any observed deficiencies. In the event that inadequacies are identified, corrective actions shall be undertaken as outlined in Section 10.0.

12.1 Field Quality Assurance Reports

The Field Team Leader shall provide the Field Consultant Project Manger with daily field progress reports. The Field Consultant Project Manager or Field Team Leader shall immediately notify the QAOM and BP Project Manager about field QA situations that require corrective action.

12.2 Laboratory Quality Assurance Reports

The Laboratory QA Coordinator shall provide periodic, routine summary reports specific to the project to the BP Project Manager. These reports summarize QA activities for the reporting period, including results of system audits (external and internal), summaries of corrective action to remedy out-of-control situations, and recommendations for revisions of laboratory procedures to improve the analytical systems. The Laboratory QA Coordinator shall notify the QAOM and BP Project Manager about situations that appear to systematically impact data quality.

12.3 Laboratory Data Submittals

The hardcopy data packages shall summarize the deviations from approved protocols and significant data findings in the Case Narratives. The laboratory shall submit the EDD to BP via electronic mail address MC252_EDD@envstd.com. The laboratory shall submit Adobe images of the Sample Confirmation Receipts/Chain-of-Custody Records and BP Limited Data Package to BP via electronic mail address MC252_Deliverables@envstd.com. The laboratory shall supply one hardcopy BP Full Data Package and two indexed Adobe images of the BP Full Data Package on CDs to BP via the address specified below.

MC252 DV Task Manager
c/o Environmental Standards, Inc.
1140 Valley Forge Road
Valley Forge, PA 19482-0810

13.0 REFERENCES

American National Standards Institute/American Society for Quality Control *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs (E4-1994).* American National Standard. (ANSI, 1995).

Contract Laboratory Program National Functional Guidelines for Organics Data Review. US EPA. October 1999 version (US EPA, 1999).

Contract Laboratory Program National Functional Guidelines for Inorganics Data Review. US EPA. July 2002 version (US EPA, 2002).

Guidance for Quality Assurance Project Plans, EPA QA/G-5. US EPA. December 2002 (US EPA, 2002a).

Test Methods for Evaluating Solid Waste (SW-846). US EPA. September 1994 and subsequent revisions (US EPA, 1998).

Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. US EPA 540-R-08-05. US EPA. January 2009 (US EPA, 2009).

Guidance for Data Quality Assessment, Practice Methods for Data Analysis, EPA QA/G-9. US EPA. July 2000 (US EPA, 2000).

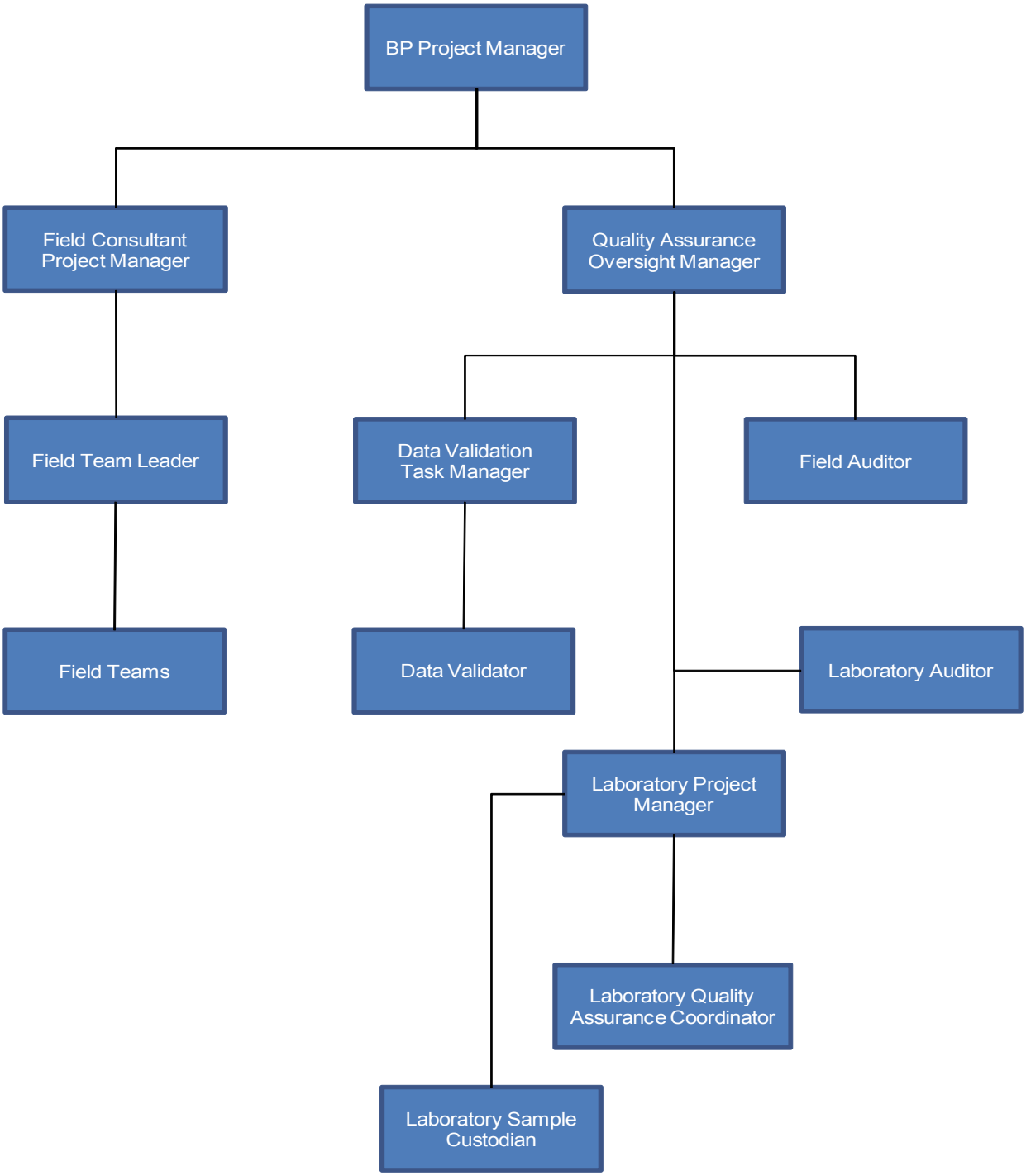
Title 40 Part 261.21 Characteristic of Ingitability. US EPA. January 1991. Code of Federal Regulations (40 CFR Part 261.21).

Title 40 Part 261.22 Characteristic of Corrosivity. US EPA. January 1991. Code of Federal Regulations (40 CFR Part 261.22).

Title 40 Part 261.24 Toxicity Characteristic. US EPA. January 1991. Code of Federal Regulations (40 CFR Part 261.24).

FIGURE 2-1

FIGURE 2 - 1
Project Organization Chart



TABLES

Table 3-1
Waste and TCLP Leachate Samples[a]
Analytical Methods, Reporting Limits, Accuracy, and Precision Goals[b]

Parameter	Analytical Method	Laboratory Reporting Limit (μg/L)	MS Accuracy (%)	Precision, RPD (%)[c]	LCS Accuracy
1,1-Dichloroethene	SW846 8260C	100	32 – 164%	20%	46 – 152%
1,2-Dichloroethane	SW846 8260C	100	56 – 150%	20%	58 - 144%
2-Butanone (MEK)	SW846 8260C	200	10 – 184%	20%	11- 169%
Benzene	SW846 8260C	100	54 – 141%	20%	63 – 133%
Carbon tetrachloride	SW846 8260C	100	49 – 146%	20%	54 – 144%
Chlorobenzene	SW846 8260C	100	67 – 136%	20%	69 -131%
Chloroform	SW846 8260C	100	64 – 138%	20%	68 – 132%
Tetrachloroethene	SW846 8260C	100	43 – 161%	20%	52 – 159%
Trichloroethene	SW846 8260C	100	57 – 144%	20%	67 – 134%
Vinyl chloride	SW846 8260C	100	29 – 152%	20%	37 – 149%
Arsenic	SW846 6010C	200	75 – 125%	20%	87 – 116%
Barium	SW846 6010C	2000	75 – 125%	20%	89 – 119%
Cadmium	SW846 6010C	100	75 – 125%	20%	87 – 116%
Chromium	SW846 6010C	200	75 – 125%	20%	87 – 115%
Lead	SW846 6010C	200	75 – 125%	20%	88 – 117%
Mercury	SW846 7470A	0.2	75 – 125%	20%	80 – 120%
Selenium	SW846 6010C	200	75 – 125%	20%	88 – 117%
Silver	SW846 6010C	200	75 – 125%	20%	77 – 124%
TPH	TNRCC Method 1005, Rev 03	5 mg/L aqueous 50 mg/kg solid for each range	75 – 125%	20%	75 – 125%
Flashpoint	SW846 Chapter 7	Ambient (°F)	NA	NA	78 – 83 (°F)

Table 3-1
Waste and TCLP Leachate Samples[a]
Analytical Methods, Reporting Limits, Accuracy, and Precision Goals[b]

Parameter	Analytical Method	Laboratory Reporting Limit (μg/L)	MS Accuracy (%)	Precision, RPD (%)[c]	LCS Accuracy
Paint Filter Test	SW846 9095B	Pass/Fail	NA	NA	NA
1,4-Dichlorobenzene	SW846 8270D	100	35 – 110%	20%	45 – 110%
2,4,5-Trichlorophenol	SW846 8270D	250	34 – 144%	20%	44 – 110%
2,4,6-Trichlorophenol	SW846 8270D	100	33 – 140%	20%	43 – 110%
2,4-Dinitrotoluene	SW846 8270D	100	33 – 128%	20%	49 – 124%
2-Methylphenol(*o*-Cresol)	SW846 8270D	100	10 – 126%	20%	46 – 110%
3&4-Methylphenol	SW846 8270D	100	38 – 128%	20%	45 – 117%
Hexachloro-1,3-butadiene	SW846 8270D	100	27 – 110%	20%	34 – 110%
Hexachlorobenzene	SW846 8270D	100	40 – 111%	20%	52 -115%
Hexachloroethane	SW846 8270D	100	35 – 110%	20%	43 – 113%
Nitrobenzene	SW846 8270D	100	29 – 118%	20%	41 – 112%
Pentachlorophenol	SW846 8270D	250	24 – 168%	20%	38 - 135%
Pyridine	SW846 8270D	100	40 – 112%	20%	24 – 118%

a - Waste samples shall be extracted according to SW846 Method 1311.

b - The goals for accuracy and precision are reflective of the contract laboratory-generated limits. As such, these limits may be revised on an annual basis to reflect the laboratory-generated limits. It is not anticipated that the updates of the limits shall vary significantly from those listed.

c - Precision limit for matrix spike/matrix spike duplicate or laboratory duplicate analyses.

Table 3-2 Analytical Methods and Surrogate Recovery Goals			
Matrix	**Method**	**Surrogate Compound[a]**	**Recovery Limits[b]**
Aqueous	8260C	4-Bromofluorobenzene	68 – 124%
Aqueous	8260C	Dibromofluoromethane	72 – 126%
Aqueous	8260C	Toluene-d_8	79 – 119%
Aqueous	8270D	2,4,6-Tribromophenol	25 – 145%
Aqueous	8270D	2-Fluorobiphenyl	34 – 117%
Aqueous	8270D	2-Fluorophenol	10 – 118%
Aqueous	8270D	Nitrobenzene-d5	33 – 120%
Aqueous	8270D	Phenol-d6	15 – 134%
Aqueous	8270D	Terphenyl-d14	24 – 133%
Aqueous/Solid	TNRCC Method 1005, Rev 03	Trifluoromethylbenzene or 1-chlorooctane (C6-C12) and 1-chlorooctadecane, 2-flurobiphenyl, or ortho terphenyl (> C12 range)	70-130%

a - The specific surrogate compounds utilized for an analytical method may change due to method updates or other factors.

b - The goals for recovery are reflective of the laboratory-generated limits. As such, these limits may be revised on an annual basis to reflect of the laboratory- generated limits. It is not anticipated that the updates of the limits shall vary significantly from these limits.

Table 4-1
Analytical Methods, Container, Preservation and Holding Times

Analyte	Analytical Methods	Matrix	Container	Preservation	Minimum Sample Weight	Holding Time from Collection to TCLP Extraction	Holding Time from TCLP Extraction to Analytical Preparation	Holding Time for Analytical Preparation to Analysis
TCLP VOCs	SW846 1311/8260C	Solid or Liquid Waste	Glass	≤ 6°C	16 oz	14 days	NA	14 days
TCLP SVOCs	SW846 1311/8270D	Solid or Liquid Waste	Glass	≤ 6°C	16 oz	14 days	7 days	40 days
TCLP Metals	SW846 1311/6010C 1311/7470A	Solid or Liquid Waste	Glass	≤ 6°C	16 oz	180 days	180 days	180 days
TCLP Mercury	SW8461311/7470A	Solid or Liquid Waste	Glass	≤ 6°C	16 oz	28 days	28 days	28 days
TPH 1005	TNRCC Method 1005, Rev 03	Solid or Liquid Waste	Glass	≤ 6°C; pH < 2 for liquids	10 grams (solids) or 40 mL (aqueous)	NA	NA	14 days from sample collection to extraction; 40 days from extraction to sample analysis; petroleum waste is 14 days

Table 4-1
Analytical Methods, Container, Preservation and Holding Times

Analyte	Analytical Methods	Matrix	Container	Preservation	Minimum Sample Weight	Holding Time from Collection to TCLP Extraction	Holding Time from TCLP Extraction to Analytical Preparation	Holding Time for Analytical Preparation to Analysis
Ignitability	SW846 Chapter 7	Solid or Liquid Waste	Glass	$\leq 6°C$	16 oz	NA	NA	14 days
Paint Filter Test	SW846 9095B	Solid or Liquid Waste	Glass	$\leq 6°C$	16 oz	NA	NA	None

ATTACHMENT 1

1 PURPOSE

The BP MC 252 Event Sampling Safety Procedures are designed to establish guidelines for the safe but efficient sampling of materials of materials, wastes, or other substances that are to be collected and transported or processed after laboratory analysis.

The procedures herein will not be a discussion of techniques of sampling with all methods and sampling instruments, but rather guidelines for the safe collection, decontamination, transport, and storage of the samples. The personal safety of the sampler is foremost.

2 SCOPE

The BP MC 252 Sampling Safety Procedures and requirements apply to all personnel and all contractor and subcontractor personnel working at all BP MC 252 Event Staging Locations

3 REFERENCES

Heritage Field Services Sampling Program,
29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response".

4 RESPONSIBILITY

The Project Manager or his/her designee shall be responsible to ensure that these procedures and requirements are met in their divisions as to sample collection, handling, and storage. In addition, he or she shall see that samples are properly stored and disposed of appropriately and in a timely manner.

5 PROCEDURES FOR SAMPLING SAFETY

5.1 Prior to sampling, supervisors shall ensure that Safety Plans are completed and approved. The Safety Plan or procedure shall be on-site.

5.2 In operations where the main scope of work is the sampling of known materials, or for obtaining samples for analysis and processing, the following requirements should normally be followed:

5.3 A minimum of 2 persons shall work the area where one shall always be in the safety zone available and able to obtain assistance in an emergency.

5.4 When appropriate, safety equipment should be available and within the immediate area of personnel containing the following minimum safety equipment or easily accessible:

a) Fire extinguisher (immediate area)
b) First Aid Kit (on site)
c) Latex or Vinyl gloves
d) Oil absorbent pads/oil dry (immediate area)
e) Shovel and broom (immediate area)
f) Eye wash (immediate area)
g) Cell phone (immediate area)

5.5 Normally, most sampling will be done at Level D protection. However, based on the type of waste stream and expected material, an upgrade or down grade may be allowed according to the waste stream's required safety equipment.

6 Roll-off Box Sampling:

6.1 Do not enter the roll-off, use a ladder to grab bags from each quadrant.
6.2 Bagged waste material will be removed from each of the selected containers and the contents of the bags will be laid out on plastic sheeting.
6.3 A representative aliquot of each type of waste material (oiled sorbent boom, oiled sorbent pads, oiled PPE, etc) will be collected.
6.4 Waste material will be cut, using shears or scissors, into manageable pieces of approximately 1 to 2 square inches, or as small as practical in the field, then placed into a dedicated pan, thoroughly mixed, then transferred to an approved sample container. Further particle size reduction may be required at the laboratory.
6.5 Sample material will be tightly packed inside sample containers.
6.6 Label sample containers
6.7 Tag out roll-off. Don't add to or remove any materials or ship off-site until results are reviewed.
6.8 All other sampling procedures shall be in accordance with generally acceptable best-demonstrated safety practices.

7 Liquid Waste Sampling

7.1 Use non-sparking tools made of non-sparking materials.
7.2 Allow all pressure to release once the seal is broken. It is a good idea to place absorbent pads around opening before breaking the seal in case contents leak when opened.
7.3 Step away until all pressure is released.
7.4 Have sample container immediately near the opening to minimize dripping and creating a mess.
7.5 Liquid waste samples will be collected from bulk containers (barges or frac tanks) using a drum thief sampler, Composite Liquid Waste Sampler (COLIWASA), or similar device. A separate sample will be collected for the oil and aqueous phases, as appropriate, and transferred to an approved sample container.
7.6 All other sampling procedures shall be in accordance with generally acceptable best-demonstrated safety practices.

8 HANDLING AND STORAGE OF SAMPLES

8.1 Samples are not to be brought into, prepared, or kept in the offices or office trailers.
8.2 All samples must be marked with a label which includes the following:
a) Sampler's Name
b) BP MC 252 Event and Location
c) Sample Date
d) Sample Type (oil and water, oily debris)
e) Sample Number
f) Unique sample identification number to match the container including the roll-off number or frac tank number and the accumulation start date.

9 SAMPLE PRESERVATION AND HOLD TIMES

9.1 Samplers will obtain and use single use sample containers for the samples collected during the sampling effort.
9.2 Laboratory samples will be stored in coolers with ice until they are submitted for analysis.
9.3 Request expedited turnaround time for waste analytical results unless otherwise advised based on discussions with the laboratory.
9.4 Samples that have been analyzed will be disposed by the designated laboratory in accordance with the laboratory SOPs.

10 Sample Shipment

10.1 The samples will be preserved and packaged in coolers with ice according to appropriate sample packing guidelines. In general, the samples will be shipped via carrier to the participating laboratories by the Department of Transportation (DOT) regulations governing environmental and hazardous sample packaging, labeling and sampling will be followed.
10.2 A separate chain-of-custody (COC) record will be completed for each sample cooler that is prepared for shipment to the laboratory.
10.3 COC forms will be filled out and the original signed COC forms will be inserted in a sealable plastic bag and placed inside the cooler. A copy of this record will remain with the shipped samples at all times.
10.4 The cooler lids will be securely taped shut, a custody seal applied, and then delivered to shipping company, courier, or directly to the analytical laboratories.

11 SAMPLE SUMISSION

11.1 Samples will be submitted to a National Environmental Laboratory Accreditation Program (NELAP) certified laboratory for the following analyses:

a) Toxicity Characteristic Leaching Procedure Volatiles (TCLP VOCs) by SW-846 Method 1311/8260B.
b) TCLP Resource Conservation and Recovery Act (RCRA) List Metals by SW-846 Method 1311/6010C and Method 1311/7470.
c) Ignitability by SW846 Method 1010/1020

ATTACHMENT 2

Deepwater Horizon
Analytical Request Form (ARF)
Process Plan
MC252-SOP-07

Unified Area Command

1.0 PURPOSE

This standard operating procedure (SOP) provides the technical requirements and operational guidelines for the proper completion of the Analytical Request Form (ARF) required for environmental sampling events associated with the BP Mississippi Canyon (MC) 252 oil spill. Additionally, these procedures have been developed to describe the ARF review process, ARF Deviation Form, ARF Revisions, and Research ARFs.

2.0 GENERAL CONSIDERATIONS

The sample Quality Assurance Oversight Manager (QAOM), Technical Review (TR) Team (a Principal chemist), Analytical Data Requestor (ADR), Analytical Data Interpreter (ADI), the Sample Receiving Officer, and the Field Team Leader (FTL) are responsible for overall implementation of this procedure. The intent of this SOP is to document a process whereby sampling events are planned, analytical laboratories are identified, sample kits are prepared, and so that sample analytical data can be easily linked back to the requestors and specific purpose.

Potential hazards associated with the planned tasks shall be evaluated prior to conducting field activities. A completed Job Safety Analysis (JSA) or Job Hazard Assessment (JHA) provides a description of potential hazards and associated safety and control measures.

3.0 PROCEDURES

The following sections describe the procedures for the proper completion of the ARF. Variations in these procedures are not acceptable unless approved by QA Team and BP Management. Any approved variation shall be documented on an ARF Deviation Form. Field work only progresses after deviations are approved or resolved.

3.1 Completion of the Analytical Request Form

Completion of the ARF (a template is provided as Attachment 1) is essential for ensuring that the appropriate procedures and approvals are in place prior to initiating sample collection activities. The ARF template may be downloaded from the sample management SharePoint™ website (SharePoint). The ARF contains essential information about the operational purpose of sample collection activities and the analytical laboratory including analysis parameters and data package requirements. The ARF shall be complete with no sections left blank. Additionally, the ARF requires a signature by the ADR or ADI, the person submitting the ARF, a member of the sample QA Team, a member of Technical Review Team, and a member of the BP Management Review team.

a. The ADR or designee shall complete the ARF, in its entirety, prior to initiating any environmental sample collection activities. The following sections of the ARF shall be completed in full:

    1. Purpose: Indicate the specific operational purpose of the sample collection activities in terms of the questions to be answered and describe the decisions

This document is valid only at the time of printing. Copies printed from this site are considered uncontrolled.

that shall be made after an assessment of the data and sample knowledge or obtained.

2. Field Team Contact (FTL) Information: Contact information for the person knowledgeable about and responsible for sample collection dates, sample crews, and the specific sampling details required by the ARF.
3. ADR Contact Information: The contact information for the person requesting the collection and analysis of samples.

Note: The ADR must reference an associated approved sampling and analysis plan (SAP), SOP, or QAPP on the ARF.

4. ADI Contact Information: The contact information for the person who shall receive the analytical results from the laboratory for evaluation.
5. Analytical Laboratory Information: The ADR or ADI shall choose a BP-approved laboratory for analysis of samples.
6. Analytical Information Table: This table shall be completed in its entirety. Blank cells shall be struck through to prevent unapproved changes.
   - Matrix: Choose from the matrices detailed below the table: Oil (OL), Solid (S), Air (A), Biota (B), or Aqueous (Q). Each line shall not encompass more than one matrix.
   - Number: Estimated number of samples to be collected per matrix per sampling event.
   - Compound List or Parameter: The list of analytes to be tested for in each matrix (*e.g.,* VO+20, Biomarkers)
   - Analytical Method: The US Environmental Protection Agency analytical method (*e.g.,* SW-846 Method 8260, SW-846 Method 8270 Mod)
   - Bottleware Needed: A list of type and number of bottles required for sample collection. If preservatives are required in bottleware this requirement must be indicated.
   - Number of Quality Control (QC) Samples: Number of each QC sample type per matrix for each sampling event. QC samples shall collected in accordance with the approved sampling plan submitted with the ARF. See MC252-SOP-05 (Field Quality Control Sampling) for a description of QC samples.
7. Additional Requests and Instructions: Any additional information necessary for laboratory or sampler conformance with the intent of the ARF.
8. Turn-Around-Time (TAT) and Data Package Requirements:
   - Electronic Deliverables e-mailed to: Shall include MC252_EDD@envstd.com. If additional deliverable e-mails are required, they shall be included in this section.

- BP Limited Data Deliverables emailed to: Shall include MC252_Deliverables@envstd.com. If additional deliverable e-mails are required, they shall be included in this section.
- If a TAT faster than the standard 10 business days is required, it must be indicated by circling "Yes" and detailing the required TAT on the line provided.
- The data reporting must be specified by circling Reporting Limit (RL) Reporting or Method Detection Limit (MDL) Reporting. This determination shall be detailed in the approved sampling plan submitted with the ARF.

9. Sample Volume and Sample Program Duration:
   - Estimated Sample Volume: Volume of matrix collected per sample (includes all analyses).
   - Estimated Sample Collection Frequency: Must choose ongoing, daily, one-time, or any other known rate of recurrence.
   - Estimated Number of Samples per Shipment: Estimated number of samples per matrix.
10. Example Program IDs: Sample collection program shall be one of the detailed programs in this section.
    - If the sample collection program is not listed but has been established, input the program name and its definition in the space provided.
    - If the sample program ID is not listed, the QA or Technical Review Team will assign a program name and abbreviation.
11. Required Signatures: Shall have printed name and signature
    - Analytical Data Requestor or Interpreter: The person requesting the collection of samples who can clearly define the purpose/question the sampling is intended to answer.
    - ARF Submitted by: The ADR (or designee) shall be the person to complete the ARF.
    - Sample QA Team Receipt: An Environmental Standards employee designated by the QAOM for ARF review.
    - Technical Reviewer: An Environmental Standards consulting chemist.
    - Management Reviewer: A person on the BP management staff.

Note: If the ADR is not on site, he/she may authorize an on-site person to sign (*e.g.,* "James Smith" for "Jane Doe"). If the signator cannot authorize an on-site person to sign, the signator shall provide e-mail concurrence of an ARF and sign and fax (1-866-662-0754) or email a copy of the signed ARF to the QA Team at BPOS-FO@envstd.com.

This document is valid only at the time of printing. Copies printed from this site are considered uncontrolled.

3.2 Approval Process for ARF

a. ARF shall be completed by ADR (or designee) in its entirety as detailed above. Additionally, the person submitting the ARF to the QA Team shall sign and date the ARF (in the "ARF Submitted By" section).

b. The ARF shall then be submitted to the QA team member, in hardcopy or electronic, to be reviewed for completeness and clarity. If the ARF is deemed complete, the sample QA Team shall sign and date the ARF (in the "Sample QA Team Receipt" section). If the ARF is not complete, the sample QA Team Member shall return the ARF and send an e-mail describing where the ARF is incomplete to the ADR (or designee). The sample QA Team Member shall work with the ADR (or designee) to complete the ARF.

c. The complete ARF is given to the Technical Review Team. The Technical Review Team Member shall review the laboratory selection, the set of analytical parameters requested, the bottleware requested, and the QA/QC specified. The Technical Review Team Member shall address any questions to the ADR. Upon resolution of the questions the Technical Review Team Member shall sign and date the ARF.

d. The ARF is then given to the Management Team Review, who will review the operational purpose, the field contact, the analytical data requestor, the analytical data interpreter, and the required TAT to verify the ARF is ready to be implemented. If any questions arise, they shall be resolved prior to ARF implementation. When the ARF is ready to be implemented, the Management Team Review will sign and date the ARF indicating approval to implement the work specified in the ARF.

e. Once the ARF is signed by all necessary parties, the QA Team shall conduct the following activities, after which the sampling plan can be executed.

    1. Assign the completed ARF a unique 3-digit ARF number.
    2. Scan the approved ARF to a PDF in black and white at 400 x 400 resolution.
    3. Update the ARF List on the SharePoint.
    4. Placed the approved ARF in the completed ARF folder on the SharePoint.
    5. E-mail approved ARF to the ADR or ADI, designated laboratory(s), Sample Receiving Office, the FTL, ESI-BPOS@envstd.com, and other designated parties on the ARF.

f. The data interpreter (identified on the ARF) shall be expected to receive and assess the BP limited data package that shall be provided directly by the laboratory.

3.3 ARF Deviation Form Process

Any one-time deviations to an approved final ARF shall be documented on an ARF Deviation Form (Attachment 2) and finalized and signed by the Project personnel identified on the ARF Deviation Form in a manner consistent with the process designated for ARF approval (Section 3.2 of this SOP).

3.4 ARF Revision Process

Permanent changes to an ARF shall be captured under a revision (*e.g., ARF-008Rev1*) or by the creation of a new ARF. The approval and finalization process for an ARF Revision is the same as detailed above (Section 3.2 of this SOP). An ARF revision shall be completed when the previous version of the ARF no longer governs a sampling program.

3.5 Research ARF (R-ARF) Process

Completion of an R-ARF is necessary for tracking of occasional special request sampling events (Attachment 3). The R-ARF template may be downloaded from the sample management SharePoint. A research ARF shall provide documentation for special projects as well as provide the laboratory clarity on TATs and deliverables.

The approval and finalization process for an R-ARF shall follow the same procedure as an ARF (Section 3.2).

Attachment 1

ARF Template

MC 252 Response

Analytical Request Form (ARF)

Sample Program ID: _____

ARF Number: _____

Revision Number: _____

Purpose: What is the Operational purpose/question that the sampling and testing event is intended to answer/guide?

_____

_____

_____

_____

Governing Project Guidance Document: _____

Field Team Contact Information:	**Analytical Data Requestor Contact Information:**	**Analytical Data Interpreter Contact Information:**
Command Center: _____	Command Center: _____	Command Center: _____
Sample Contact: _____	Data Requestor: _____	Data Interpreter: _____
Organization: _____	Organization: _____	Organization: _____
Mobile #: _____	Mobile #: _____	Mobile #: _____
Email: _____	Email: _____	Email: _____

Analytical Laboratory Information:

Laboratory Name: _____

Contact: _____

Phone #: _____

Email: _____

Address: _____

_____

Investigatory Samples		Analytical Information		Sample Preparation	Number of Quality Control Samples			
Matrix *	Number per Event	Compound List or Parameter	Analytical Method	Bottleware and Preservatives Needed	MS/ MSD **	TB **	EB or FB **	FD **

* Lab Matrix Code: Oil (O), Solid (S), Air (A), Biota (B), or Aqueous (Q)

** MS (Matrix Spike) / MSD (Matrix Spike Duplicate) / Trip Blank (TB) / Equipment Blank (EB)/ Field Blank (FB) / Field Duplicate (FD)

**Equipment rinsate blanks are not required when pre-cleaned, dedicated, or disposable sampling equipment is used. (1 per 20 samples) In these cases a field blank sample shall be collected.

**Field duplicates & MS/MSD samples should be collected for every 20 investigative samples (Oil matrix samples do not require MS/MSD).

Additional Requests and Instructions

Laboratory should provide Batch QC including: Preparation blanks, LCS, & Laboratory Duplicates.

Data Package Requirements

Electronic Deliverables emailed to: MC252_EDD@envstd.com

BP Limited Data Deliverable: Adobe image - Specification can be obtained from Szeiner@envstd.com

BP Limited Data Deliverables emailed to: MC252_Deliverables@envstd.com

Name/email:

Name/email:

Name/email:

Name/email:

BP Full Data Package Deliverable: One (1) Hardcopy BP Full Data Package - Specification can be obtained from Szeiner@envstd.com

Two (2) Indexed Adobe images on CDs should be shipped to:
MC252 DV Task Manager
Environmental Standards, Inc.
1140 Valley Forge Road
Valley Forge, PA 19482 - 0810
610-935-5577

Turn Around Time (TAT) Requirements

Is a faster TAT required for this request (circle one): YES or NO If Yes list required TAT:

Specify data reporting (circle one): RL Reporting or MDL Reporting

Standard TAT: 10 business days for BP Limited Data Package; 35 business days for BP Full Data Package.

Sample Volume and Sample Program Duration

Sample Bottleware and Volume (per sample):

Estimated Sample Collection Frequency: (ongoing, daily, one-time)

Estimated Number of Samples per Shipment:

Analytical Data Requestor or Interpreter (Name/Signature): **Date:**

ARF Submitted by (Name/Signature): **Date:**

Sample QA Team Receipt (Name/Signature): **Date:**

Technical Reviewer (Name/Signature): **Date:**

Management Reviewer (Name/Signature): **Date:**

Attachment 2

ARF Deviation Form

ARF Deviation Form

ARF Number: _____ **Date of Request:** _____

COC Number: _____

Person requesting Deviation:

Printed Name: _____ **Date:** _____

Signature: _____

Description of Deviation:

_____

_____

_____

_____

_____

_____

_____

_____

Analytical Data Requestor Identified on ARF:

Printed Name: _____ **Date:** _____

Signature: _____

Sample Quality Assurance Team Approval:

Printed Name: _____ **Date:** _____

Signature: _____

Attachment 3

R-ARF

Research Analytical Request Form (R-ARF)

MC 252 Response

R-ARF Number:

Rev. 1: 2010.06.29

Purpose: What is the purpose of the research? What is the research intended to answer/guide? (1-2 sentences maximum.)

Additional Analytical Information/Instructions

Analytical Data Requestor Contact Information:	Analytical Data Interpreter Contact Information:	Turnaround Time
Command Center:	Command Center:	☐ 6 Hours from sample acceptance
Data Requestor:	Data Interpreter:	☐ 24 Calendar hours from sample acceptance
Organization:	Organization:	☐ 3 Calendar days from sample acceptance
Mobile #:	Mobile #:	☐ Other (specify)
E-Mail:	E-Mail:	Deliver Data To: and MC252_Deliverables@envstd.com

Qualitative Analysis Only (Describe)

Qualitative and Quantitative Analysis (Describe)

Matrix *	Number	Requested Preparation Method (e.g., Dilute/Shoot, Sonicate)	Analytical Technique (e.g., GC-FID, GC/MS)	Deliverables (Check all that apply)
				☐ Chromatogram
				☐ Excel Table
				☐ Special Report

* Matrix: Oil (O), Solid (S), Air (A), Biota (B), or Aqueous (Q)

Analytical Data Requestor (Name/Signature): **Date:**

QA/Technical Reviewer (Name/Signature): **Date:**

Management Reviewer (Name/Signature): **Date:**

Laboratory Acceptance (Name/Signature): **Date:**

ATTACHMENT 3

Deepwater Horizon
Standard Operating Procedure for Sample Labeling, Packing, and Transport
MC252-SOP-01

Unified Area Command

This document is valid only at the time of printing. Copies printed from this site are considered uncontrolled.

1.0 PURPOSE

This standard operating procedure (SOP) provides the general technical requirements and operational guidelines for the proper labeling, packing, and transporting of environmental samples at the MC 252 oil incident to a laboratory for analysis associated with sediment/soil, aqueous, and waste samples. These procedures have been developed to instruct field crews on how to reduce the risk of damage to the samples (such as breakage of the sample containers) and to maintain sample temperature (as required) within the cooler.

2.0 GENERAL CONSIDERATIONS

Potential hazards associated with the planned tasks shall be evaluated prior to conducting field activities. A completed Job Safety Analysis (JSA) or Job Hazard Assessment (JHA) provides a description of potential hazards and associated safety and control measures.

Protocols for sample temperature maintenance and sample packing shall be applicable to collection of samples year-round or as otherwise specified. The intent is to ensure that samples arrive at the Command Center specific Sample Receipt Office (SRO) or designated laboratory in the appropriate condition - both physically intact and appropriately preserved.

3.0 PROCEDURES

The following sections describe the procedures for sample labeling, packing, and transport. In the event these procedures cannot be performed as written in this SOP, field personnel shall contact their immediate supervisor to get approval for the deviation to the procedure.

3.1 Pre-Job Preparation

The Sample Manager, SRO personnel , designated laboratory, and Field Team Leaders are responsible for overall implementation of this procedure and complying with applicable regulations and standards.

a. Check with the Analytical Data Requestor (as identified on the governing Analytical Request Form [ARF] and Sampling and Analysis Plan [SAP]) regarding the equipment required, sample types and preservatives, and anticipated range of contaminant concentrations.
b. Obtain labeling, packing, and shipping materials as listed on the example checklist provided on Table 1 from the SRO or designated laboratory; the field logbook; project-specific work plans; and quality assurance documents.
c. Verify methods to be used to transport materials (such as the contractor's courier or commercial driver). Identify the telephone numbers, locations, and any special requirements of couriers that are used.
d. Prepare US DOT paperwork in advance where necessary.

3.2 Sample Labeling

This document is valid only at the time of printing. Copies printed from this site are considered uncontrolled.

Sample containers shall be pre-labeled before sample collection, and the labels should be protected from the sample matrix by covering with a clear tape. Sample labels shall be made of weatherproof or waterproof materials, where available. Sample labels shall include:

a. A unique sample ID (in accordance with MC252-SOP-08).
b. Location name (coordinates in decimal degrees).
c. Parameter sampled.
d. Date and time sampled.
e. Sampler's initials.
f. Preservative.
g. Site name.

3.2.1 Label Correction Process

If labeling errors have occurred prior to covering with clear tape:

a. A permanent marker or indelible ink pen shall be used to single line strike through with date, initials of the correction initiator and the corrector's affiliation.
b. Write the correct information in the space provided.

If the label errors have occurred post taping or the pre-taped label cannot support edits due to size limitations:

a. The old label shall be removed.
b. A new label shall be placed on the sample container.
c. A new label shall not be placed over an old or incorrect label.

3.3 Sample Temperature Maintenance

In order to facilitate preservation of samples, samples requiring preservation by chilling should be cooled to an appropriate temperature (< 6ºC) and maintained at this temperature from the point of collection through transport and receipt at the SRO o. To achieve this chilling and temperature maintenance, the procedures listed below should be followed for all samples collected.

a. Prepare an ice bath(s) prior to sample collection. Obtain ample amounts of ice and potable water and place the ice and water in a container large enough to accommodate several sample jars (for example, a 5-gallon bucket or sample cooler). Depending on the number of sample containers anticipated, more than one ice bath may be necessary.

b. Place trip blank vials (as appropriate) and the temperature blank bottle (sealed in resealable plastic bags) in the ice bath immediately after preparation. Whenever possible, locate the ice bath(s) out of direct sunlight or other sources of heat. Label the trip blank bottles in accordance with Section 3.2 of this SOP.

c. Immediately after sample collection, wipe off each container and place each container in an appropriately sized resealable plastic bag. Up to three 40-mL vials may be placed in one bag.

d. Place the sealed samples in the prepared ice bath. Place samples in the ice bath in a manner such that the risk of bottle breakage is reduced during the cooling process. Avoid placing too many containers in an ice bath at one time.

e. Allow samples to remain in the ice bath until such time as samplesare sufficiently chilled.

f. After icing, remove the samples and place in a dry cooler containing sufficient amounts of ice in order to maintain the samples in a chilled condition. Allow samples to remain in the iced cooler until delivery to the SRO.

g. If applicable, deliver samples to the SRO at the Command Center. SRO personnel will perform final preparation of the samples for delivery to the laboratory in accordance with their Sample Handling and Shipping SOP.

3.4 Sample Packing

Environmental samples shall be collected as outlined in the Standard Operating Procedures (SOPs) for MC252.

The following is a summary of steps required for packing and sealing the samples for shipment to the SRO or designated laboratory.

a. Verify the completeness and correctness of the sample identification information on the label and the Chain-of-Custody (COC) record.

b. If packaging aqueous samples or using wet ice for temperature preservation, place a garbage bag or impervious liner in the cooler.

c. Place samples in resealable plastic bags and then into the cooler. If appropriate, place a temperature blank in the center of the cooler.

d. Place ample amounts of wet ice contained in doubled resealable bags inside the garbage bag/liner in cooler. As needed, place bubble wrap or other inert packing material around the garbage bag/liner in the cooler.

   Note: Blue Ice may not be used for temperature maintenance unless otherwise directed in the SAP for the sampling event.

e. Seal the garbage bag/liner with heavy industrial grade tape, so that if the contents were to spill, the garbage bag/liner would contain the spill.

   Note: If samples are to be maintained frozen during shipment, refer to Section 3.4.1 which defines the procedures for the use of dry ice.

This document is valid only at the time of printing. Copies printed from this site are considered uncontrolled.

f. Place the completed COC form in a large resealable plastic bag and tape to the inside lid of the cooler. In the event multiple coolers are required a copy of the original COC shall be made and placed in resealable plastic bags and placed in each of the coolers containing samples included on the original COC. Copy COC's will be clearly marked as "COPY". If samples are shipped to the SRO, SRO personnel will make a copy of the original COC and place a copy in each of the coolers.

g. If shipped by courier:

   1. The sampler must relinquish the samples on the COC record by signing their name and providing the date and time that the samples were packed prior to delivery to the SRO or designated laboratory.

   2. Place the COC in a sealable plastic bag and tape it to the inside of the cooler lid.

h. If a courier other than UPS or FedEx is to be used for sample transport, a Courier Transport Documentation Form (Attachment A) shall be used.

i. If shipped by courier, UPS, or FedEx the sampler who relinquished the samples in Step h.1 above must sign and place the date and time on the custody seals. The custody seal signature, dates and times must match the relinquished signature, dates and times as they appear on the COC form. Place tamper-evident custody seals/tape on two sides of the cooler such that opening the cooler causes the custody seal/tape to break. Tamper-evident custody seals/tape shall be able to indicate that the seal had been disturbed (such as leave remnants of the seal or some type of ink residue on the surface when the seal is lifted).

3.4.1 Shipping Samples Using Dry Ice

In addition to the steps identified in Section 3.4, the following steps are required for packing and sealing frozen samples for shipment on dry ice.

a. Place inert material (such as bubble wrap and/or cardboard) in the bottom of the cooler.

b. Place samples requiring frozen preservation in the cooler on top of the inert material.

c. Place an additional piece of inert material on top of the samples to prevent the samples from contacting the dry ice.

d. Put on leather gloves and place one layer of dry ice (approximately 2 inches thick) on top of the second layer of inert material, covering as much surface area as possible.

   Note: Do not place more than one layer of dry ice in the cooler. The weight of the dry ice may cause container breakage.

e. If using a commercial courier to transport the cooler with dry ice by domestic air freight, place a placard on the outside of the cooler following the 49 CFR and International Air Transport Association (IATA) regulations presented below.

   1. For non-medical, non-hazardous U.S. domestic air packages with ≤ 2.5 kg (≤ 5.5 pounds) of dry ice, mark the outside of the cooler with the words “Dry Ice” or “Carbon Dioxide, Solid.”

   2. For non-medical U.S. domestic packages with > 2.5 kg (> 5.5 pounds) of dry ice, the following are required under 49 CFR and IATA:
      - Hazardous Materials shipping papers shall be completed in accordance with applicable regulations.
      - The package shall be properly marked as containing “Dry Ice” (or “Carbon Dioxide, Solid”), “UN1845”, and with a Class 9 Diamond label.
      - The net weight of dry ice shall be indicated (in kg) on the shipping papers and shall also be marked on the outer package.

3.5 SRO or Designated Laboratory Receipt and Inspection

Upon receipt by the SRO or designated laboratory, coolers will be inspected for evidence of tampering (such as broken custody seals). In the event that custody seals are missing or broken, the sample packaging and shipping center shall report this condition to the MC252 Quality Assurance (QA) Manager immediately.

An SRO or laboratory employee shall record the condition of sample containers, and shall denote acceptance of the samples by signing the COC form; and include the date and time, in the appropriate locations.

The original COC form and documented changes to the original COC form shall be included as part of the final analytical report to the Project Manager. This form shall be used to document sample custody transfer from the sampler through the sample packaging and shipping center to the laboratory and shall become a permanent addition to the Project file.

3.6 Field Logbook Documentation

Field logbooks to record daily activities, including sample collection and tracking information, shall be maintained by the Field Team Leader. Information shall be entered into the field logbook by the appropriate field team member. Entries shall be made in waterproof ink.

In addition to the minimum requirements discussed in the *Field Documentation* SOP (MC252-SOP-02), the field logbooks shall document the following shipping activities:

- Method of transportation.
- Courier tracking number.
- Material shipped (for example, sample ID numbers) associated with each courier tracking number.
- Date shipped.

The shipper’s copies of the manifest or the shipper’s copy of the courier’s airbill shall be retained in the central data management files.

This document is valid only at the time of printing. Copies printed from this site are considered uncontrolled.

4.0 REFERENCES

- International Air Transport Association (IATA). *Dangerous Goods Regulations*, 49th Edition, Montreal, 2008.
- International Civil Aviation Organization (ICAO). *The ICAO Technical Instructions on the Safe Transport of Dangerous Goods by Air,* 2007 - 2008 Edition.
- International Maritime Organization (IMO). *International Maritime Dangerous Goods Code*, 2006 Edition.
- Office of the Federal Register, National Archives and Records Administration, *49 Code of Federal Regulations Parts 171-179*, US Government Printing Office, Washington, DC, 2006.
- BP. *Field Documentation* SOP (MC252-SOP-02), 2010.
- United States Environmental Protection Agency (US EPA). Region 4, *Packing, Marking, Labeling and Shipping of Environmental and Waste Samples Operating Procedure*. Document Number SESDPROC-209-R1, November 2007.
- United States Environmental Protection Agency (US EPA). Region 4, *Sample and Evidence Management*. Document Number SESDPROC-005-R1, November 2007.

This document is valid only at the time of printing. Copies printed from this site are considered uncontrolled.

Table 1: Sample Labeling, Packing, and Transport Equipment & Material Checklist

Item Description	Check
Health & Safety	
Nitrile gloves	
Hard hat	
Steel-toed boots	
Hearing protection	
Field first-aid kit	
Eyewash	
Safety glasses	
Respirator and cartridges (if necessary)	
Saranex™/Tyvek® suits and booties (if necessary)	
Sun Screen and Insect Repellant	
Paperwork	
Health and Safety Plan (HASP)	
Project work control documents	
MC252 Courier Pickup/Delivery Documentation Form	
Chain-of-Custody forms	
Field logbook	
Appropriate SOP for field work being completed	
Packing and Shipping Supplies	
Packing tape	
Tamper-evident custody seals/tape	
Coolers	
Ice	
Permanent markers	
Shipping labels	
Resealable plastic bags (gallon and pint sizes)	
Shipping forms (or courier forms)	

Attachment A

MC252 Courier Pickup/Delivery Documentation Form

MC252 COURIER TRANSPORTATION DOCUMENTATION FORM

DATE:_____

COURIER COMPANY:

_____

From:	To:

No. of Items:	Description:

Shippers Name/Company:_____

Date / Time:_____

Courier Signature/Company:_____

Date / Time:_____

Receipt Signature/Company:_____

Date / Time:_____

Corresponding Chain of Custody:

End of Procedure

ATTACHMENT 4

Deepwater Horizon
Standard Operating Procedure for Sample Management Program
MC252-SOP-03

Unified Area Command

This document is valid only at the time of printing. Copies printed from this site are considered uncontrolled.

1.0 PURPOSE

This standard operating procedure (SOP) provides the general technical requirements and operational guidelines for the proper management of samples from initiating a sample collection event through laboratory analysis that is required for environmental sampling events associated with the BP Mississippi Canyon (MC) 252 oil spill. Additionally, these procedures have been developed to describe the Analytical Request Form (ARF) completion process, ensure proper completion of the Chain-of-Custody (COC), provide the framework for the collection of relevant field data associated with the COC, and complete transfer of field data and analytical data to the Unified Command central EQuIS database.

2.0 GENERAL CONSIDERATIONS

In addition to this SOP, the project procedures defined in the *Sample Labeling, Packing, and Shipping* SOP (MC252-SOP-01), *Field Documentation* SOP (MC252-SOP-02), *Analytical Request Form Process Plan* SOP (MC252-SOP-07), and *Chain of Custody Process Plan* SOP (MC252-SOP-08) are employed concurrently with particular procedures presented herein. Procedures are also conducted in accordance with U.S. Environmental Protection Agency (EPA) *Packing, Marking, Labeling and Shipping of Environmental and Waste Samples Operating Procedure* (EPA, 2007).

The sample Quality Assurance (QA) team, Technical Review (TR) Team (a Principal chemist), Analytical Data Requestor (ADR), the Sample Receiving Office (SRO) personnel, and Field Team Leaders (FTL) are responsible for overall implementation of this procedure. The intent of this SOP is to document a process whereby sampling events are planned, analytical laboratories are identified, sample kits are prepared, and for samples to arrive under proper chain of custody, accompanied by necessary sample information and documentation.

Potential hazards associated with the planned tasks shall be evaluated prior to conducting field activities. A completed Job Safety Analysis (JSA) or Job Hazard Assessment (JHA) provides a description of potential hazards and associated safety and control measures.

3.0 PROCEDURES

The following sections describe the procedures for the proper completion of the ARF; the creation and implementation of COC; and transfer of field data and analytical data to the Unified Command central database. Variations in these procedures are not acceptable unless approved by QA team and BP management. Any approved variation shall be fully documented. Field work only progresses as deviations are approved or resolved.

3.1 Completion of the Analytical Request Form

Completion of the ARF, attached in *Analytical Request Form Process Plan* SOP (MC252-SOP-07), is required so that procedures and approvals are in place prior to sample collection activities. The ARF may be downloaded from the sample management SharePoint™ website (SharePoint). The ARF contains essential information about the operational purpose of sample collection activities, the ADR, the FTL, and the analytical laboratory including analysis parameters and data package requirements. The ARF shall be completed in full with no section

left unfinished. Additionally the ARF requires a signature by the ADR, the person submitting the ARF, a member of the sample QA team, a member of Technical Review team, and a member of the Management Review team. The ARF shall be completed according to MC252-SOP-07.

The ADR or designee shall complete the ARF prior to initiating any environmental sample collection activities. The ARF shall be completed in full to identify appropriate project contacts, laboratory contacts, sample analytical methods requested, duration of sampling activities, and anticipated number of samples that are to be collected during the sampling program. The ADR shall explain the specific operational purpose of the sample collection activities in terms of what questions are to be answered and describe the decisions that are to be made after an assessment of the data and sample knowledge is obtained. The ADR shall reference related approved sampling and analysis plans (SAPs), SOPs, or Quality Assurance Project Plans on the ARF.

Any one-time deviations to an approved final ARF shall be documented on an ARF Deviation Form (attached in MC252-SOP-07) and signed by the appropriate Project personnel identified on the ARF Deviation Form (the same required signatures identified on the ARF). Permanent changes and deviations to the ARF shall be captured under a revision (e.g., *ARF-008REV1*) or a new ARF.

3.2 Creation and Completion of the Chain-of-Custody

Specific project requirements have been established for creating Chain-of-Custody (COC) forms. An example Project COC is presented as an Attachment in Chain of Custody Process Plan SOP (MC252-SOP-08). It is the responsibility of the FTL to generate a complete and correct COC. Review project-specific work plans and the ARF to ascertain pertinent information about sample collection activities.

Individual samples are assigned a unique date-referenced identification defined as "*(Matrix Code)-(Date)-(Sampling Team Code / Vessel Code)-(Sequential#)*". The specifics of the unique sample identification schema are defined in MC252-SOP-08.

A unique date-referenced COC identification number is assigned to each COC. The COC identification number is similar in structure to the Sample ID. Each COC is given a unique COC identification defined as *(Date)(Sampling Team Code / Vessel Code)(Sequential #)*." The specifics of the unique COC identification number are defined in MC252-SOP-08.

3.3 Collection of Field Data and Field Implementation of the COC and Sample Identification System

The field sampling crews are responsible for documenting certain minimum required field data (using the field data form, Attachment 1), and sample custody (using the COC) when any sample is collected. It is vital to the project that the field sampling crews are competent in collecting required sample-specific field data, and maintaining and recording sample custody in the field. The required minimum field data includes:

- Site ID (MC252)
- Program (identified on the ARF)
- Sampling Organization (the company name of the sample team)
- Command Center (BP command center which initiated the sample program)

This document is valid only at the time of printing. Copies printed from this site are considered uncontrolled.

- Vessel Code or Sampling Team Code
- Matrix
- Sample Type (normal or QC sample), and parent sample ID if QC sample
- Sample Collection Method (grab or composite)
- Sample Data
- Sample Collection Time
- Latitude and Longitude (in WGS 84 datum and decimal degree format)
- Sample ID

A description of the matrix codes, team, vessel identification examples, and sample type codes are provided in Attachment 2. Additional codes shall be created by the sample QA team to accommodate sampling program expansion.

3.3.1 Collection of Field Data

The Trimble Nomad™ hand-held field data collector ("hand-held") or equivalent GPS unit shall be used to generate sample identifications and collect field data when possible. The hand-held is the preferred way to collect the required field data listed above. When the hand-held is employed the field data is automatically transmitted wirelessly to Project data management on an expedited basis and aides project coordination. Additionally, when the required inputs are completed properly a Sample Identification is created for the sample (in accordance with MC252-SOP-08).

Note: If the hand-held is not used the field data shall be collected on the field data form spreadsheet. The field data form may be obtained from the SharePoint.

3.3.2 COC Forms and Container Labels

a. The sampling team completes the COC form and container labels with the appropriate identifiers at the time of sample collection.

b. The FTL reviews the sample identifications and COC nomenclature requirements (as defined in MC252-SOP-08) and is responsible for proper implementation.

c. Upon completion of the sampling activities the COC shall be fully completed.

Sample custody is implemented to document sample history from the time of sample collection through shipment, analysis, and disposal. A sample is considered to be in one's custody, if one or more of the following conditions apply:

- The sample is in an individual's actual possession.
- The sample is in view after being in an individual's physical possession.
- It is in the physical possession of an investigator who secures it to prevent tampering.
- It is placed in a designated secure area.

Custody shall be properly documented on the COC each time sample custody changes from one individual (or group) to another. Completing sample container labels in the field shall be completed according to Sample Labeling, Packing, and Shipping SOP (MC252-SOP-02).

This document is valid only at the time of printing. Copies printed from this site are considered uncontrolled.

Sample container labels shall be properly completed in the field to enable sample identification from the field through receipt at the laboratory.

3.3.3 Revising COC Records

Competent field sampling personnel that are proficient in the Project nomenclature for Project COC forms have the ability to revise COC forms in the field. It is not uncommon for environmental sampling events to deviate slightly from what was proposed or planned. Field personnel shall follow the procedures below when revising an existing Project COC form in the field.

a. Make any revision to an existing COC record by hand using indelible ink.

b. Single line cross each revision and initial and date each revision.

c. Make minor revisions (such as part of a sample ID other than date) on the COC form in conformance with Section 3.2 of this SOP.

d. If a sample is not collected, draw a single line running through that Sample ID row and initial and date that line.

e. Determine if the revision to the COC form is also required for the sample container label, Project COC Forms, and Field Data Forms.

Each individual field sampler is responsible for the care and custody of the samples collected until the samples are properly transferred to temporary storage or are shipped to the laboratory (directly or by SRO personnel).

a. Each individual field sampler is responsible for the care and custody of the collected samples until the samples are properly transferred (relinquished on the COC form by a field team member) to another person (“acceptor” of the samples) or to the SRO for shipment to the laboratory.

b. Each time a sample group is transferred (field sampling personnel relinquish custody to the laboratory), signatures of the individuals relinquishing and receiving the sample batch (and appropriate affiliation), as well as the date and time of transfer, are documented on the COC or courier documentation form.

> **Note:** Commercial courier custody is tracked by commercial courier records and not by COC forms. Private courier is tracked by a courier transportation form and not by a COC form (see attachment in MC252-SOP-01).

c. Sample coolers are packed and sealed with custody seals for transport from the field to the SRO and/or for shipment from the field or SRO to the laboratory.

d. If hand-helds are not used, the field team shall submit the field data form to the data management team (MC252_files@envstd.com).

3.3.4 SRO Responsibilities Pertaining to the COC

The SRO has the responsibility of verifying that the COC matches the container labels, and that the COC is completed in accordance with this SOP. The SRO shall follow the procedures listed below and defined in the SRO *Sample Handling and Shipping* SOP.

a. The SRO shall receive samples from the field team or from a courier.

b. The SRO shall review the COC for completeness and correctness in accordance with this SOP.

c. If the SRO identifies issues with the COC form or container labels, the SRO shall contact the FTL (identified on the COC) immediately. If the FTL is unable to resolve the issue, the SRO shall contact the ADR (identified in the ARF). The SRO is required to work with the FTL or ADR to bring the issue to proper resolution.

d. The SRO shall receive custody of the samples once all issues have been brought to a satisfactory resolution.

e. The SRO shall prepare the samples for shipment to the specified analytical laboratory according to this SOP and the SRO's *Sample Handling and Shipping* SOP.

f. The SRO shall scan all shipped COCs at the end of each day and email those documents to MC252_files@envstd.com.

4.0 REFERENCES

- BP, *Field Documentation* SOP (MC252-SOP-02), 2010.
- BP, *Sample Labeling, Packing, and Shipping SOP* (MC252-SOP-01), 2010.
- U.S. Environmental Protection Agency (EPA), Region 4. *Packing, Marking, Labeling and Shipping of Environmental and Waste Samples Operating Procedure*. Document Number SESDPROC-209-R1, November 2007.
- BP, *Analytical Request Form Process Plan* SOP (MC252-SOP-07), 2010
- BP, *Chain of Custody Process Plan* SOP (MC252-SOP-08), 2010
- TestAmerica, *SRO Sample Handling, Packing, and Shipping* SOP, Draft 2010

End of Procedure

ATTACHMENT 1

Field Data Form

#Site ID*	Program*	Sampling Organization*	Command Center*	Vessel or Team ID*	COC ID*	Matrix *	Sample ID*
#Example MC252	RAT	EPA	Houma	RAT1	20100621RAT1001	WS	SW-20100615-RAT1-01
#Text(20)	Text(50)	Text(20)	Text(50)	Text(6)	Text(20)	Text(10)	Text(40)

Sample Type*	Parent Sample ID	Collection Method*	Sample Date*	Sample Time*	X_Coord* (Long)	Y_Coord* (Lat)	ARF_Number*	Comment
N		G	5/15/2010	13:51	-84.12345	28.12345	ARF001	comment
Text(20)	Text(40)	Text(1)	mm/dd/yyyy	hh:mm	number	number	Text(12)	Text(2000)

Location Description	Location Code	Sampler Name	Sample Name	Sample Reason	Analysis Purpose	Start Depth	End Depth	Depth Unit
Location Description	Leave blank if X and Y Coords are populated	Alex Jones	Sample-Description	BAK	OT	1		m
Text(255)	Text(20)	Text(50)	Text(50)	Text(50)	Text(6)	Numeric	Numeric	Text(15)

ATTACHMENT 2

Project Nomenclature Codes Table

Sample IDs: **(Matrix Code)-(Date)-(Sampling Team Code / Vessel Code)-(Sequential #)**

Date: Using YYYYMMDD Format

MATRIX CODE

Matrix Codes	Matrix Description
Oil Sample Codes:	
SO	Fresh Oil / Source Oil
MS	Mousse (Brown, rust or orange in color, pudding-like, sticky)
OL	Oil (Generic/Unknown)
TRB	Tar Balls (Small, hard, floating, black pellets or chunks of oil)
TC	Tar (Highly Weathered oil, nearly solid consistency)
WO	Weathered oil (Substance remaining after evaporation occurs)
WF	Weathered oil, Floating
WB	Weathered oil, Beached
WS	Weathered oil, Sheen
BR	Burn Residue - Brittle, hard, asphalt-like, typically mixed with unburned fresh oil
Aqueous Sample Codes:	
SW	Surface Water
GW	Groundwater
WW	Waste Water
OTW	Other Aqueous Sample
Soild Sample Codes:	
BP	Boom and Pad
LM	Multiple Phase Liquid Waste Sample
ST	Solid Waste
WW	Waste Water
SE	Sediment (Associated with Surface Water)
SL	Soil
SN	Snare Sample
TKDM	Top Kill Drilling Mud
OTS	Other Solid Sample
Biota (BO) Sample Codes:	
BD	Bird
FH	Fish
MM	Mammals
MP	Amphibians
MC	Macroinvertibrates (i.e., crabs, shrimp, crawafish)
RT	Reptile
VG	Vegetation
TA	Animal Tissue
TP	Plant Tissue
OTB	Other Biota Sample
Air (AR) Sample Codes:	
AA	Ambient Air
AE	Air, Vapor Extraction Well Effluent
OTA	Other Air Sample

Sampling Team Code	Team Description
SR	Special Request
WASTE	Waste
PS	Platform Intake Sampling
RAT#	Rapid Assessment Team
FRAT#	Forensic Rapid Assessment Team
SMART	Spec. Monitoring of Applied Response Technology
SOS	Subsurface Oil Sampling
LOOP	Louisiana Offshore Oil Port
SENT#	Snare Sentinel Team
HotShot#	Hot Shot Team
OTHER	Other Sample Team Not Listed

Vessel Code	Vessel Description
OV	Ocean Veritas
BM	Brooks McCall
MVIP	M/V International Peace

Sample Type Codes	Type Code Description
TB	Trip Blank
EB	Equipment Blank
FB	Field Blank
FD	Field Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N	Normal Field Sample

ATTACHMENT 5

ATTACHMENT 5

DATA PACKAGE DELIVERABLE REQUIREMENTS

1.0 Introduction

The following sections describe in detail the types of data packages designed for BP projects. These details are provided to all BP LaMP laboratories to produce data packages that are similar in format, order of presentation, and content. Project-specific analysis requirements will indicate if the laboratory is required to report the results of library searches for tentatively identified compounds (TICs) in the GC/MS analyses. For projects that do not require TIC searches, the deliverables specified in Sections 2.1 and 2.3 for TICs will not be required.

BP data package deliverables are categorized into two levels as follows:

Full	-	See Section 2.0
Limited	-	See Section 3.0

State-specific data deliverables (*e.g.*, Texas TRRP or New Jersey Tier deliverables) may be requested on a project-specific basis.

Electronic data deliverables (EDD) must be provided for all data package deliverables via the format required for the project. In addition, indexed, thumb-nailed Portable Document Format (PDF) files of all data packages must be provided.

The laboratory is required to submit supporting documentation for the reported analytical results. The supporting documentation and the analytical results are required to be reported in one of the data package delivery categories listed above (defined below). The data package deliverables must be submitted in the order in which the deliverables appear in the text. The laboratory need not include the documentation for any fraction not required for a sample delivery group (SDG).

The laboratory is responsible for ensuring that all electronic and hardcopy data deliverables are in parity, including but not limited to significant figures, analyte names, and any qualifiers and/or footnotes used. All electronic data and hardcopy data deliverables are the property of BP and must be maintained for a minimum of five years. Under no circumstances is the laboratory to discard, dispose of, alter, or destroy any electronic data or hardcopy data deliverables without the express written consent of BP. In certain cases, state, federal or other regulatory agencies require that the data packages meet certain specific reporting formats. The laboratory is responsible for presenting the laboratory data to meet these regulatory program requirements with prior written notification by BP or its designated representative.

Prior to issuance to the client, all data must undergo at least an initial technical review by a trained analyst and a second technical review by a supervisor or another trained analyst.

2.0 General Format for Full Data Package Deliverables

For some analyses, BP Full Data Package deliverables may be requested instead of BP Limited Data Package deliverables. A Full Data Package will also be required with the Limited package as a summary package. The Full data package described below is equivalent to a CLP-compliant data package, which may be requested on a project-specific basis.

The Full Sample Data Package will include data for analyses of all samples in one SDG, including field samples, re-analyses, secondary dilutions, blanks, laboratory control samples, laboratory control sample duplicates, matrix spikes, matrix spike duplicates, and/or laboratory duplicates. As indicated in Section 3.1.1, the laboratory will report one single set of data representing the best of results for each sample (see Table 2 for guidance). The Full Data Package is divided into up to eight sections, as described below. Sections 2.1 through 2.8 are each specific to an analytical fraction. A fraction-specific unit is not a required deliverable if the analysis of that fraction was not required for samples in the SDG. The Full Data Package must be complete before submission and must be consecutively paginated. The Full Data Package will be arranged in the following order:

- Cover Letter/Letter of Transmittal signed by Technical Project Manager or designee
- Title Page
- Table of Contents
- SDG Narrative signed by Technical Project Manager or designee [The SDG Narrative must include a statement or statements relative to compliance with this document and any applicable Quality Assurance Project Plan (QAPP) or Work Plan (WP) and description of any deviations.]
- References to preparation and analytical methods performed and applicable project documents (*i.e.*, QAPP)
- Field and Internal Laboratory Chain-of-Custody Records
    - Sample Receipt Information
    - Project Correspondence
- For each analytical method and matrix included in the SDG, the laboratory must provide the summary of the full MDL study (seven replicates, standard concentrations, *etc.*) and the annual single point confirmation data, as applicable.

2.1 GC/MS Volatile Organic Results and Quality Control

A. Quality Control (QC) Summary

- Surrogate Percent Recovery Summary that must include the following:
    - SDG number
    - BP sample number
    - Method blank sample number
    - MS sample number
    - MSD sample number
    - LCS identification number
    - LCSD identification number (if performed)
    - matrix of the summarized samples
    - percent recovery for all surrogate compounds
    - applicable recovery limits for each surrogate compound
- MS/MSD Summary that must include the following:
    - SDG number
    - matrix of the summarized samples
    - BP sample number of the non-spiked aliquot
    - analysis file numbers for the MS and MSD analyses
    - names of the compounds included in the MS solution
    - true concentrations and concentration units for each compound in the MS and MSD
    - observed compound concentration and concentration units in the non-spiked aliquot
    - observed compound concentration and concentration units in the MS aliquot

- observed compound concentration and concentration units in the MSD aliquot
- percent recovery for each compound
- relative percent difference (RPD) between the MS/MSD results
- recovery limits for each compound
- RPD limit for each compound

- LCS Summary, which must include the following:
  - SDG number
  - LCS matrix
  - LCS identifier
  - analysis file number
  - LCS solution lot number
  - names of the compounds included in the LCS solution
  - true concentrations and concentration units for each compound in the LCS
  - observed compound concentrations and concentration units
  - percent recovery for each compound
  - recovery limits for each compound

If an LCSD is performed, the LCS Summary must also include:

- LCSD identifier
- observed concentration for each LCSD compound
- percent recovery for each compound
- RPD between the LCS/LCSD results
- RPD limit for each compound

- Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

    - SDG number
    - matrix of summarized samples
    - method blank identifier
    - analysis file number for the method blank
    - date and time of method blank analysis
    - instrument identifier
    - BP sample numbers associated with the method blank
    - analysis file number for each associated BP sample

- GC/MS Tuning and Mass Calibration Summary: The tuning summaries will be arranged in chronological order, by instrument and must include the following:

    - SDG number
    - matrix of the summarized samples
    - tuning injection file number
    - tuning inject date and time of analysis
    - instrument identifier
    - percent relative abundance for each required mass ion
    - acceptance criteria for each relative abundance
    - identifier for each associated QC sample
    - each associated BP sample number
    - analysis file number, date, and time for each associated QC and BP sample analysis

- Initial Calibration Summary: The initial calibration summaries will be arranged in chronological order, by instrument and must include the following:

    - SDG number
    - start and end dates and times of the initial calibration
    - analysis file numbers for all initial calibration analyses
    - instrument identifier
    - compound names for all target compounds and surrogates
    - relative response factors (RRFs) for each initial calibration standard performed
    - average RRF for each target compound and surrogate
    - percent relative standard deviation (%RSD) for each target compound and surrogate
    - calibration curve equation and curve plot for each target compound and surrogate (if applicable)

- Initial Calibration Verification (ICV) Summary: The ICV summaries will be arranged in chronological order, by instrument and must include the following:

    - SDG number
    - start and end dates and times of associated initial calibration
    - analysis date and time of ICV standard
    - analysis file number of the ICV analysis
    - instrument identifier
    - compound names for all target compounds and surrogates
    - initial calibration average RRF or true concentration for each target compound and surrogate
    - observed ICV standard RRF or concentration for each target compound and surrogate

    - percent difference or percent drift for each target compound and surrogate
    - acceptance criteria for each compound

- Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument and must include the following:
    - SDG number
    - start and end dates and times of associated initial calibration
    - analysis date and time of CCV standard
    - analysis file number of the CCV analysis
    - instrument identifier
    - compound names for all target compounds and surrogates
    - initial calibration average RRF or true concentration for each target compound and surrogate
    - observed continuing calibration standard RRF or concentration for each target compound and surrogate
    - percent difference or percent drift for each target compound and surrogate

- Internal Standard Area and Retention Time Summary: The internal standard summary will be arranged in chronological order, by instrument and must include the following:
    - SDG number
    - CCV standard file number
    - CCV standard date and time of analysis
    - instrument identifier
    - compound name for each internal standard
    - observed area and retention time for each internal standard in the CCV standard

- project samples and QC sample areas and retention times must be compared to the associated CCV standard

- CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration

- upper acceptance limit for the area and retention time for each internal standard

- lower acceptance limit for the area and retention time for each internal standard

- observed area and retention time for each internal standard from the mid-point standard of the associated initial calibration.

- each associated BP sample number

- observed area and retention time for each internal standard for associated BP sample

- identifier for each associated QC sample

- observed area and retention time for each internal standard for associated QC sample

B. Sample Data

Sample data shall be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries followed by the raw data for volatile samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

- Target Compound Analytical Results Summary that must include the following:

  - SDG number

  - BP sample number

  - laboratory sample identifier

  - matrix of the BP sample

  - date of sample collection

  - date of analysis

- analysis file number
- sample weight or volume used for analysis
- sample percent solid content
- final extract sample volume
- extract aliquot volume used for analysis
- dilution factor
- name and Chemical Abstract Service (CAS) number for each target compound
- concentration of positive results and project-required quantitation limit and/or MDL for each target compound
- any applicable flags for target compound results (*e.g.*, “U” to designate a “not-detected” result)
- concentration units

- Tentatively Identified Compound (TIC) Analytical Results Summary (if applicable) that must include the following:

  - SDG number
  - BP sample number
  - laboratory sample identifier
  - matrix of the BP sample
  - date of sample collection
  - date of analysis
  - analysis file number
  - sample weight or volume used for analysis
  - sample percent solid content
  - final extract sample volume

- extract aliquot volume used for analysis
- dilution factor
- name and CAS number (if applicable) for each TIC
- concentration for each TIC
- any applicable flags for TIC results (*e.g.*, “N” to designate a tentatively identified compound name)
- concentration units

- Reconstructed total ion chromatogram (RIC) and quantitation report (including initial and re-integrations for manually-integrated data)

- Copies of raw spectra and copies of background-subtracted mass spectrum of each target compound identified in the sample and corresponding background-subtracted target compound standard mass spectrum

- Quantitation/Calculation of TIC concentrations (if applicable)

- Copies of up to 10 non-surrogate and non-internal standard volatile TICs and the associated best-match spectra (best three matches) from the GC/MS library search for each TIC (if requested)

C. Standards Data

- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with analyses in the SDG, in chronological order, by instrument

- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each ICV standard associated with analyses in the SDG, in chronological order, by instrument

- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each CCV standard associated with analyses in the SDG, in chronological order, by instrument

D. Raw QC Data

- For each GC/MS tuning and mass calibration arranged in chronological order, by instrument:

    - Bromofluorobenzene (BFB) bar graph spectrum
    - BFB mass listing

- Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument:
    - Target Compound Analytical Results Summary (as previously defined)
    - TIC Analytical Results Summary (if applicable, as previously defined)
    - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
    - Copies of raw spectra and copies of background-subtracted mass spectra of each target compound identified in the blank and corresponding background-subtracted target compound standard mass spectra
    - Quantitation/Calculation of TIC concentrations (if applicable)
    - Copies of mass spectra of non-surrogate and non-internal standard volatile tentatively identified compounds (TICs) and the associated best-match spectra (best three matches) from the GC/MS library search for each TIC (if requested)

- LCS Data
    - Target Compound Analytical Results Summary (as previously defined)
    - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)

- LCSD Data (if performed)
    - Target Compound Analytical Results Summary (as previously defined)
    - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)

- MS Data
    - Target Compound Analytical Results Summary (as previously defined)
    - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- MSD Data
    - Target Compound Analytical Results Summary (as previously defined)
    - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)

E. Preparation Logs

- Toxicity Characteristic Leaching Procedure (TCLP) or Synthetic Precipitation leaching procedure (SPLP) Extraction Logs (if performed)
- Volatile Medium-Level (Methanol) Extraction Logs (if performed)
- Volatile Low-Level (En Core®) Sample Preparation Logs (if performed)
- Volatile Sample pH Logs (aqueous samples only)

2.2 GC Volatile Organic Results and QC

A. QC Summary

- Surrogate Percent Recovery Summary that must include the following:
    - SDG number
    - BP sample number
    - Method blank sample number
    - MS sample number
    - MSD sample number
    - LCS identification number
    - LCSD identification number (if performed)

- matrix of the summarized samples
- percent recovery for all surrogate compounds
- applicable recovery limits for each surrogate compound

- MS/MSD Summary that must include the following:
  - SDG number
  - matrix of the summarized samples
  - analysis file numbers for the MS and MSD analyses
  - BP sample number of the non-spiked aliquot
  - names of the compounds included in the MS solution
  - true concentrations and concentration units for each compound in the MS and MSD
  - observed compound concentration and concentration units in the non-spiked aliquot
  - observed compound concentration and concentration units in the MS aliquot
  - observed compound concentration and concentration units in the MSD aliquot
  - percent recovery for each compound
  - RPD between the MS/MSD results
  - recovery limits for each compound
  - RPD limit for each compound

- LCS Summary, which must include the following:
  - SDG number
  - LCS matrix
  - LCS identifier

- analysis file number
- LCS solution lot number
- names of the compounds included in the LCS solution
- true concentrations and concentration units for each compound in the LCS
- observed compound concentrations and concentration units
- percent recovery for each compound
- recovery limits for each compound

If an LCSD is performed, the LCS Summary must also include:

- LCSD identifier
- observed concentration for each LCSD compound
- percent recovery for each compound
- RPD between the LCS/LCSD results
- RPD limit for each compound

- Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

  - SDG number
  - matrix of summarized samples
  - method blank identifier
  - analysis file number for the method blank
  - date and time of method blank analysis
  - instrument identifier
  - BP sample numbers associated with the method blank
  - analysis file number for each associated BP sample

- Initial Calibration Summary: The initial calibration summaries will be arranged in chronological order, by instrument and must include the following:

    - SDG number
    - start and end dates and times of the initial calibration
    - analysis file numbers for all initial calibration analyses
    - instrument identifier
    - compound names for all target compounds and surrogates
    - RRFs or response factor (RF) for each initial calibration standard performed
    - average RRF or average RF for each target compound and surrogate
    - %RSD for each target compound and surrogate
    - calibration curve equation and curve plot for each target compound and surrogate (if applicable)

- Initial Calibration Verification (ICV) Summary: The ICV summaries will be arranged in chronological order, by instrument and must include the following:

    - SDG number
    - start and end dates and times of associated initial calibration
    - analysis date and time of ICV standard
    - analysis file number of the ICV analysis
    - instrument identifier
    - compound names for all target compounds and surrogates
    - initial calibration average RRF, average RF, or true concentration for each target compound and surrogate
    - observed ICV standard RRF or RF or concentration for each target compound and surrogate

    - percent difference or percent drift for each target compound and surrogate
    - acceptance criteria for ICV standard

- Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument and must include the following:
    - SDG number
    - start and end dates and times of associated initial calibration
    - analysis date and time of CCV standard
    - analysis file number of the CCV analysis
    - instrument identifier
    - compound names for all target compounds and surrogates
    - initial calibration average RRF, average RF or true concentration for each target compound and surrogate
    - observed continuing calibration standard RRF or RF or concentration for each target compound and surrogate
    - percent difference or percent drift for each target compound and surrogate

- Internal Standard Area and Retention Time Summary (if applicable): The internal standard summary will be arranged in chronological order, by instrument and must include the following:
    - SDG number
    - CCV standard file number
    - CCV standard date and time of analysis
    - instrument identifier
    - compound name for each internal standard
    - observed area and retention time for each internal standard in the CCV standard

- project samples and QC sample areas and retention times must be compared to the associated CCV standard

- CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration

- upper acceptance limit for the area and retention time for each internal standard

- lower acceptance limit for the area and retention time for each internal standard

- observed area and retention time for each internal standard from the mid-point standard of the associated initial calibration.

- each associated BP sample number

- observed area and retention time for each internal standard for associated BP sample

- identifier for each associated QC sample

- observed area and retention time for each internal standard for associated QC sample

B. Sample Data

Sample data will be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries followed by the raw data for volatile samples) that must be placed in increasing alphanumeric order by BP sample number. The order of each sample packet is as follows:

- Target Compound Analytical Results Summary that must include the following:

    - SDG number

    - BP sample number

    - laboratory sample identifier

    - matrix of the BP sample

    - date of sample collection

    - date of analysis

- analysis file number
- sample weight or volume used for analysis
- sample percent solid content
- final extract sample volume
- extract aliquot volume used for analysis
- dilution factor
- name and CAS number for each target compound
- concentration of positives, PRQL and/or MDL for each target compound
- any applicable flags for target compound results (e.g., “U” to designate a “not-detected” result)
- concentration units

- Copies of volatile chromatograms (including initial and re-integrations for manually-integrated data)

- Copies of volatile chromatograms (including initial and re-integrations for manually-integrated data) from second gas chromatograph (GC) column confirmation (if performed)

- GC integration reports or data system printouts. All peaks must be included on the integration reports or data system printouts.

- Manual work sheets (including example calculation showing how sample results are calculated using initial calibration standard peak areas/heights and sample peak areas/heights for at least one sample)

C. Standards Data

- Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by GC column, by instrument and must include the following:

  - SDG Number
  - instrument identifier
  - BP sample numbers associated with the sequence

- QC sample identifiers associated with the sequence
- analysis file number, date, and time for each BP sample and QC sample associated with the sequence
- initial calibration start and end dates and times associated with the sequence

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with SDG in chronological order, by GC column, by instrument

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each ICV standard associated with SDG in chronological order, by GC column, by instrument following the associated initial calibration standards data

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each CCV associated with SDG in chronological order, by GC column, by instrument following the associated initial calibration standards data

D. Raw QC Data

- Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.

- LCS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports(including initial and re-integrations for manually-integrated data)

- LCSD Data (if performed)
  - Target Compound Analytical Results Summary (as previously defined)

- chromatograms and integration reports(including initial and re-integrations for manually-integrated data)

- MS Data

  - Target Compound Analytical Results Summary (as previously defined)

  - chromatograms and integration reports(including initial and re-integrations for manually-integrated data)

- MSD Data

  - Target Compound Analytical Results Summary (as previously defined)

  - chromatograms and integration reports(including initial and re-integrations for manually-integrated data)

E. Preparation Logs

- TCLP or SPLP Extraction Logs (if performed)

- Volatile Medium-Level (methanol) Extraction Logs (if performed)

- Volatile Low-Level (En Core®) Sample Preparation Logs (if performed)

- Volatile sample pH logs (aqueous samples only)

2.3 GC/MS Semivolatile Organic Results and QC

A. QC Summary

- Surrogate Percent Recovery Summary that must include the following:

  - SDG number

  - BP sample number

  - Method blank sample number

  - MS sample number

  - MSD sample number

  - LCS identification number

- LCSD identification number (if performed)
- matrix of the summarized samples
- percent recovery for all surrogate compounds
- applicable recovery limits for each surrogate compound

- MS/MSD Summary that must include the following:
  - SDG number
  - matrix of the summarized samples
  - BP sample number of the non-spiked aliquot
  - analysis file numbers for the MS and MSD analyses
  - names of the compounds included in the MS solution
  - true concentrations and concentration units for each compound in the MS and MSD
  - observed compound concentration and concentration units in the non-spiked aliquot
  - observed compound concentration and concentration units in the MS aliquot
  - observed compound concentration and concentration units in the MSD aliquot
  - percent recovery for each compound
  - RPD between the MS/MSD results
  - recovery limits for each compound
  - RPD limit for each compound

- LCS Summary that must include the following:
  - SDG number
  - LCS matrix

- LCS identifier
- LCS solution lot number
- analysis file number
- names of the compounds included in the LCS solution
- true concentrations and concentration units for each compound in the LCS
- observed compound concentrations and concentration units
- percent recovery for each compound
- recovery limits for each compound

If an LCSD is performed, the LCS Summary must also include:

- LCSD identifier
- observed concentration for each LCSD compound
- percent recovery for each compound
- RPD between the LCS/LCSD results
- RPD limit for each compound

- Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

  - SDG number
  - matrix of summarized samples
  - method blank identifier
  - date and time of method blank analysis
  - instrument identifier
  - BP sample numbers and QC sample identifiers associated with the method blank

    - analysis file number for each associated BP sample and QC sample
    - indication if and what type of sample clean-up was performed.

- GC/MS Tuning and Mass Calibration Summary: The tuning summaries will be arranged in chronological order, by instrument and must include the following:
    - SDG number
    - matrix of the summarized samples
    - tuning injection file number
    - tuning inject date and time of analysis
    - instrument identifier
    - percent relative abundance for each required mass ion
    - acceptance criteria for each relative abundance
    - identifier for each associated QC sample
    - each associated BP sample number
    - analysis file number, date, and time for each associated QC and BP sample analysis

- Initial Calibration Summary: The initial calibration summaries will be arranged in chronological order, by instrument and must include the following:
    - SDG number
    - start and end dates and times of the initial calibration
    - analysis file numbers for all initial calibration analyses
    - instrument identifier
    - compound names for all target compounds and surrogates
    - RRFs for each initial calibration standard performed

- average RRF for each target compound and surrogate
- %RSD for each target compound and surrogate
- calibration curve equation and curve plot for each target compound and surrogate (if applicable)

- Initial Calibration Verification (ICV) Summary: The ICV summaries will be arranged in chronological order, by instrument and must include the following:
    - SDG number
    - start and end dates and times of associated initial calibration
    - analysis date and time of ICV standard
    - analysis file number of the ICV analysis
    - instrument identifier
    - compound names for all target compounds and surrogates
    - initial calibration average RRF, average RF, or true concentration for each target compound and surrogate
    - observed ICV standard RRF or RF or concentration for each target compound and surrogate
    - percent difference or percent drift for each target compound and surrogate
    - acceptance criteria for ICV standard

- Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument and must include the following:
    - SDG number
    - start and end dates and times of associated initial calibration
    - analysis date and time of CCV standard
    - analysis file number of the CCV analysis

- instrument identifier
- compound names for all target compounds and surrogates
- initial calibration average RRF, average RF, or true concentration for each target compound and surrogate
- observed continuing calibration standard RRF or RF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate

- Internal Standard Area and Retention Time Summary: The internal standard summaries will be arranged in chronological order, by instrument and must include the following:

  - SDG number
  - CCV standard file number
  - CCV standard date and time of analysis
  - instrument identifier
  - compound name for each internal standard
  - observed area and retention time for each internal standard in the CCV standard
    - project samples and QC sample areas and retention times must be compared to the associated CCV standard
    - CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration
  - upper acceptance limit for the area and retention time for each internal standard
  - lower acceptance limit for the area and retention time for each internal standard
  - observed area and retention time for each internal standard from the mid-point standard of the associated initial calibration.
  - each associated BP sample number

- observed area and retention time for each internal standard for associated BP sample
- identifier for each associated QC sample
- observed area and retention time for each internal standard for associated QC sample

B. Sample Data

Sample data will be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries, followed by the raw data for semivolatile samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

- Target Compound Analytical Results Summary that must include the following:
  - SDG number
  - BP sample number
  - laboratory sample identifier
  - matrix of the BP sample
  - date of sample collection
  - date of sample extraction
  - date of sample analysis
  - analysis file number
  - sample with or volume used for extraction with units
  - sample percent solids
  - sample final extract volume with units
  - sample extract injection volume with units
  - dilution factor
  - indication if and what type of sample cleanup was performed

- name and CAS number for each target compound
- concentration of positives and PRQL and/or MDL for each target compound
- any applicable flags for target compound results (*e.g.*, “U” to designate a “not-detected” result)
- concentration units

- TIC Analytical Results Summary (if applicable) that must include the following:
    - SDG number
    - BP sample number
    - laboratory sample identifier
    - matrix of the BP sample
    - date of sample collection
    - date of sample extraction
    - date of sample analysis
    - analysis file number
    - sample with or volume used for extraction with units
    - sample percent solids
    - sample final extract volume with units
    - sample extract injection volume with units
    - dilution factor
    - indication if and what type of sample cleanup was performed
    - name and CAS number (if applicable) for each TIC
    - concentration for each TIC

    - any applicable flags for TIC results (*e.g.*, “N” to designate a tentatively identified compound name)
    - concentration units

- RIC and quantitation report (including initial and re-integrations for manually-integrated data)
- Copies of raw spectra and copies of background-subtracted mass spectra of each target compound identified in the sample and corresponding background-subtracted target compound standard mass spectra
- Quantitation/Calculation of TIC concentrations (if applicable)
- Copies of mass spectra of up to 20 non-surrogate and non-internal standard semivolatile TICs and the associated best-match spectra (best three matches) from the GC/MS library search for each TIC (if requested)
- UV trace for GPC (if performed)

C. Standards Data

- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with analyses in the SDG, in chronological order, by instrument
- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each ICV standard associated with analyses in the SDG, in chronological order, by instrument
- Copies of RIC and quantitation report (including initial and re-integrations for manually-integrated data) for each CCV standard associated with analyses in the SDG, in chronological order, by instrument

D. Raw QC Data

- For each GC/MS tuning and mass calibration arranged in chronological order, by instrument:
    - Decafluorotriphenylphosphine (DFTPP) bar graph spectrum
    - DFTPP mass listing
- Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument:

- Target Compound Analytical Results Summary (as defined in Section 2.3.b)
- TIC Analytical Results Summary (as defined in Section 2.3b)
- RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- Copies of raw spectra and copies of background-subtracted mass spectra of each target compounds identified in the blank and corresponding background-subtracted target compound standard mass spectra
- Quantitation/Calculation of TIC concentrations (if applicable)
- Copies of mass spectra of non-surrogate and non-internal standard semivolatile tentatively identified compounds (TICs) and the associated best-match spectra (best three matches) from the GC/MS library search for each TIC (if requested)

- LCS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- LCSD Data (if performed)
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)
- MS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)

- MSD Data
    - Target Compound Analytical Results Summary (as previously defined)
    - RIC and quantitation reports (including initial and re-integrations for manually-integrated data)

E. Preparation Logs

- TCLP or SPLP Extract Logs (if performed)
- Semivolatile Extraction Logs

2.4 GC Organochlorine Pesticide/PCB Results and QC

A. QC Summary

- Surrogate Percent Recovery Summary that must include the following:
    - SDG number
    - BP sample number
    - Method blank sample number
    - MS sample number
    - MSD sample number
    - LCS identifier
    - LCSD identification number (if performed)
    - matrix of the summarized samples
    - percent recovery for all surrogate compounds from both columns
    - applicable recovery limit for each surrogate compound
- MS/MSD Summary that must include the following:
    - SDG number
    - matrix of the summarized samples

- BP sample number of the non-spiked aliquot
- names of the compounds included in the MS solution
- true concentrations and concentration units for each compound in the MS and MSD
- observed compound concentration and concentration units in the non-spiked aliquot
- observed compound concentration and concentration units in the MS aliquot
- observed compound concentration and concentration units in the MSD aliquot
- percent recovery for each compound
- RPD between the MS/MSD results
- recovery limits for each compound
- RPD limits for each compound

- LCS Summary, which must include the following:

  - SDG number
  - LCS matrix
  - LCS identifier
  - LCS solution lot number
  - names of the compounds included in the LCS solution
  - true concentration and concentration units for each compound in the LCS
  - observed compound concentration and concentration units
  - percent recovery for each compound
  - recovery limits for each compound

  If LCSD is performed, the summary must also include:

- LCSD identifier
- Observed concentration for each LCSD compound
- Percent recovery for each compound
- RPD between the LCS/LCSD results
- RPD limit for each compound

- Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

    - SDG number
    - matrix of summarized samples
    - method blank identifier
    - analysis file number for the method blank
    - date and time of method blank analysis
    - instrument identifier
    - column identifiers
    - BP sample numbers associated with the method blank
    - analysis file number for each associated BP sample.
    - an indication if and what type of sample clean-up was performed.

- Initial Calibration RRF or RF Summary: The initial calibration RRF or RF summaries will be arranged in chronological order, by instrument, by column, and must include the following:

    - SDG number
    - start and end dates and times of the initial calibration
    - file identifiers for all initial calibration analyses
    - instrument identifier

- column identifier
- compound names for all target compounds and surrogates
- RRFs or CFs for each initial calibration standard performed
- average RRF or CF for each target compound and surrogate
- %RSD for each target compound and surrogate
- calibration curve equation and curve plot for each target compound and surrogate (if applicable)

- Initial Calibration Retention Time Summary: The initial calibration retention time summaries will be arranged in chronological order, by instrument, by column, and must include the following:

    - SDG number
    - start and end dates and times of the initial calibration
    - file identifiers for all initial calibration analyses
    - instrument identifier
    - column identifier
    - compound names for all target compounds and surrogates
    - retention times for each initial calibration standard performed
    - average retention time for each target compound and surrogate
    - upper and lower retention time acceptance limits for each target compound and surrogate

- Initial Calibration Verification (ICV) Summary: The ICV summaries will be arranged in chronological order, by instrument, by column, and must include the following:

    - SDG number
    - start and end dates and times of associated initial calibration
    - analysis dated and time of ICV standard

- file number of the ICV analysis
- instrument identifier
- column identifier
- compound names for all target compounds and surrogates
- observed retention times for each target compound and surrogate
- initial calibration average RRF or CF or true concentration for each target compound and surrogate
- acceptance criteria for ICV standard

- Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument, by column, and must include the following:

  - SDG number
  - start and end dates and times of associated initial calibration
  - analysis dated and time of CCV standard
  - file number of the CCV analysis
  - instrument identifier
  - column identifier
  - compound names for all target compounds and surrogates
  - observed retention times for each target compound and surrogate
  - initial calibration average RRF or CF or true concentration for each target compound and surrogate
  - observed CCV standard RRF or CF or concentration for each target compound and surrogate
  - percent difference or percent drift for each target compound and surrogate
  - percent breakdown for endrin and 4,4′-DDT

- Internal Standard Area and Retention Time Summary (if applicable): The internal standard summaries will be arranged in chronological order, by instrument, by column, and must include the following:

    - SDG number
    - CCV standard file number
    - CCV standard date and time of analysis
    - instrument identifier
    - column identifier
    - compound name for each internal standard
    - observed area and retention time for each internal standard in the CCV standard
        - project samples and QC sample areas and retention times must be compared to the associated CCV standard
        - CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration
    - upper acceptance limit for the area and retention time for each internal standard
    - lower acceptance limit for the area and retention time for each internal standard
    - observed area and retention time for each internal standard from the midpoint standard of the associated initial calibration
    - each associated BP sample number
    - observed area and retention time for each internal standard for associated BP sample
    - identifier for each associated QC sample
    - observed area and retention time for each internal standard for associated QC sample

B. Sample Data

Sample data shall be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries followed by the raw data for organochlorine pesticide/PCB samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

- Target Compound Analytical Results Summary that must include the following:

    - SDG number
    - BP sample number
    - laboratory sample identifier
    - matrix of the BP sample
    - date of sample collection
    - date of sample extraction
    - date of sample analysis
    - analysis file number
    - sample with or volume used for extraction with units
    - sample percent solids
    - sample final extract volume with units
    - sample extract injection volume with units
    - dilution factor
    - indication if and what type of sample cleanup was performed
    - name and CAS number for each target compound
    - concentration of positives and PRQL and/or MDL for each target compound
    - any applicable flags for target compound results (*e.g.*, “U” to designate a “not-detected” result)

- concentration units

- Copies of organochlorine pesticide/PCB chromatograms

- Copies of organochlorine pesticide/PCB chromatograms from second GC column confirmation (if performed)

- RPD between concentrations on columns for positive results.

- GC integration reports or data system printouts (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.

- Manual work sheets (including example calculation showing how sample results are calculated using initial calibration standard peak areas/heights and sample peak areas/heights for at least one sample)

- UV traces from GPC (if performed)

- If organochlorine pesticides/PCBs are confirmed by GC/MS, the laboratory must submit copies of raw spectra and copies of background-subtracted mass spectra of target compounds that are identified in the sample and corresponding background-subtracted target compound standard mass spectra. For multi-component pesticides/PCBs confirmed by GC/MS, the laboratory must submit mass spectra of three major peaks of multi-component compounds from samples and standards

C. Standards Data

- Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by GC column, by instrument, by column, and must include the following:

  - SDG number

  - instrument identifier

  - column identifier

  - BP sample numbers associated in the sequence

  - QC sample identifiers associated in the sequence

  - analysis file number, date, and time for each BP sample and QC sample associated in the sequence

    - initial calibration start and end dates and times associated in the sequence

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with SDG in chronological order, by column, by instrument

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each ICV standard associated with SDG in chronological order, by column, by instrument following the associated initial calibration standards data

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each CCV standard associated with SDG in chronological order, by column, by instrument following the associated initial calibration standards data

D. Raw QC Data

- Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument

    - Target Compound Analytical Results Summary (as previously defined)

    - chromatograms and integration reports (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.

- LCS Data

    - Target Compound Analytical Results Summary (as previously defined)

    - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

- LCSD Data (if performed)

    - Target Compound Analytical Results Summary (as previously defined)

    - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

- MS Data
    - Target Compound Analytical Results Summary (as previously defined)
    - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)
- MSD Data
    - Target Compound Analytical Results Summary (as previously defined)
    - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

E. Preparation Logs

- TCLP or SPLP Extract Logs (if performed)
- Organochlorine Pesticide/PCB Extraction Logs

2.5 GC Herbicide Results and QC

A. QC Summary

- Surrogate Percent Recovery Summary, which must include the following:
    - SDG number
    - BP sample number
    - Method blank sample number
    - MS sample number
    - MSD sample number
    - LCS identifier
    - LCSD identification number (if performed)
    - matrix of the summarized samples
    - percent recovery for all surrogate compounds from both columns
    - applicable recovery limit for each surrogate compound

- MS/MSD Summary that must include the following:
    - SDG number
    - matrix of the summarized samples
    - BP sample number of the non-spiked aliquot
    - names of the compounds included in the MS solution
    - true concentrations and concentration units for each compound in the MS and MSD
    - observed compound concentration and concentration units in the non-spiked aliquot
    - observed compound concentration and concentration units in the MS aliquot
    - observed compound concentration and concentration units in the MSD aliquot
    - percent recovery for each compound
    - RPD between the MS/MSD results
    - recovery limits for each compound
    - RPD limit for each compound
- LCS Summary that must include the following:
    - SDG number
    - LCS matrix
    - LCS identifier
    - LCS solution lot number
    - names of the compounds included in the LCS solution
    - true concentration and concentration units for each compound in the LCS
    - observed compound concentration and concentration units

- percent recovery for each compound
- recovery limits for each compound

If LCSD is performed, the summary must also include:

- LCSD identifier
- observed concentration for each LCSD compound
- percent recovery for each compound
- RPD between LCS/LCSD results
- RPD limit for each compound

- Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument and must include the following:

  - SDG number
  - matrix of summarized samples
  - method blank identifier
  - analysis file number for the method blank
  - date and time of method blank analysis
  - instrument identifier
  - column identifiers
  - BP sample numbers associated with the method blank
  - analysis file number for each associated BP sample.
  - indication if and what type of sample clean-up was performed.

- Initial Calibration RRF or RF Summary: The initial calibration RRF or CF summaries will be arranged in chronological order, by instrument, by column, and must include the following:

- SDG number
- start and end dates and times of the initial calibration
- file identifiers for all initial calibration analyses
- instrument identifier
- column identifier
- compound names for all target compounds and surrogates
- RRFs or RFs for each initial calibration standard performed
- average RRF or RF for each target compound and surrogate
- %RSD for each target compound and surrogate
- calibration curve equation and curve plot for each target compound and surrogate (if applicable)

- Initial Calibration Retention Time Summary: The initial calibration retention time summaries will be arranged in chronological order, by instrument, by column, and must include the following:

    - SDG number
    - start and end dates and times of the initial calibration
    - file identifiers for all initial calibration analyses
    - instrument identifier
    - column identifier
    - compound names for all target compounds and surrogates
    - retention times for each initial calibration standard performed
    - average retention time for each target compound and surrogate
    - upper and lower retention time acceptance limits for each target compound and surrogate

- Initial Calibration Verification (ICV) Summary: The ICV summaries will be arranged in chronological order, by instrument, by column, and must include the following:

    - SDG number
    - start and end dates and times of associated initial calibration
    - analysis dated and time of ICV standard
    - file number of the ICV analysis
    - instrument identifier
    - column identifier
    - compound names for all target compounds and surrogates
    - observed retention times for each target compound and surrogate
    - initial calibration average RRF or CF or true concentration for each target compound and surrogate
    - observed ICV standard RRF or CF or concentration for each target compound and surrogate
    - percent difference or percent drift for each target compound and surrogate
    - acceptance criteria for ICV standard

- Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument, by column, and must include the following:

    - SDG number
    - start and end dates and times of associated initial calibration
    - analysis dated and time of CCV standard
    - file number of the CCV analysis
    - instrument identifier
    - column identifier

- compound names for all target compounds and surrogates
- observed retention times for each target compound and surrogate
- initial calibration average RRF or RF or true concentration for each target compound and surrogate
- observed CCV standard RRF or RF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate

- Internal Standard Area and Retention Time Summary (if applicable): The internal standard summaries will be arranged in chronological order, by instrument, by column, and must include the following:
    - SDG number
    - CCV standard file number
    - CCV standard date and time of analysis
    - instrument identifier
    - column identifier
    - compound name for each internal standard
    - observed area and retention time for each internal standard in the reference standard
        - project samples and QC sample areas and retention times must be compared to the associated CCV standard
        - CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration
    - upper acceptance limit for the area and retention time for each internal standard
    - lower acceptance limit for the area and retention time for each internal standard
    - observed area and retention time for each internal standards from the midpoint standard of the associated initial calibration

- each associated BP sample number
- observed area and retention time for each internal standard for associated BP sample
- identifier for each associated QC sample
- observed area and retention time for each internal standard for associated QC sample

B. Sample Data

Sample data shall be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries followed by the raw data for herbicide samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

- Target Compound Analytical Results Summary that must include the following:
  - SDG number
  - BP sample number
  - laboratory sample identifier
  - matrix of the BP sample
  - date of sample collection
  - date of sample extraction
  - date of sample analysis
  - analysis file number
  - sample with or volume used for extraction with units
  - sample percent solids
  - sample final extract volume with units
  - sample extract injection volume with units
  - dilution factor

- indication if and what type of sample cleanup was performed
- name and CAS number for each target compound
- concentration of positives and PRQL and/or MDL for each target compound
- any applicable flags for target compound results (*e.g.*, “U” to designate a “not-detected” result)
- concentration units

- Copies of herbicide chromatograms
- Copies of herbicide chromatograms from second GC column confirmation (if performed)
- GC integration reports or data system printouts (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.
- RPD between concentrations on columns for positive results.
- Manual work sheets (including example calculation showing how sample results are calculated using initial calibration standard peak areas/heights and sample peak areas/heights for at least one sample)
- UV traces from GPC (if performed)
- If herbicides are confirmed by GC/MS, the laboratory must submit copies of raw spectra and copies of background-subtracted mass spectra of target compounds that are identified in the sample and corresponding background-subtracted target compound standard mass spectra.

C. Standards Data

- Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by column, by instrument and must include the following:
  - SDG number
  - instrument identifier
  - column identifier
  - BP sample numbers associated in the sequence

- QC sample identifiers associated in the sequence
- analysis file number, date, and time for each BP sample and QC sample associated in the sequence
- initial calibration start and end dates and times associated in the sequence

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with SDG in chronological order, by GC column, by instrument

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each initial calibration verification standard associated with SDG in chronological order, by GC column, by instrument following the associated initial calibration standards data

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each continuing calibration standard associated with SDG in chronological order, by GC column, by instrument following the associated initial calibration standards data

D. Raw QC Data

- Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument

  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.

- LCS Data

  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

- LCSD Data (if performed)
    - Target Compound Analytical Results Summary (as previously defined)
    - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)
- MS Data
    - Target Compound Analytical Results Summary (as previously defined)
    - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)
- MSD Data
    - Target Compound Analytical Results Summary (as previously defined)
    - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

E. Preparation Logs

- TCLP or SPLP Extraction Logs (if performed)
- Herbicide Extractions Logs

2.6 HPLC PAH/Explosive Results and QC

A. QC Summary

- Surrogate Percent Recovery Summary, which must include the following:
    - SDG number
    - BP sample number
    - Method blank sample number
    - MS sample number
    - MSD sample number
    - LCS identifier

- LCSD identification number (if performed)
- matrix of the summarized samples
- percent recovery for all surrogate compounds from each column/detector
- applicable recovery limit for each surrogate compound

- MS/MSD Summary that must include the following:
  - SDG number
  - matrix of the summarized samples
  - BP sample number of the non-spiked aliquot
  - names of the compounds included in the MS solution
  - true concentrations and concentration units for each compound in the MS and MSD
  - observed compound concentration and concentration units in the non-spiked aliquot
  - observed compound concentration and concentration units in the MS aliquot
  - observed compound concentration and concentration units in the MSD aliquot
  - percent recovery for each compound
  - RPD between the MS/MSD results
  - recovery limits for each compound
  - RPD limit for each compound

- LCS Summary that must include the following:
  - SDG number
  - LCS matrix
  - LCS identifier

- LCS solution lot number
- names of the compounds included in the LCS solution
- true concentration and concentration units for each compound in the LCS
- observed compound concentration and concentration units
- percent recovery for each compound
- recovery limits for each compound

If LCSD is performed, the summary must also include:

- LCSD identifier
- observed concentration for each LCSD compound
- percent recovery for each compound
- RPD between LCS/LCSD results
- RPD limit for each compound

- Method Blank Summary: The Method Blank Summaries will be arranged in chronological order by date of analysis of the blank, by instrument, by column, by detector, and must include the following:

  - SDG number
  - matrix of summarized samples
  - method blank identifier
  - analysis file number for the method blank
  - date and time of method blank analysis
  - instrument identifier
  - column/detector identification
  - BP sample numbers associated with the method blank
  - analysis file number for each associated BP sample.

- indication if and what type of sample clean-up was performed.

- Initial Calibration RRF or RF Summary: The initial calibration RRF or CF summaries will be arranged in chronological order, by instrument, by column, by detector, and must include the following:

  - SDG number
  - start and end dates and times of the initial calibration
  - file identifiers for all initial calibration analyses
  - instrument identifier
  - column/detector identifier
  - compound names for all target compounds and surrogates
  - RRFs or RFs for each initial calibration standard performed
  - average RRF or RF for each target compound and surrogate
  - %RSD for each target compound and surrogate
  - calibration curve equation and curve plot for each target compound and surrogate (if applicable)

- Initial Calibration Retention Time Summary: The initial calibration retention time summaries will be arranged in chronological order, by instrument, by column, by detector, and must include the following:

  - SDG number
  - start and end dates and times of the initial calibration
  - file identifiers for all initial calibration analyses
  - instrument identifier
  - column/detector identifier
  - compound names for all target compounds and surrogates
  - retention times for each initial calibration standard performed
  - average retention time for each target compound and surrogate

- upper and lower retention time acceptance limits for each target compound and surrogate

- Initial Calibration Verification (ICV) or Second Source Calibration Summary (if applicable): The ICV or Second Source Calibration Summary summaries will be arranged in chronological order, by instrument, by column, by detector, and must include the following:

  - SDG number
  - start and end dates and times of associated initial calibration
  - analysis dated and time of ICV or second source standard
  - file number of the ICV or second source analysis
  - instrument identifier
  - column/detector identifier
  - compound names for all target compounds and surrogates
  - observed retention times for each target compound and surrogate
  - initial calibration average RRF or RF or true concentration for each target compound and surrogate
  - observed ICV or second source standard RRF or RF or concentration for each target compound and surrogate
  - percent difference or percent drift for each target compound and surrogate
  - acceptance criteria for ICV or second source standard

- Continuing Calibration Verification (CCV) Summary: The CCV summaries will be arranged in chronological order, by instrument, by column, by detector, and must include the following:

  - SDG number
  - start and end dates and times of associated initial calibration
  - analysis dated and time of CCV standard

- file number of the CCV analysis
- instrument identifier
- column/detector identifier
- compound names for all target compounds and surrogates
- observed retention times for each target compound and surrogate
- initial calibration average RRF or RF or true concentration for each target compound and surrogate
- observed CCV standard RRF or RF or concentration for each target compound and surrogate
- percent difference or percent drift for each target compound and surrogate

- Internal Standard Area and Retention Time Summary (if applicable): The internal standard summaries will be arranged in chronological order, by instrument, by column, by detector, and must include the following:

  - SDG number
  - CCV standard file number
  - CCV standard date and time of analysis
  - instrument identifier
  - column/detector identifier
  - compound name for each internal standard
  - observed area and retention time for each internal standard in the reference standard
    - project samples and QC sample areas and retention times must be compared to the associated CCV standard
    - CCV standard areas and retention times must be compared to the midpoint standard of the associated initial calibration
  - upper acceptance limit for the area and retention time for each internal standard

- lower acceptance limit for the area and retention time for each internal standard
- observed area and retention time for each internal standards from the midpoint standard of the associated initial calibration
- each associated BP sample number
- observed area and retention time for each internal standard for associated BP sample
- identifier for each associated QC sample
- observed area and retention time for each internal standard for associated QC sample

B. Sample Data

Sample data shall be arranged in individual sample packets (consisting of the Target Compound Analytical Results Summaries followed by the raw data for PAH/Explosive samples) that must be placed in increasing alphanumeric order by laboratory sample number. The order of each sample packet is as follows:

- Target Compound Analytical Results Summary that must include the following:
  - SDG number
  - BP sample number
  - laboratory sample identifier
  - matrix of the BP sample
  - date of sample collection
  - date of sample extraction
  - date of sample analysis
  - analysis file number
  - sample with or volume used for extraction with units
  - sample percent solids

- sample final extract volume with units
- sample extract injection volume with units
- dilution factor
- indication if silica gel or other cleanup was performed
- name and CAS number for each target compound
- concentration of positives and PRQL and/or MDL for each target compound
- any applicable flags for target compound results (*e.g.*, “U” to designate a “not-detected” result)
- concentration units

- Copies of PAH/Explosive chromatograms
- Copies of PAH/Explosive chromatograms from UV and fluorescence column confirmation (if performed)
- HPLC integration reports or data system printouts (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.
- Manual work sheets (including example calculation showing how sample results are calculated using initial calibration standard peak areas/heights and sample peak areas/heights for at least one sample)
- UV traces from silica gel cleanup (if performed)

C. Standards Data

- Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by HPLC column (if more than one used), by instrument, by detector, and must include the following:
    - SDG number
    - instrument identifier
    - column/detector identifier
    - BP sample numbers associated with the sequence

- QC sample identifiers associated with the sequence
- analysis file number, date, and time for each BP sample and QC sample associated with the sequence
- initial calibration start and end dates and times associated with the sequence

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each initial calibration standard associated with SDG in chronological order, by HPLC column (if more than one used), by instrument, by detector

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each initial calibration verification standard associated with SDG in chronological order, by HPLC column (if more than one used), by instrument, by detector following the associated initial calibration standards data

- Copies of chromatogram and integration report (including initial and re-integrations for manually-integrated data) for each continuing calibration standard associated with SDG in chronological order, by HPLC column (if more than one used), by instrument, by detector following the associated initial calibration standards data

D. Raw QC Data

- Blank Data (including instrument/solvent blank data) arranged in chronological order, by instrument

  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data). All peaks must be included on the integration reports or data system printouts.

- LCS Data

  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

- LCSD Data (if performed)

- Target Compound Analytical Results Summary (as previously defined)
- chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

- MS Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

- MSD Data
  - Target Compound Analytical Results Summary (as previously defined)
  - chromatograms and integration reports (including initial and re-integrations for manually-integrated data)

E. Preparation Logs

- PAH/Explosive Extractions Logs

2.7 ICP, ICP/MS, and AA Metals Results and QC

A. Target Analyte Results Summaries: Target analyte results summaries are required for all samples and will be arranged in increasing alphanumeric order by BP sample number. The target analyte results summary must include the following:

- SDG Number
- BP sample number
- laboratory sample identifier
- matrix of the BP sample
- date of sample collection
- sample percent solids

- name and CAS number for each target analyte
- concentration of positives and project-required detection limit (PRDL) and/or MDL for each target analyte
- any applicable flags for target analyte results (*e.g.*, “U” to designate a “not-detected” result)
- concentration units

B. QC and Quarterly Verification of Instrument Parameters Summaries

- Initial and Continuing Calibration Verification Summary: The initial and continuing calibration verification summaries will be arranged in chronological order, by instrument and must include the following:

  - SDG number
  - names for all target analytes
  - instrument identifier
  - start and end dates and times of the analytical sequence
  - true concentrations for all target analytes for the initial calibration verification (ICV) and continuing calibration verification (CCV) standards
  - observed concentrations for all target analytes for each ICV and CCV analyses
  - calculated percent recoveries for all target analytes for each ICV and CCV analyses
  - control limits for ICV and CCV percent recoveries
  - concentration units

- Reporting Limit (RL) Standard Summary: The RL standard summaries will be arranged in chronological order, by instrument and must include the following:

  - SDG number
  - instrument identifier
  - names for all target analytes

- dates and times for the RL standard analyses
- true concentrations for all target analytes
- observed concentrations for all target analytes for each RL standard analysis
- calculated percent recoveries for all target analytes for each RL standard analysis
- control limits for RL standard recoveries
- concentration units

- Initial and Continuing Calibration Blank Summary: The initial and continuing calibration blank summaries will be arranged in chronological order, by instrument and must include the following:

  - SDG number
  - names for all target analytes
  - instrument identifier
  - start and end dates and times of the analytical sequence
  - observed concentration or MDL for each target analyte for each initial calibration blank (ICB) or continuing calibration blank (CCB) analysis
  - acceptance limits for ICB and CCB analyses
  - concentration units

- Preparation Blank Analytical Summary: The preparation blank analytical summaries will be arranged in chronological order, by instrument and must include the information presented in Section 2.7A.

- ICP and/or ICP/MS Interference Check Sample Summary: The ICP and/or ICP/MS interference check sample summaries will be arranged in chronological order, by instrument and must include the following: [NOTE: Aluminum, Calcium, Iron, and Magnesium results are to be reported even if these are not target analytes.]

  - SDG number

- names for all target analytes
- instrument identifier
- dates and times for the ICP interference check standard analyses
- true concentrations for all target analytes
- observed concentrations for all target analytes observed in each ICP interference check standard analysis
- calculated percent recoveries for all target analytes for each ICP interference check standard analysis
- control limits for ICP interference check standard recoveries
- concentration units

- MS Sample Recovery Summary: The MS sample recovery summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:

  - SDG number
  - BP sample number for the spiked sample
  - percent solids for the BP sample
  - names for all target analytes
  - analyte concentration observed in the non-spiked sample aliquot
  - true concentrations for all target analytes in the MS solution
  - observed concentrations for all target analytes in the MS sample analysis
  - calculated percent recoveries for all target analytes
  - control limits for MS sample recoveries
  - concentration units

If an MSD is performed, the summary must also include:

- MSD identifier

- observed concentration for each all target analytes in the MSD sample
- percent recovery for all target analytes
- RPD between the MS/MSD results for each analyte
- RPD limit for each analyte

- Post-Spike Sample Recovery Summary (if applicable): The post-spike sample recovery summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:
    - SDG number
    - BP sample number for the post-spiked sample
    - percent solids for the BP sample
    - names for all target analytes
    - analyte concentration observed in the non-spiked sample aliquot
    - true concentrations for all target analytes in the post-spike solution
    - observed concentrations for all target analytes in the post-spike sample analysis
    - calculated percent recoveries for all target analytes
    - control limits for post-spike sample recoveries
    - concentration units

- Duplicates Precision Summary: The duplicate precision summaries will be arranged in alphanumerical order by BP sample number and must include the following:
    - SDG number
    - BP sample number for the duplicate sample
    - percent solids for the BP sample
    - names for all target analytes

- analyte concentration observed in the original sample aliquot
- observed concentrations for all target analytes in the duplicate sample analysis
- calculated RPD for all target analytes
- control limits for RPD
- concentration units

- LCS Recovery Summary: The LCS recovery summaries will be arranged in chronological order, by instrument and must include the following:
  - SDG number
  - LCS identifier
  - names for all target analytes
  - true concentrations for all target analytes in the LCS solution
  - observed concentrations for all target analytes in the LCS analysis
  - calculated percent recoveries for all target analytes
  - control limits for LCS recoveries
  - concentration units
- Standard Addition Results Summary that must include the following:
  - SDG number
  - BP sample number for the sample that underwent the standard additions procedure
  - names for all target analytes
  - analyte concentration or absorbance observed in the non-spiked sample aliquot
  - true concentrations for all target analytes for each standard addition analysis

- observed concentration or absorbance for each standard addition analysis
- calculated concentration for each target analyte
- calculated correlation coefficient for each target analyte
- concentration units

- ICP and/or ICP/MS Serial Dilution Summary: The ICP and/or ICP/MS serial dilution summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:
  - SDG number
  - BP sample number for the ICP or ICP/MS serial dilution sample
  - names for all target analytes
  - analyte concentration observed in the original sample aliquot
  - observed concentrations for all target analytes in the ICP or ICP/MS serial dilution analysis
  - calculated percent difference for all target analytes
  - control limits for percent difference
  - concentration units

- RL and Method Detection Limit (MDL) Summary: The RL and MDL summaries will be arranged in chronological order, by instrument and must include the following:
  - SDG number
  - instrument identifier
  - date the MDL determination was performed
  - names for all target analytes
  - determined MDL for all target analytes
  - RL for all target analytes

- concentration units

- ICP Interelement Correction Factors Summary: The ICP interelement correction factors summaries will be arranged in chronological order, by instrument and must include the following:

  - SDG number
  - instrument identifier
  - date the ICP interelement correction factors determination was performed
  - names for all target analytes
  - determined ICP interelement correction factors concentrations for all target analytes
  - concentration units

- ICP and/or ICP/MS Linear Range Summary: The ICP and/or ICP/MS linear range summaries will be arranged in chronological order, by instrument and must include the following:

  - SDG number
  - instrument identifier
  - date the ICP linear range determination was performed
  - names for all target analytes
  - determined ICP linear range concentrations for all target analytes
  - concentration units

- TCLP or SPLP Preparation Logs (if performed)

- BP sample and QC sample preparation logs

- Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by analyte, by instrument and must include the following:

  - SDG number

- BP sample numbers associated with the sequence
- QC sample identifiers associated with the sequence
- analysis date and time for each BP sample and QC sample associated with the sequence
- identification of all target analytes reported from each BP sample and QC sample analysis
- dilution factor for each BP sample and QC sample analysis
- start and end dates and times for the sequence

- ICP/MS Data Packages will include the following forms in addition to the requirements listed above.

  - ICP/MS Tune Summary
  - ICP/MS Internal Standards Relative Intensity Summary [the summary must include the acceptance limits and reference internal standards intensity.]

C. Raw Data

For each reported value, the laboratory will provide all raw data used to obtain that value; this requirement applies to all required QA/QC measurements and instrument standardization as well as all sample analysis results. This statement does not apply to the Quarterly Verifications Parameters submitted as part of each data package. Raw data must contain all instrument readouts used for the sample results. Each exposure or instrumental reading must be provided, including those readouts that may fall below the RL but greater than the MDL. All ICP, ICP/MS, and AA instruments must provide a legible hardcopy of the direct real-time instrument readout (*e.g.*, strip-charts, printer tapes, *etc.*). A photocopy of the instrument's direct sequential readout must be included. A hardcopy of the instrument's direct instrument readout for cyanide must be included if the instrumentation has the capability.

2.8 General Chemistry Results and QC

The general chemistry data will be arranged in the following order by individual parameter requested for the samples in the SDG.

A. Target Analyte Results Summaries: Target analyte results summaries are required for all samples and will be arranged in increasing alphanumeric order by BP sample number. The target analyte results summary must include the following:

- SDG Number
- BP sample number
- laboratory sample identifier
- matrix of the BP sample
- date of sample collection
- sample percent solids
- name and CAS number for each target analyte
- concentration of positives and PRDL and/or MDL for each target analyte
- any applicable flags for target analyte results (*e.g.*, “U” to designate a “not-detected” result)
- concentration units

B. QC Summaries

- Initial and Continuing Calibration Verification Summary: The initial and continuing calibration verification summaries will be arranged in chronological order, by instrument and must include the following:

  - SDG number
  - names for all target analytes
  - instrument identifier
  - start and end dates and times of the analytical sequence
  - true concentrations for all target analytes for the ICV and CCV standards
  - observed concentrations for all target analytes for each ICV and CCV analyses
  - calculated percent recoveries for all target analytes for each ICV and CCV analyses
  - control limits for ICV and CCV percent recoveries

- concentration units

- Initial and Continuing Calibration Blank Summary: The initial and continuing calibration blank summaries will be arranged in chronological order, by instrument and must include the following:

  - SDG number
  - names for all target analytes
  - instrument identifier
  - start and end dates and times of the analytical sequence
  - observed concentration or MDL for each target analyte for each ICB or CCB analysis
  - acceptance limits for ICB and CCB analyses
  - concentration units

- Preparation Blank Analytical Summary: The preparation blank analytical summaries will be arranged in chronological order, by instrument and must include the information presented in Section 2.8a.

- MS Sample Recovery Summary: The spike sample recovery summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:

  - SDG number
  - BP sample number for the spiked sample
  - percent solids for the BP sample
  - names for all target analytes
  - analyte concentration observed in the non-spiked sample aliquot
  - true concentrations for all target analytes in the spike solution
  - observed concentrations for all target analytes in the spike sample analysis
  - calculated percent recoveries for all target analytes

- control limits for spike sample recoveries
- concentration units

If an MSD is performed, the summary must also include:

- MSD identifier
- observed concentration for each all target analytes in the MSD sample
- percent recovery for all target analytes
- RPD between the MS/MSD results for each analyte
- RPD limit for each analyte

- Duplicates Precision Summary: The duplicate precision summaries will be arranged in alphanumeric order by laboratory sample number and must include the following:

  - SDG number
  - BP sample number for the duplicate sample
  - percent solids for the BP sample
  - names for all target analytes
  - analyte concentration observed in the original sample aliquot
  - observed concentrations for all target analytes in the duplicate sample analysis
  - calculated RPD for all target analytes
  - control limits for RPD
  - concentration units

- LCS Recovery Summary: The LCS recovery summaries will be arranged in chronological order, by instrument and must include the following:

  - SDG number
  - LCS identifier

- names for all target analytes
- true concentrations for all target analytes in the LCS solution
- observed concentrations for all target analytes in the LCS analysis
- calculated percent recoveries for all target analytes
- control limits for LCS recoveries
- concentration units

- Analytical Sequence Form: The analytical sequence forms will be arranged in chronological order, by analyte, by instrument and must include the following:

  - SDG number
  - instrument identifier
  - identification of the target analyte
  - BP sample numbers associated with the sequence
  - QC sample identifiers associated with the sequence
  - analysis date and time for each BP sample and QC sample associated with the sequence
  - start and end dates and times for the sequence

C. Raw Data

For each reported value, the laboratory will provide all raw data (instrument printouts or logbook pages) used to obtain that value; this requirement applies to all required QA/QC measurements and instrument standardization, as well as all sample analysis results. Raw data must contain all instrument readouts/logbooks pages used for the sample results. Each exposure or instrumental reading must be provided, including those readouts/logbook pages that may fall below the quantitation limit. A photocopy of the instrument's direct sequential readout must be included if the instrumentation has the capability.

D. General Chemistry Preparation Logs (by parameter)

2.9. Radiological Data

The radiological data will be arranged in the following order by individual parameter requested for the samples in the SDG.

A. Target Analyte Results Summaries: Target analyte results summaries are required for all samples and will be arranged in increasing alphanumeric order by BP sample number. The target analyte results summary must include the following:

- SDG Number
- BP sample number
- laboratory sample identifier
- matrix of the BP sample
- date of sample collection
- date of sample analysis
- sample activity, uncertainty, and the sample-specific minimum detectable concentration (MDC). The sample-specific MDC will be based on the background of the detector that the sample was counted on. The sample activity (positive or negative), uncertainty, and sample-specific MDC will be reported for positive and “not-detected” results
- any applicable flags for target analyte results (e.g., “U” to designate a “not-detected” result)
- concentration units

B. Quality Control Summaries

- Chemical Yield (Tracer/Carrier) Recovery Summary that must include the following:
  - SDG number
  - BP sample number
  - Method blank sample number
  - MS sample number
  - MSD sample number

- LCS identification number
- LCSD identification number (if performed)
- percent recovery for all tracers/carriers
- applicable recovery limits for each tracer/carrier

- Method Blank Summary: The method blank summaries will be arranged in chronological order, by instrument and method and must include the following:
  - SDG number
  - names for all target analytes
  - observed activity, uncertainty, and MDC for each target analyte for each method blank analysis
  - concentration units

- MS Sample Recovery Summary: The MS sample recovery summaries will be arranged by instrument and method and must include the following:
  - SDG number
  - BP sample number for the spiked sample
  - names for all target analytes
  - analyte concentration observed in the non-spiked sample aliquot
  - true concentrations for all target analytes in the MS solution
  - observed concentrations for all target analytes in the MS sample analysis
  - calculated percent recoveries for all target analytes
  - control limits for MS sample recoveries
  - concentration units

If an MSD is performed, the summary must also include:

- MSD identifier

- observed concentration for each all target analytes in the MSD sample
- percent recovery for all target analytes
- RPD/RER between the MS/MSD results for each analyte
- RPD/RER limit for each analyte

- Duplicates Precision Summary: The duplicate precision summaries will be arranged by instrument and method and must include the following:
  - SDG number
  - BP sample number for the duplicate sample
  - names for all target analytes
  - analyte activity, uncertainty, and MDC observed in the original sample aliquot
  - observed activity, uncertainty, and MDC for all target analytes in the duplicate sample analysis
  - calculated RPD/Replicate Error Ratio (RER) for all target analytes
  - control limits for RPD/RER
  - concentration units

- LCS Recovery Summary: The LCS recovery summaries will be arranged by instrument and method and must include the following:
  - SDG number
  - LCS identifier
  - names for all target analytes
  - true concentrations for all target analytes in the LCS solution
  - observed concentrations for all target analytes in the LCS analysis
  - calculated percent recoveries for all target analytes
  - control limits for LCS recoveries

- concentration units

- Calibration Verification Summary: The calibration verification summaries will be arranged by instrument and method and must include the following:

  - SDG number
  - names for all target analytes
  - instrument identifier
  - date the calibration verification was performed. For each method and analyte, the Contracted Laboratories will provide Calibration Verification summaries that include or bracket the analysis dates of the field and QC samples.
  - acceptance limits for the calibration verification
  - the following calibration verification summaries will be provided for Gas Flow Proportional Counter data

    a. Efficiency Checks
    b. Background Checks

  - the following calibration verification summaries will be provided for Alpha Spectroscopy data

    a. Energy Calibration Checks
    b. Efficiency Checks
    c. Background Checks (
    d. Resolution (FWHM) Checks

  - the following calibration verification summaries will be provided for Alpha Scintillation data

    a. Daily Instrument Performance Checks
    b. Background Checks

C. Raw Data

For each reported value, the Contracted Laboratories will provide all raw data (instrument printouts) used to obtain that value. This applies to all required QA/QC measurements (including tracer/carrier recoveries) as

well as all sample analysis results. Raw data must contain all instrument readouts and worksheets used for the sample results. An exhibit work sheet per method (including example calculations showing how sample activity, TPU and MDA are calculated) will be provided.

D. Preparation Logs (by method)

E. Traceability Documents (by method)

3.0 General Format for Limited Data Package Deliverables

Limited Data Package Deliverables will contain data for all samples in one SDG. All Limited Data Packages will be arranged in the following order:

3.1 Documentation

- Cover Letter/Letter of Transmittal signed by Technical Project Manager or designee
- SDG Narrative signed by Technical Project Manager or designee [The SDG Narrative must include a statement or statements relative to compliance with this document and any applicable QAPP or WP and description of any deviations.]
- References to preparation and analytical methods performed and applicable project documents (i.e., QAPP)
- Field and Internal Laboratory Chain-of-Custody Records
- Sample Receipt Information
- Project Correspondence

3.2 Results and QC

- GC/MS Volatile Data (analytical results summaries for all samples, method blanks, matrix spike [MS] samples, MS duplicate [MSD] samples, laboratory control samples [LCSs], and LCS duplicates [LCSDs]; MS/MSD recovery and precision summaries; LCS/LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries [summaries defined in Section 2.1]).
- GC Volatile Data (analytical results summaries for all samples, method blanks, MS samples, MSD samples, LCSs, and LCSDs; MS/MSD recovery and precision summaries; LCS /LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries [summaries defined in Section 2.2]).

- GC/MS Semivolatile Data (analytical results summaries for all samples, method blanks, MS samples, MSD samples, LCSs, and LCSDs; MS/MSD recovery and precision summaries; LCS /LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries [summaries defined in Section 2.3]).

- GC Organochlorine Pesticide/PCB Data (analytical results summaries for all samples, method blanks, MS samples, MSD samples, LCSs, and LCSDs; MS/MSD recovery and precision summaries; LCS /LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries [summaries defined in Section 2.4]).

- GC Herbicide Data (analytical results summaries for all samples, method blanks, MS samples, MSD samples, LCSs, and LCSDs; MS/MSD recovery and precision summaries; LCS /LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries [summaries defined in Section 2.5]).

- HPLC PAH/Explosive Data (analytical results summaries for all samples, method blanks, MS samples, MSD samples, LCSs, and LCSDs; MS/MSD recovery and precision summaries; LCS /LCSD recovery and precision summaries; surrogate percent recovery summary; and method blank summaries [summaries defined in Section 2.6]).

- ICP, ICP/MS, and AA Metals Data (analytical results summaries for all samples and preparation blanks; MS/MSD recovery and precision summaries; post-digestion MS recovery summaries; laboratory duplicate precision summaries; LCS recovery summaries; and preparation logs [summaries defined in Section 2.7]).

- General Chemistry Data (by parameter: analytical results summaries for all samples and preparation blanks; MS/MSD recovery and precision summaries; laboratory duplicate precision summaries; LCS recovery summaries; and preparation logs [summaries defined in Section 2.8]).

- Radiological Data (analytical results summaries for all samples and preparation blanks; MS/MSD recovery and precision summaries; laboratory duplicate precision summaries; LCS recovery summaries; and chemical yield [tracer/carrier] recovery summaries [summaries defined in Full Deliverables Section 2.9]).

ATTACHMENT 6

Environmental Standards, Inc. Simple EDD Specification

5/17/2010

Contents

INTRODUCTION 3
FILE FORMAT 3
NULL FORMAT 3
NAMING CONVENTION 3
FILE DELIVERY 3
FORMAT FILES 4
Reference Values 4
Valid Values for laboratories not using EQuIS EDP 4
ESI_v2:ESI_RESULTS (EDD SPECIFICATION) 5
EXAMPLE COC 9

INTRODUCTION

The purpose of this document is to describe the processing of the analytical data received from the laboratory and includes the required specifications of the electronic data deliverable (EDD).

FILE FORMAT

All data from the laboratory must be stored in an ASCII file using a tab-delimited standard format. Maximum length of text fields is indicated in the parentheses. If the information is less than the maximum length, do not pad the record with spaces.

Each record must be terminated with a carriage return/line feed (i.e., standard DOS text file). The file can be produced using any software with the capability to create ASCII files. Date is reported as MM/DD/YYYY (month/day/year) and time as HH:MM (hour: minute). Time uses a 24 hour clock, thus 3:30 p.m. will be reported as 15:30.

Each record in an import file must have one or more fields with values that make the row unique. These fields are indicated in the "PRIMARY KEY?" column. Required fields are indicated in the "REQUIRED?" column.

NULL FORMAT

Some fields in the EDD are optional or only required "when applicable". When a field is <u>not</u> listed as required, this means that a null or blank may be appropriate. However, the blank value must still be surrounded by tabs. In other words, the number of fields is always the same, whether or not the fields include data.

NAMING CONVENTION

EDD file name should be as follows:

- SDG.ESI_Result.txt

SDG refers to the sample delivery group provided by the laboratory.

FILE DELIVERY

All EDD deliverables must be sent in a zip file containing the EDD and an EQuIS user certificate. EQuIS user certificate can be obtained by contacting the Environmental Standards' Information Technology department. The zipped file must be named using the following naming convention:

- SDG.MC252.ESI_v2.zip

SDG refers to the sample delivery group provided by the laboratory.

The zipped file should be emailed to MC252_EDD@Envstd.com

FORMAT FILES

EDDs should be tested prior to submission. The ESI_v2 EDP format package can be obtained by contacting Environmental Standards, Inc. However, laboratories will be responsible for obtaining the appropriate EarthSoft EDP software and user license.

- ESI_v2 EDP Format Package contains four files:
  - ESI_v2.rvf
    - Contains project specific valid values related to method, analyte, CAS, units, etc.
  - ESI_v2.vb
  - ESI_v2.xsd
  - ESI_v2-enum.xsd

All four files are necessary for testing EDDs and must be stored in the same folder. You will receive the four files in a zipped file from Environmental Standards, Inc along with project details.

Reference Values

All project reference values are contained in either the ESI_v2.rvf file or the ESI_v2-enum.xsd file. The EDD specification below indicates which file the reference value is in. Generally, the .rvf file contains “project-specific” reference values, while the enum.xsd contains “Environmental Standards-specific” reference values.

Valid Values for laboratories not using EQuIS EDP

Environmental Standards, Inc. will provide a series of Excel spreadsheets with every update to the EQuIS EDP valid values. These files will contain the same values as those contained in the EQuIS EDP file and can be used as a reference for those laboratories that are not using EDP to test data prior to submission.

ESI_v2:ESI_RESULTS (EDD SPECIFICATION)

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
1	PROJECT_CODE	TEXT(20)	Y			For the BP Oil Spill Response, the project code is "MC252"
2	SAMPLE_LOCATION	TEXT(30)		Y		Sample location found on the chain of custody. Enter "LABQC" for lab QC samples.
3	SAMPLE_NAME	TEXT(50)	Y	Y		Sample name found on the chain of custody
4	SAMPLE_DATE	DATE (MM/DD/YYYY)	WHEN APPLICABLE			Sample date found on the chain of custody. Null for lab samples
5	SAMPLE_TIME	TEXT(5)	WHEN APPLICABLE			Sample time found on the chain of custody. Null for lab samples
6	SYS_SAMPLE_CODE	TEXT(40)	Y	Y		Field Samples: Sample name found on the chain of custody. Lab Samples: Laboratory generated by concatenating the lab sample ID and the sample delivery group separated by an underscore (lab sample ID"_" sample delivery group)
7	ANALYSIS_LOCATION	TEXT(2)	Y		ENUM	The location where analysis of the samples took place.
8	LAB_NAME_CODE	TEXT(20)	Y		RVF	Unique identifier of the laboratory
9	LAB_SAMPLE_ID	TEXT(20)	Y			Laboratory sample identifier
10	SAMPLE_TYPE_CODE	TEXT(20)	Y		RVF	Code used to distinguish different types of samples
11	SAMPLE_DELIVERY_GROUP	TEXT(20)	Y			Work group code assigned by laboratory
12	LAB_BATCH_NUMBER	TEXT(20)				Tracking number used by laboratory

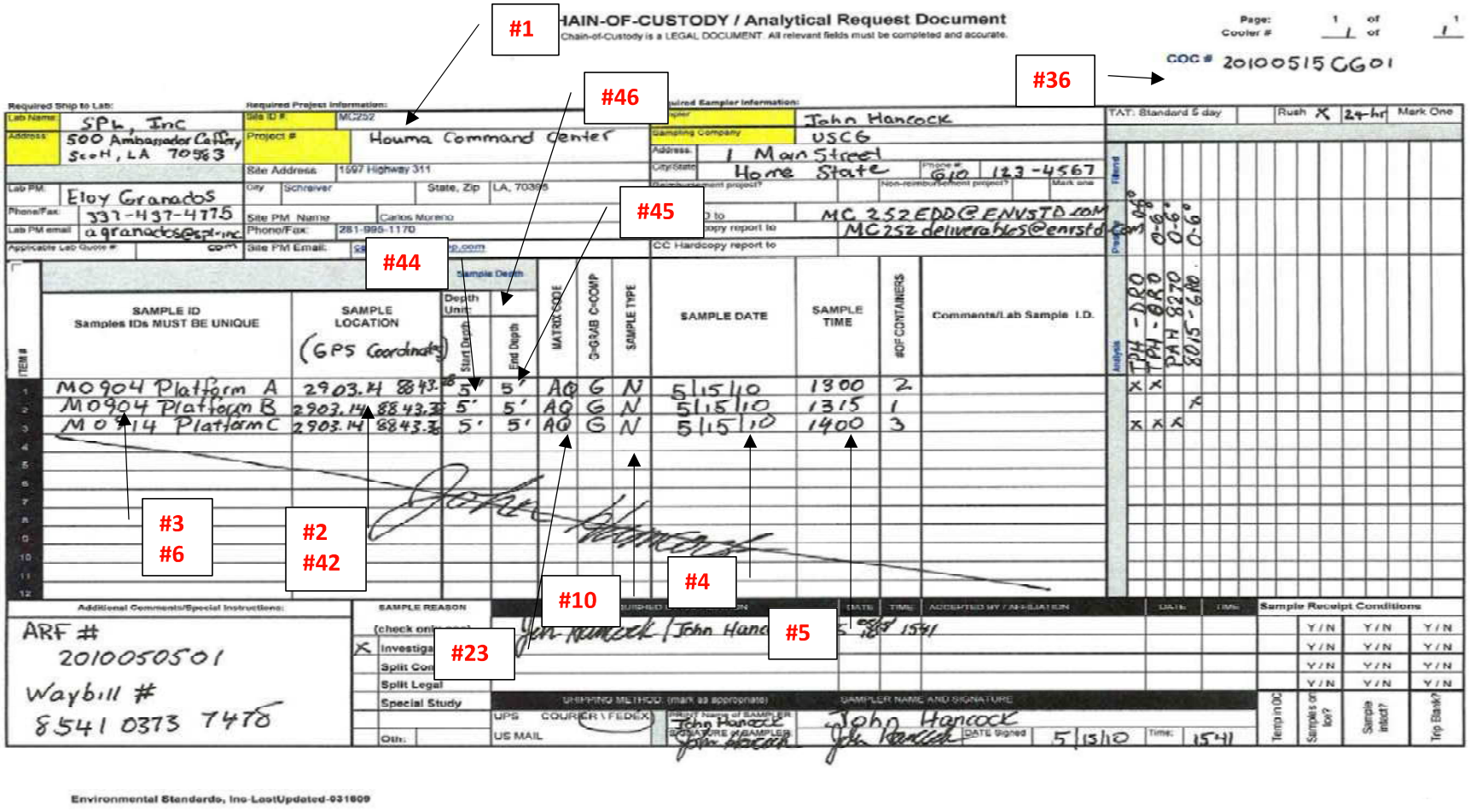
POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
						to identify groups of samples analyzed in the same batch.
13	LAB_ANL_METHOD_NAME	TEXT(35)	Y	Y	RVF	Analytical method name used by laboratory
14	CAS_RN	TEXT(15)	Y	Y	RVF	Chemical Abstracts Registry number
15	CHEMICAL_NAME	TEXT(60)	Y			Name of parameter analyzed
16	RESULT_VALUE	NUMERIC	WHEN APPLICABLE			Analytical result reported at the project specified number of significant digits. Must be blank for non-detects.
17	LAB_QUALIFIER	TEXT(7)	WHEN APPLICABLE			Qualifier flag assigned by laboratory. Must be “U” for Non-detected results
18	RESULT_UNIT	TEXT(15)	Y		RVF	Unit of reported result and detection limit
19	RESULT_TYPE_CODE	TEXT(10)	Y		RVF	Type of result
20	DETECT_FLAG	TEXT(2)	Y		ENUM	Enter “Y” for detected results and “N” for non-detected results
21	REPORTING_DETECTION_LIMIT	NUMERIC	Y			Use the value of the Reporting Limit (RL), Practical Quantitation Limit (PQL), or Contract Required Quantitation Limit.
22	DILUTION_FACTOR	NUMERIC	Y			The factor by which the sample was diluted. If no dilution was preformed, enter “1”
23	SAMPLE_MATRIX_CODE	TEXT(10)	Y		RVF	Sample matrix code found on the chain of custody. For lab samples, use the matrix of the samples on the chain of custody
24	TOTAL_OR_DISSOLVED	TEXT(1)	Y	Y	RVF	Code used to determine whether an analyzed parameter is total (use

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
						"T"), dissolved (use "D") or neither (use "NA")
25	BASIS	TEXT(10)	Y		ENUM	Use "WET" for wet-weight analyses, "DRY" for dry-weight analyses, "RCD" for samples analyzed as-received, and "NA" for those analyses not applicable to wet or dry.
26	ANALYSIS_DATE	DATE (MM/DD/YYYY)	Y	Y		Date the parameter was analyzed
27	ANALYIS_TIME	TEXT(5)	Y	Y		Time the parameter was analyzed
28	METHOD_DETECTION_LIMIT	TEXT(20)	Y			The method detection limit(MDL)
29	LAB_PREP_METHOD_NAME	TEXT(35)			RVF	Description of sample preparation or extraction method
30	PREP_DATE	DATE (MM/DD/YYYY)				Date of sample preparation or extraction
31	PREP_TIME	TEXT(5)				Time of sample preparation or extraction
32	TEST_BATCH_ID	TEXT(20)				Sample preparation batch number assigned by laboratory
33	RESULT_ERROR	TEXT(20)				Statistical measure for the accuracy to be expected for the result, when all relevant error sources are taken into account. (i.e. background of sample, volume of sample, efficiency of detector, etc).
34	TIC_RETENTION_TIME	TEXT(8)				Retention time, in seconds, for tentatively identified compounds.
35	QC_LEVEL	TEXT(10)				The requested QC level for the COC.
36	COC	TEXT(50)	Y			Chain of custody number on the chain of custody

POSITION	FIELD NAME	DATA TYPE	REQUIRED?	PRIMARY KEY?	REFERENCE VALUE?	DESCRIPTION
37	FRACTION	TEXT(20)	Y			The group type of analysis preformed
38	COMMENTS	TEXT(225)				Comments
39	PARENT_SAMPLE_CODE	TEXT(40)				The SYS_SAMPLE_CODE that uniquely identifies the sample that was the source (parent) for this sample
40	LAB_RECEIPT_DATE	DATE (MM/DD/YYYY)				The date the laboratory received the samples
41	TEST_TYPE	TEXT(20)			RVF	The type of test in the laboratory
42	SYS_LOC_CODE	TEXT(30)	Y			Sample Location found on the chain of custody. Enter “LABQC” for lab QC samples.
43	ANALYST_NAME	TEXT(30)				Name or initials of the laboratory analyst
44	START_DEPTH	NUMERIC	WHEN APPLICABLE			Beginning depth for samples found on the chain of custody.
45	END_DEPTH	NUMERIC	WHEN APPLICABLE			End depth for samples found on the chain of custody.
46	DEPTH_UNIT	TEXT(15)	WHEN APPLICABLE			Unit of measurement for sample depths found on the chain of custody.

EXAMPLE COC

The following is an example of a chain-of-custody used for the BP Oil Spill Response project. The numbers indicate position numbers in the EDD.



ATTACHMENT 7

Primary Scribe Table	Scribe Field Name	Field Description	Data Type	Field Size	Primary Key?	Required?	Valid Values?	EDD: Waste Sampling	EDD: Lab Results
SamplesTags	Analyses	Lab Analyses for this sample	Text	64	No	No		X	
COC	COC	Chain of Custody Number	Text	30	Yes	Yes		X	
Samples	Color	Color or Product/liquid condition	Text	25	No	No	Yes	X	
SamplesTags	Container	Sample Container	Text	30	No	No		X	
Events	EventID	The daily reporting period that the sample or monitoring result is associated in the format MM/DD/YYYY.	Text	50	No	Yes		X	
Events	EventsRemarks	The Task that is supported by this data.	Text	255	No	Yes	Yes	X	
Location	Location	Use the facility code that is provided by EPA.	Text	30	PK	Yes		X	
Samples	Matrix	Sample medium that was sampled	Text	40	No	No	Yes	X	
SamplesTags	MS_MSD	Matrix Spike/Matrix Spike Duplicate (Y or N)	Text	1	No	No		X	
SamplesTags	No_Container	Number of Containers associated with the sample tag	Numeric	0	No	No		X	
SamplesTags	Preservation	Sample Preservation	Text	30	No	No	Yes	X	
PropertyInfo	PropertyID	Description of the basecamp a sample or monitoring result is associated with	Text	50	No	Yes	Yes	X	
Samples	Remarks	Description of any issues related to the sample or monitoring result that would affect the data interpatation. Tar add Size and Consistency, Mousse add Color and consistency, Oily Debris color and type of debris, Sediment add comments on oil within the sediment.	Text	250	No	No		X	
Samples	Samp_Depth	Sampling Depth	Numeric	0	No	No		X	
Samples	Samp_Depth_To	Sampling Depth	Numeric	0	No	No		X	
Samples	Samp_Depth_Units	Sampling Depth Units	Text	20	No	No	Yes	X	
Samples	Samp_No	Sample Number. Scribe requires a unique sample number (Required)	Text	25	PK	Yes		X	X
Samples	SampleCollection	Sample Collection Method (i.e. Grab, Composite, Discrete Interval, 8hr, 24 hr)	Text	30	No	Yes	Yes	X	
Samples	SampleDate	Date Sample Collected	DateTime	0	No	Yes		X	
Samples	Sampler	Sampler Name	Text	30	No	No	Yes	X	
Samples	SampleTime	Time Sample taken. Format used is hh:mm	Text	5	No	No		X	
Samples	SampleType	Sample Type (i.e. Field Sample, Field Duplicate, Lab QC, Spike, Trip Blank)	Text	30	No	No	Yes	X	
Site	Site_No	Designates the organization a sample or monitoring result belongs to	Text	12	No	Yes	Yes	X	
SamplesTags	Tag	Identifer for each allequot of the original sample that is to be analyzed by a lab (Required. Defaults to A)	Text	15	PK	No		X	
LabResults	Analysis	Lab Analysis (i.e VOCs)	Text	100	PK	Yes			X
LabResults	Analyte	Analyte/Paramater name (i.e. Lead; Arsenic; etc.) (Required PK)	Text	60	PK	Yes			X
LabResults	Analytical_Method	Lab Analytical Method (i.e. 8270M)	Text	100	No	No			X
LabResults	Basis	"Wet" for wet_weight basis reporting; "Dry" for dry_weight reporting	Text	10	No	Yes	Yes		X
LabResults	Cas_no	Chemical Abstract Number (CAS)	Text	50	No	No			X
LabResults	Comments	Result Comments	Text	250	No	No			X
LabResults	Date_Analyzed	Date Analysis was performed by Lab	DateTime	0	No	No			X
LabResults	Date_Collected	Date Sample Collected as reported by the Lab	DateTime	0	No	No			X
LabResults	Date_Extracted	Date Samples Extracted by Lab	DateTime	0	No	No			X
LabResults	Detected	Detected or Not Detected. i.e. "Y" for detected analytes or "N" for non_detects.	Text	20	No	Yes			X
LabResults	Dilution_Factor	Effective test dilution factor.	Numeric	0	No	No			X
LabResults	Extraction_Method	Lab Extraction Method (i.e. MEP; TCLP; SPLP; EP)	Text	100	No	No			X
LabResults	Lab_Coc_No	Chain of Custody Number as reported by the Lab	Text	50	No	No			X
LabResults	Lab_Name	Laboratory that performed the analysis	Text	50	No	No			X
LabResults	Lab_Result_Qualifier	Result Qualifier as Reported by the Lab	Text	10	No	No			X
LabResults	Lab_Samp_No	Lab Sample Number	Text	25	No	No			X
LabResults	Matrix_ID	Lab Matrix. (i.e. Soil; Water; Air; etc.)	Text	20	No	No			X
LabResults	MDL	Method Detection Limit (MDL)	Numeric	0	No	No			X
LabResults	MDL_Units	MDL Units	Text	20	No	No	Yes		X
LabResults	QA_Comment	QA Comment	Text	250	No	Yes	Yes		X
LabResults	QAFlag	QAFlag (Values: 0 = Not QAed 1=Final)	Numeric	0	No	No			X

LabResults	QC_Type	Laboratory_Control_Sample; Method_Blank	Text	40	No	No		X
LabResults	Quantitation_Limit	Quantitation Limits as determined by the lab.	Numeric	0	No	No		X
LabResults	Quantitation_Limit_Units	Quantitation Limit Units	Text	20	No	No	Yes	X
LabResults	Reportable_Result	"Yes" for results which are considered to be reportable; or "No" for other results	Text	5	No	No		X
LabResults	Reporting_Limit	Reporting Limits as determined by the lab.	Numeric	0	No	No		X
LabResults	Reporting_Limit_Units	Reporting Limit Units	Text	20	No	No	Yes	X
LabResults	Result	Result (number) returned from lab	Numeric	0	No	No		X
LabResults	Result_Qualifier	Final/Validated Result qualifier/flag (i.e. J;U;ND;<;>)	Text	10	No	No	Yes	X
LabResults	Result_Type_Code	"TRG" for a target or regular result; "TIC" for tentatively identifed compounds; "SUR" for surrogates; "IS" for internal standards; or "SC" for spiked compounds.	Text	10	No	No		X
LabResults	Result_Units	Result Unit of measurement (Required PK)	Text	20	PK	Yes	Yes	X
Samples	SampleMedia	(i.e. Summa Cannnister)	Text	30	No	Yes	Yes	
LabResults	Test_Type	Type of test (i.e. "initial"; "reextract1"; "reextract2"; "reextract3"; "reanalysis"; "dilution1"; "dilution2"; and "dilution3")	Text	10	No	No		X

Scribe Field Name	Valid Value	Notes
Basis	Wet	
Basis	Dry	
Color	Pure Product	Product = Pure Product
Color	Pure Dispersant	Dispersant = Pure Dispersant
Coord_Sys_Desc	WGS 84	
EventRemarks	Waste Sampling	
Matrix	Waste - Liquid	
Matrix	Waste - Solid	
MDL_Units	%	
MDL_Units	mg/kg	
MDL_Units	mg/L	
MDL_Units	ug/Kg	
MDL_Units	ug/L	
MDL_Units	ug/m3	
Preservation	HCl None	
Preservation	HCl None	
Preservation	n/a	
PropertyID	Venice	
PropertyID	Chalmett	
PropertyID	Mobile	
PropertyID	Houma	
QA_Comment	Prelim	
QA_Comment	Final	
Quantitation_Limit_Units	%	
Quantitation_Limit_Units	mg/kg	
Quantitation_Limit_Units	mg/L	
Quantitation_Limit_Units	ug/Kg	
Quantitation_Limit_Units	ug/L	
Quantitation_Limit_Units	ug/m3	
Reporting_Limit_Units	%	
Reporting_Limit_Units	mg/kg	
Reporting_Limit_Units	mg/L	
Reporting_Limit_Units	ug/Kg	
Reporting_Limit_Units	ug/L	
Reporting_Limit_Units	ug/m3	
Result_Qualifier	J	
Result_Qualifier	U	
Result_Qualifier	UJ	
Result_Units	mg/kg	
Result_Units	mg/L	
Result_Units	ug/Kg	
Result_Units	ug/L	
Result_Units	ug/m3	
Samp_Depth_Units	m	meters
Samp_Depth_Units	ft	feet
Samp_Depth_Units	in	inches
Samp_Depth_Units	cm	centimeters
SampleCollection	Grab	
SampleCollection	Composite	
SampleCollection	Discrete Interval 8hr	
SampleCollection	24 hr	
SampleMedia	Summa Cannister	
SampleMedia	PQ200 2.5	
Sampler	R06 START	
Sampler	R04 START	
SampleType	Equipment Rinsate	
SampleType	Field Blank	
SampleType	Field Duplicate	
SampleType	Field Sample	
SampleType	Trip Blank	
Site_No	ENVSTDDW	

APPENDIX A

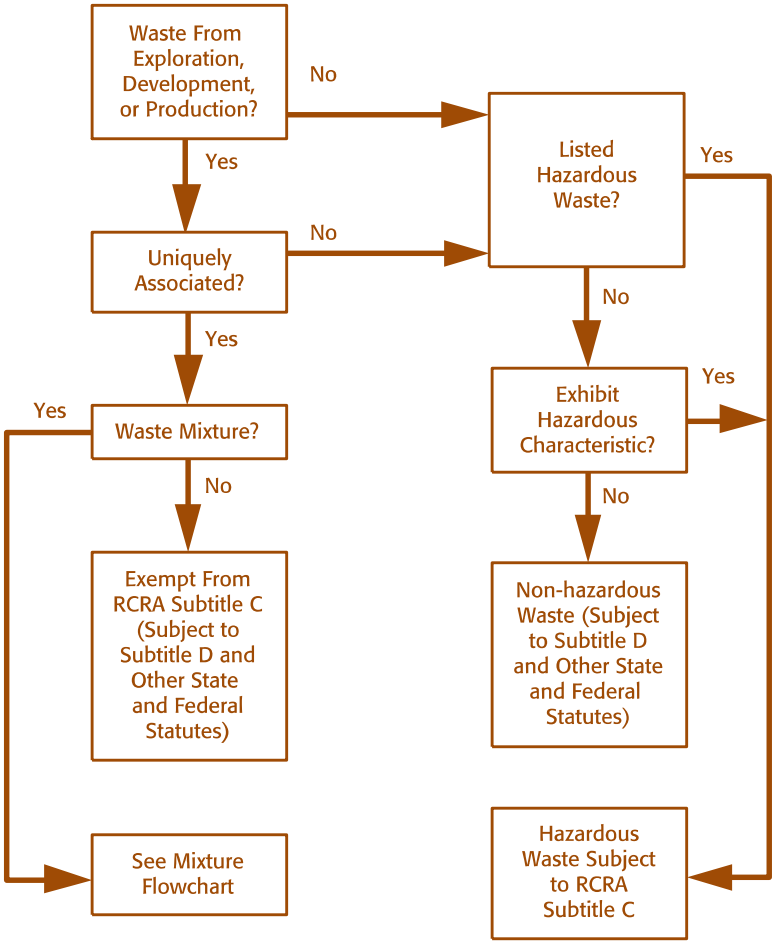
Exempt E&P Wastes

- Produced water
- Drilling fluids
- Drill cuttings
- Rigwash
- Drilling fluids and cuttings from offshore operations disposed of onshore
- Geothermal production fluids
- Hydrogen sulfide abatement wastes from geothermal energy production
- Well completion, treatment, and stimulation fluids
- Basic sediment, water, and other tank bottoms from storage facilities that hold product and exempt waste
- Accumulated materials such as hydrocarbons, solids, sands, and emulsion from production separators, fluid treating vessels, and production impoundments
- Pit sludges and contaminated bottoms from storage or disposal of exempt wastes
- Gas plant dehydration wastes, including glycol-based compounds, glycol filters, and filter media, backwash, and molecular sieves
- Workover wastes
- Cooling tower blowdown
- Gas plant sweetening wastes for sulfur removal, including amines, amine filters, amine filter media, backwash, precipitated amine sludge, iron sponge, and hydrogen sulfide scrubber liquid and sludge
- Spent filters, filter media, and backwash (assuming the filter itself is not hazardous and the residue in it is from an exempt waste stream)
- Pipe scale, hydrocarbon solids, hydrates, and other deposits removed from piping and equipment prior to transportation
- Produced sand
- Packing fluids
- Hydrocarbon-bearing soil
- Pigging wastes from gathering lines
- Wastes from subsurface gas storage and retrieval, except for the non-exempt wastes listed on page 11
- Constituents removed from produced water before it is injected or otherwise disposed of
- Liquid hydrocarbons removed from the production stream but not from oil refining

- Gases from the production stream, such as hydrogen sulfide and carbon dioxide, and volatilized hydrocarbons
- Materials ejected from a producing well during blowdown
- Waste crude oil from primary field operations
- Light organics volatilized from exempt wastes in reserve pits, impoundments, or production equipment

Non-Exempt Wastes

- Unused fracturing fluids or acids
- Gas plant cooling tower cleaning wastes
- Painting wastes
- Waste solvents
- Oil and gas service company wastes such as empty drums, drum rinsate, sandblast media, painting wastes, spent solvents, spilled chemicals, and waste acids
- Vacuum truck and drum rinsate from trucks and drums transporting or containing non-exempt waste
- Refinery wastes
- Liquid and solid wastes generated by crude oil and tank bottom reclaimers [1]
- Used equipment lubricating oils
- Waste compressor oil, filters, and blowdown
- Used hydraulic fluids
- Waste in transportation pipeline related pits
- Caustic or acid cleaners
- Boiler cleaning wastes
- Boiler refractory bricks
- Boiler scrubber fluids, sludges, and ash
- Incinerator ash
- Laboratory wastes
- Sanitary wastes
- Pesticide wastes
- Radioactive tracer wastes
- Drums, insulation, and miscellaneous solids

[1] Although non-E&P wastes generated from crude oil and tank bottom reclamation operations (e.g., waste equipment cleaning solvent) are non-exempt, residuals derived from exempt wastes (e.g., produced water separated from tank bottoms) are exempt. For a further discussion, see the Federal Register notice, Clarification of the Regulatory Determination for Waste from the Exploration, Development, and Production of Crude Oil, Natural Gas and Geothermal Energy, March 22, 1993, Federal Register Volume 58, Pages 15284 to 15287.

Exempt/Non-Exempt Wastes