EXHIBIT E

QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES AND REQUIREMENTS

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Exhibit E – Quality Assurance/Quality Control Procedures and Requirements

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1.0 OVERVIEW

The QA process consists of management review and oversight at the planning, implementation, and completion stages of the environmental data collection activity, and ensures that data provided are of the quality required. The QC process includes those activities required during data collection to produce the data quality desired and to document the quality of the collected data.

1.1 Quality Assurance/Quality Control (QA/QC) Activities

During the planning of an environmental data collection program, QA activities focus on defining data quality criteria and designing a QC system to measure the quality of data being generated. During the implementation of the data collection effort, QA activities ensure that the QC system is functioning effectively, and that the deficiencies uncovered by the QC system are corrected. After environmental data are collected, QA activities focus on assessing the quality of data obtained to determine its suitability to support enforcement or remedial decisions.

1.1.1

This exhibit describes the overall QA/QC operations and the processes by which the QA/QC objectives defined above are met. This contract requires a variety of QA/QC activities. These contract requirements are the minimum QC operations necessary to satisfy the analytical requirements associated with the determination of the different compounds. These QC operations are designed to facilitate laboratory comparison by providing USEPA with comparable data from all Contractors. These requirements do not release the analytical Contractor from maintaining their own QC checks on method and instrument performance.

2.0 INTRODUCTION

Appropriate use of data generated under the large range of analytical conditions encountered in environmental analyses requires reliance on the Quality Control (QC) procedures and criteria incorporated into the analytical methods. Inaccuracies can also result from causes other than unanticipated matrix effects, such as sampling artifacts, equipment malfunctions, contamination, and operator error. Therefore, the QC component of each method is indispensable.

The data acquired from QC procedures are used to estimate and evaluate the information content of analytical results and to determine the necessity for, or the effect of, corrective action procedures. The parameters used to estimate information content include precision, accuracy, detection limit, and other quantitative and qualitative indicators. In addition, QC procedures give an overview of the activities required in an integrated program to generate data of known and documented quality required to meet defined objectives.

2.1 Quality Assurance/Quality Control (QA/QC) Program Components

2.1.1 The necessary components of a complete QA/QC program include internal QC criteria that demonstrate acceptable levels of performance, as determined by QA review. External review of data and procedures is accomplished by the monitoring activities of the USEPA through various reviews. These reviews are described in specific sections of this exhibit. Laboratory evaluation samples, electronic data audits, and data packages provide an external QA reference for the program. A Contractor on-site evaluation system is also part of the external QA monitoring. A feedback loop provides the results of the various review functions to the Contractors through direct communication with the Project Officer (PO).

2.1.2 This exhibit does not provide specific instructions for constructing QA Plans (QAPs), QC systems, or a QA organization. It is, however, an explanation of the QA/QC requirements of the Statement of Work (SOW). It outlines some minimum standards for QA/QC programs. It also includes specific items that are required in a QAP and by the QA/QC documentation detailed in the contract. Delivery of this documentation provides the Government with a complete data package which will stand alone, and limits the need for contact with the Contractor or with an analyst, at a later date, if some aspect of the analysis is questioned.

2.1.3 To assure the product delivered by the Contractor meets the requirements of the contract, and to improve inter-laboratory data comparison, the Contractor shall:

- Prepare and adhere to a written QAP, the elements of which are defined in Section 5;
- Prepare and adhere to QA/QC Standard Operating Procedures (SOPs), as described in Section 6;
- Adhere to the analytical methods in Exhibit D and associated QC requirements specified within Exhibit E;
- Verify and document analytical standards and retain documentation of the purity of neat materials, as well as the purity and accuracy of solutions obtained from private chemical supply houses;
- Submit all raw data and required documentation for Regional review;

- Submit results of all analyzed laboratory evaluation samples, including adherence to corrective action procedures;
- Submit, upon request, instrument data tapes and applicable documentation for tape audits, including a copy of the Sample Data Package;
- Participate in on-site laboratory evaluations, and adhere to corrective action procedures; and
- Submit all original documentation generated during sample analyses for Government review.

3.0 GENERAL QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REQUIREMENTS

The Contractor shall adhere to USEPA's Good Laboratory Practices for laboratory cleanliness with regard to glassware and apparatus. The Contractor shall also adhere to good laboratory practices with regard to reagents, solvents, and gases.

4.0 SPECIFIC QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROCEDURES

4.1 Purpose

4.1.1 The purpose of this document is to provide a uniform set of procedures for the analysis of volatile organic constituents of air samples, documentation of methods and their performance, and verification of the sample data generated. Although it is impossible to address all analytical situations in one document, this exhibit defines the minimum requirements for all major steps relevant to any organic analysis.

4.1.2 The QA/QC procedures defined herein shall be used by the Contractor when performing the methods specified in Exhibit D. When additional QA/QC procedures are specified in Exhibit D, the Contractor shall follow those procedures, in addition to the procedures specified in this Exhibit.

4.2 Laboratory Audit and Intercomparison Study Program

As required by the Task Order agreement, the Contractor may be required to participate in the Laboratory Audit and Intercomparison Study Program run by USEPA.

4.3 Annual Verification of Method Detection Limits (MDLs)

The Contractor shall perform annual verification of MDLs by the method specified in Exhibit D for each instrument used on the contract. All the MDLs shall meet the requirements specified in Exhibit C and Exhibit D. The MDLs shall be available during on-site laboratory evaluations and shall be submitted within seven days of written request by the Project Officer (PO).

4.4 Quality Assurance/Quality Control (QA/QC) Measurements

4.4.1 In this Exhibit, as well as other places within this Statement of Work (SOW), the term "analytical sample" discusses the required frequency or placement of certain QA/QC measurements. The term "analytical sample" includes all field samples, including PE samples, received from an external source. It also includes all required QA/QC samples except those directly related to instrument calibration or calibration verification (calibration standards, Initial Calibration, Continuing Calibration, and tunes).

4.4.2 In order for the QA/QC information to reflect the status of the samples analyzed all samples and their associated QA/QC analysis shall be analyzed under the same analytical operating and procedural conditions.

4.4.3 If any QC measurement fails to meet contract criteria, the analytical measurement must not be repeated prior to taking the appropriate corrective action, as specified in Exhibit D.

4.4.4 The Contractor shall report all QC data in the exact format specified in Exhibits B and H.

4.4.5 In addition, the Contractor shall establish a QA program with the objective of providing sound analytical chemical measurements. This program shall incorporate the QC procedures, any necessary corrective action, and all documentation required during data collection, as well as the quality assessment measures performed by management to ensure acceptable data production.

5.0 QUALITY ASSURANCE PLAN (QAP)

5.1 Introduction

The Contractor shall establish a Quality Assurance (QA) program with the objective of providing sound analytical chemical measurements. This program shall incorporate the Quality Control (QC) procedures, any necessary corrective action, and all documentation required during data collection as well as the quality assessment measures performed by management to ensure acceptable data production. The Contractor shall follow the requirements for QA and QC procedures in the Task Order agreement if they are specified otherwise the contractor shall follow the USEPA EPA Requirements for Quality Management Plans (QA/R-2). An electronic version can be found at: http://www.epa.gov/QUALITY/qs-docs/r2-final.pdf.

5.1.1 The Contractor shall prepare a written QAP that describes the procedures that are implemented to achieve the following:

- Maintain data integrity, validity, and usability. Ensure that analytical measurement systems are maintained in an acceptable state of stability and reproducibility;
- Detect problems through data assessment and establish corrective action procedures that keep the analytical process reliable; and
- Document all aspects of the measurement process to provide data that are technically sound and legally defensible.

5.1.2 The QAP shall present, in specific terms, the policies, organization, objectives, functional guidelines, and specific QA/QC activities designed to achieve the data quality requirements in the contract. Where applicable, Standard Operating Procedures (SOPs) pertaining to each element shall be included or referenced as part of the QAP. The QAP shall be paginated consecutively in ascending order. The QAP shall be available during on-site laboratory evaluations and shall be submitted within 7 days of written request by the Project Officer (PO). Additional information relevant to the preparation of a QAP can be found in USEPA and American Society for Testing and Materials (ASTM) publications.

5.2 Required Elements of a Quality Assurance Plan (QAP)

The required elements of a laboratory's QAP are outlined in this section. This outline should be used as a framework for developing the QAP.

A. Organization and Personnel

1. QA Policy and Objectives (the mission and quality policy of the organization)
2. QA Management (the specific roles, authorities, and responsibilities of management and staff with respect to QA and QC activities)
    a. Organization
    b. Assignment of QA/QC Responsibilities
    c. Reporting Relationships (the means by which effective communications with personnel actually performing the work are assured)
    d. QA Document Control Procedures
    e. QA Program Assessment Procedures (the process used to plan, implement, and assess the work performed)
3. Key Personnel (Laboratory Personnel Involved in QA and QC Activities)
    a. Résumés
    b. Education and Experience Pertinent to the contract
    c. Training Records and Progress

B. Facilities and Equipment

1. Instrumentation and Backup Alternatives
2. Maintenance Activities and Schedules

C. Document Control

1. Laboratory Notebook Policy
2. Sample Tracking/Custody Procedures
3. Logbook Maintenance and Archiving Procedures
4. Sample Delivery Group (SDG) File Organization, Preparation, and Review Procedures
5. Procedures for Preparation, Approval, Review, Revision, and Distribution of SOPs
6. Process for Revision of Technical or Documentation Procedures

D. Analytical Methodology

1. Calibration Procedures and Frequency
2. Sample Analysis Procedures
3. Standards Preparation Procedures
4. Decision Processes, Procedures, and Responsibility for Initiation of Corrective Action

E. Data Generation

1. Data Collection Procedures
2. Data Reduction Procedures
3. Data Validation Procedures
4. Data Reporting and Authorization Procedures

F. Quality Control (QC)

1. Solvent, Reagent, and Adsorbent Check Analysis
2. Reference Material Analysis
3. Internal QC Checks
4. Corrective Action and Determination of QC Limit Procedures
5. Responsibility Designation

G. Quality Assurance (QA) (the process which measures the effectiveness of QA will be established and how frequently effectiveness will be measured)

1. Data QA
2. Systems/Internal Audits
3. Performance/External Audits
4. Corrective Action Procedures (the continual improvement based on lessons learned from previous experience)
5. QA Reporting Procedures
6. Responsibility Designation

5.3 Updating and Submitting the Quality Assurance Plan (QAP)

5.3.1 Initial Submission. During the contract solicitation process, the Contractor is required to submit their QAP to the USEPA Contracting Officer (CO). Within 60 days after contract award, the Contractor shall maintain, on file at their facility, a revised QAP that is fully compliant with the requirements of the contract. The Contractor shall maintain the QAP on file at the Contractor's facility for the term of the contract. The revised QAP will become the official QAP under the contract and may be used during legal proceedings. Both the initial QAP submission and the revised QAP shall be paginated consecutively in ascending order. The revised QAP shall include:

- Changes resulting from (1) the Contractor's internal review of their organization, personnel, facility, equipment, policy, and procedures and, (2) the Contractor's implementation of the requirements of the contract, and
- Changes resulting from USEPA review of the laboratory evaluation sample data, contractor-supplied documentation, and recommendations made during the pre-award on-site laboratory evaluation.

5.3.1.1 The Contractor shall send a copy of the latest version of the QAP within 7 days of a request from the PO or CO. The PO or CO will designate the recipients.

5.3.2 Subsequent Updates and Submissions. During the term of the contract, the Contractor shall amend the QAP when the following circumstances occur:

- USEPA modifies the contract or the requirements of the Task Order agreement;
- USEPA notifies the Contractor of deficiencies in the QAP documentation;
- USEPA notifies the Contractor of deficiencies resulting from USEPA's review of the Contractor's performance;

- The Contractor identifies deficiencies resulting from their internal review of the QAP documentation;
- The Contractor's organization, personnel, facility, equipment, policy, or procedures change; or
- The Contractor identifies deficiencies resulting from the internal review of changes in their organization, personnel, facility, equipment, policy, or procedures.

5.3.2.1 The Contractor shall amend the QAP within 14 days of when the circumstances listed in Section 5.3 result in a discrepancy between what was previously described in the QAP and what is presently occurring at the Contractor's facility. When the QAP is amended, all changes in the QAP shall be clearly marked (e.g., a bar in the margin indicating where the change is found in the document, highlighting the change by underlining the change, bold printing the change, or using a different print font). The amended pages shall have the date on which the changes were implemented and refer to the specific Task Order agreements that required the amendments. The Contractor shall incorporate all amendments and identify the changes specific to Task Order requirements in the latest version of the QAP document. The Contractor shall archive all amendments to the QAP document for future reference by USEPA.

5.3.2.2 The Contractor shall send a copy of the latest version of the QAP document within 7 days of a written request by the Contracting Officer (CO). The CO requestor will designate the recipients.

6.0 STANDARD OPERATING PROCEDURES (SOP)

6.1 Introduction

To obtain reliable results, adherence to prescribed analytical methodology is imperative. In any operation that is performed on a repetitive basis, reproducibility is best accomplished through the use of SOPs. As defined by USEPA, an SOP is a written document that provides directions for the step-by-step execution of an operation, analysis, or action which is commonly accepted as the method for performing certain routine or repetitive tasks. The Contractor shall follow the USEPA Guideline for Preparing Standard Operating Procedures (SOPs) (QA/G-6). An electronic version can be found at: http://www.epa.gov/quality1/qa_docs.html.

6.1.1 SOPs prepared by the Contractor shall be functional (i.e., clear, comprehensive, up-to-date, and sufficiently detailed to permit duplication of results by qualified analysts). The SOPs shall be paginated consecutively, in ascending order.

6.1.2 All SOPs shall reflect activities as they are currently performed by the Contractor. In addition, all SOPs shall be:

- Consistent with current USEPA regulations, guidelines, and the contract's requirements.
- Consistent with instrument manufacturers' specific instruction manuals.
- Available to USEPA during an on-site laboratory evaluation. A complete set of SOPs shall be bound together and available for inspection at such evaluations. During on-site laboratory evaluations, laboratory personnel may be asked to demonstrate the application of the SOPs;
- Available to the designated recipients within 7 days, upon request by the Contracting Officer (CO).
- Capable of providing for the development of documentation that is sufficiently complete to record the performance of all tasks required by the protocol.
- Capable of demonstrating the validity of data reported by the Contractor and explaining the cause of missing or inconsistent results.
- Capable of describing the corrective measures and feedback mechanism utilized when analytical results do not meet protocol requirements.
- Reviewed regularly and updated as necessary when contract, facility, or Contractor procedural modifications are made.
- Archived for future reference in usability or evidentiary situations.
- Available at specific work stations as appropriate.
- Subject to a document control procedure that precludes the use of outdated or inappropriate SOPs.
- Reviewed and signed by all Contractor personnel performing action identified in the SOP.

6.2 Format

The format for SOPs may vary depending upon the type of activity for which they are prepared; however, at a minimum, the following sections shall be included:

- Title page;
- Document Control;
- Scope and Applicability;
- Summary of Method;
- Definitions (acronyms, abbreviations, and specialized forms used in the SOP);
- Health and Safety;
- Personnel Qualifications;
- Interferences;
- Apparatus and Materials (list or specify, also note designated locations where found);
- Handling and Preservation;
- Instrument or Method Calibration;
- Sample Preparation and Analysis;
- Data Calculations;
- Procedures;
- Quality Control (QC) limits;
- Corrective action procedures, including procedures for secondary review of information being generated;
- Documentation description and example forms;
- Data Management and Records Management;
- Miscellaneous notes and precautions; and
- References.

6.3 Required SOPs

In addition to SOPs specified by the Task Order agreement, the Contractor shall maintain the following SOPs:

6.3.1 Evidentiary SOPs for required chain-of-custody and document control, as discussed in Exhibit F.

6.3.2 Sample receipt and storage

- Sample receipt and identification logbooks;
- Security precautions.

6.3.3 Glassware Cleaning

6.3.4 Calibration (Balances, etc.)

- Procedures;
- Frequency requirements;
- Preventative maintenance schedule and procedures;
- Acceptance criteria and corrective actions; and
- Logbook maintenance authorization.

6.3.5 Analytical Procedures for each analytical system

- Instrument performance specifications;
- Instrumental operating procedures;
- Data acquisition system operation;
- Procedures when automatic quantitation algorithms are overridden;
- QC required parameters;
- Analytical run/injection logbooks; and
- Instrumental error and editing flag descriptions and resulting corrective actions.

6.3.6 Maintenance Activities for each analytical system

- Preventative maintenance schedule and procedures;
- Corrective maintenance determinants and procedures; and
- Maintenance authorization.

6.3.7 Analytical Standards

- Standard coding/identification and inventory system;
- Standards preparation logbook(s);
- Standards preparation procedures;
- Procedures for equivalency/traceability analyses and documentation;
- Purity logbook (primary standards and solvents);
- Storage, replacement, and labeling requirements; and
- QC and corrective action measures.

6.3.8 Data Reduction Procedures

- Data processing systems operation;
- Outlier identification methods;
- Identification of data requiring corrective action; and
- Procedures for format and/or forms for each operation.

6.3.9 Documentation Policy/Procedures

- Contractor/analysts' notebook policy, including review policy;
- Complete Sample Delivery Group (SDG) File (CSF) contents;
- CSF organization and assembly procedures, including review policy; and

- Document inventory procedures, including review policy.

6.3.10 Data Validation/Self-Inspection Procedures

- Data flow and chain-of-command for data review;
- Procedures for measuring precision and accuracy;
- Evaluation parameters for identifying systematic errors;
- Procedures to ensure that hardcopy and electronic deliverables are complete and compliant with the requirements in Exhibits B and H;
- Procedures to ensure that hardcopy deliverables are in agreement with their comparable electronic deliverables;
- Demonstration of internal Quality Assurance (QA) inspection procedure [demonstrated by supervisory sign-off on personal notebooks, internal Performance Evaluation (PE) samples, etc.];
- Frequency and type of internal audits (e.g., random, quarterly, spot checks, perceived trouble areas);
- Demonstration of problem identification, corrective actions, and resumption of analytical processing; sequence resulting from internal audit (i.e., QA feedback); and
- Documentation of audit reports (internal and external), audit response, corrective action, etc.

6.3.11 Data Management and Handling

- Procedures for controlling and estimating data entry errors;
- Procedures for reviewing changes to data and deliverables and ensuring traceability of updates;
- Life Cycle Management (LCM) procedures for testing, modifying, and implementing changes to existing computing systems including hardware, software, and documentation or installing new systems;
- Database security, backup, and archival procedures including recovery from system failures;
- System maintenance procedures and response time;
- Individual(s) responsible for system operation, maintenance, data integrity, and security;
- Specifications for staff training procedures;
- Storage, retrieval, and verification of the completeness and readability of Gas Chromatograph/Mass Spectrometer (GC/MS) files transferred to electronic media; and
- Virus protection procedures for software and electronic deliverables.

6.4 Updating and Submitting SOPs

6.4.1 Initial Submission. During the contract solicitation process, the Contractor is required to submit their SOPs to the USEPA Contracting Officer (CO). Within 60 days after contract award, the Contractor shall prepare and maintain on file, at their facility, a complete, revised set of SOPs that are fully compliant with the requirements of the contract.

The revised SOPs will become the official SOPs under the contract and may be used during legal proceedings. The Contractor shall maintain the complete set of SOPs on file at the Contractor's facility for the term of the contract. Both the initial submission of SOPs and the revised SOPs shall be dated and paginated consecutively in ascending order. The revised SOPs shall include:

- Changes resulting from (1) the Contractor's internal review of their procedures, and (2) the Contractor's implementation of the requirements of the contract, and
- Changes resulting from USEPA's review of the laboratory evaluation sample data, bidder-supplied documentation, and recommendations made during the pre-award on-site laboratory evaluation.

6.4.1.1 The Contractor shall send a complete set of the latest version of SOPs or individual SOPs required by the Task Order agreement within 7 days of a request from the CO. The CO will designate the recipients.

6.4.2 Subsequent Updates and Submissions. During the term of the contract, the Contractor shall amend the SOPs when the following circumstances occur:

- USEPA modifies the technical requirements of the contract or Task Order agreement;
- USEPA notifies the Contractor of deficiencies in their SOP documentation;
- USEPA notifies the Contractor of deficiencies resulting from USEPA's review of the Contractor's performance;
- The Contractor's procedures change;
- The Contractor identifies deficiencies resulting from internal review of the SOPs documentation; or
- The Contractor identifies deficiencies resulting from internal review of the procedures.

6.4.2.1 Existing SOPs shall be amended or new SOPs shall be written within 14 days of when the circumstances listed in Section 6.4 result in a discrepancy between what was previously described in the SOPs and what is presently occurring at the Contractor's facility. All changes in the SOPs shall be clearly marked (e.g., a bar in the margin indicating where the change is found in the document, highlighting the change by underlining the change, bold printing the change, or using a different print font). The amended/new SOPs shall have the date on which the changes were implemented. Amended/new SOPs written for specific Task Order requirements shall identify the Task Order number.

6.4.2.2 When existing SOPs are amended or new SOPs are written, the Contractor shall document the reason(s) for the change, and maintain the amended SOPs or new SOPs on-file at the laboratory facility. Amended/new SOPs written for specific Task Order requirements shall identify the Task Order number. Documentation of the reason(s) for the change shall be maintained on file with the amended SOPs or new SOPs.

6.4.2.3 The Contractor shall send a complete set of the latest version of SOPs or individually requested SOPs within 7 days of a request from the CO. The CO will designate the recipients.

7.0 ANALYTICAL STANDARDS REQUIREMENTS

7.1 Overview

USEPA will not supply analytical reference standards either for direct analytical measurements or for the purpose of traceability. All Contractors shall be required to prepare from neat materials or purchase from private chemical supply houses those standards necessary to successfully and accurately perform the analyses required in this protocol.

7.2 Preparation of Chemical Standards from the Neat High Purity Bulk Material

7.2.1 If a Contractor cannot obtain analytical reference standards, the Contractor may prepare their own standards. Contractors shall obtain the highest purity possible when purchasing neat chemical standards. When standards are purchased at less than 98% purity, the Contractor shall document the reason why a higher purity could not be obtained.

7.2.2 If required by the manufacturer, the chemical standards shall be kept sealed when not being used in the preparation of standard solutions. Proper storage of standards is essential to safeguard them from decomposition.

7.2.3 The purity of a compound can sometimes be misrepresented by a chemical supply house. Since knowledge of purity is needed to calculate the concentration in a standard, it is the Contractor's responsibility to have analytical documentation proving the purity of each compound is correctly stated. Purity confirmation, when performed, should use appropriate techniques. Use of two or more independent methods is recommended.

7.2.4 Mis-identification of compounds occasionally occurs and it is possible that a mis-labeled compound may be received from a chemical supply house. It is the Contractor's responsibility to have analytical documentation ascertaining that all compounds used in the preparation of standards are correctly identified. Identification confirmation, when performed, shall use Gas Chromatography/Mass Spectrometry (GC/MS) analysis on at least two different analytical columns, or other appropriate techniques.

7.2.5 Log notebooks shall be kept for all dilutions. All subsequent dilutions from the primary standard and the calculations for determining their concentrations shall be recorded and verified by a second person. All standards shall be clearly labeled as to the identity of the compound or compounds, the standard ID number of the mixture, concentration, date prepared, expiration date, special storage requirements (if any), and initials of the preparer.

7.3 Purchase of Mixed Chemical Standards

Analytical reference standards can be purchased by Contractors provided the mixtures meet the following criteria.

7.3.1 Contractors shall maintain the following documentation to verify the integrity of the standard mixtures:

- Mass spectral identification confirmation;
- Purity confirmation; and
- Chromatographic and quantitative documentation that the standard was Quality Control (QC) checked according to the following section.

7.3.2 The Contractor is responsible for the quality of the standards employed for analyses under the contract.

7.4 Documentation of the Verification and Preparation of Chemical Standards

It is the responsibility of each Contractor to maintain the necessary documentation to show that the chemical standards they have used in the performance of analysis conform to the requirements previously listed in Section 7.3.1.

7.4.1 Logbooks, calculations, chromatograms, mass spectra, etc., whether produced by the Contractor or purchased from chemical supply houses, shall be maintained by the Contractor and may be subject to review during on-site laboratory evaluations. In those cases where the documentation is supportive of the analytical results of data packages sent to USEPA, such documentation is to be kept on file by the Contractor for a period of one year.

7.4.2 Upon request by the Project Officer (PO), the Contractor shall submit their most recent previous year's (12 months) documentation for the verification and preparation of stock or working chemical standards within 14 days of receipt of the request.

7.4.3 USEPA may periodically generate a report discussing deficiencies in the Contractor's documentation for the verification and preparation of chemical standards or may discuss the deficiencies during an on-site laboratory evaluation. In a detailed letter to the PO, the Contractor shall address the deficiencies and the subsequent corrective action implemented by the Contractor to correct the deficiencies within 14 days of receipt of the report or the on-site laboratory evaluation.

7.4.4 If new Standard Operating Procedures (SOPs) are required to be written or if existing SOPs are required to be rewritten or amended because of deficiencies and the subsequent corrective action implemented by the Contractor, the Contractor shall write/amend and submit the SOPs per the requirements listed in Exhibit E, Section 6.

8.0 REGIONAL DATA REVIEW

Contractor data are generated to meet the specific needs of the USEPA Regions as defined in the Task Order agreement. In order to verify the usability of data for the intended purpose, each Region may review data from the perspective of the end user, based upon functional guidelines for data review that have been developed jointly by the Regions and the USEPA Office of Superfund Remediation and Technology Innovation (OSRTI) Analytical Services Branch (ASB). Each Region may use these guidelines as the basis for data evaluation. Individual Regions may augment the basic guideline review process with additional review based on Region-specific or site-specific concerns. Regional reviews, like the sites under investigation, vary based on the nature of the problems under investigation and the Regional response appropriate to the specific circumstances.

9.0 PROFICIENCY TESTING

As a means of measuring and evaluating both the Contractor's and the method's analytical performance, the Contractor may be required to participate in USEPA's Proficiency Testing Program as defined in the Task Order agreement. If required under the Task Order agreement, the USEPA's Proficiency Testing Program may involve the analysis of Case-specific Performance Evaluation (PE) samples and blind audits. The Contractor's analytical PE samples and audit results maybe used by USEPA to assess and verify the Contractor's continuing ability to produce acceptable analytical data in accordance with the contractual requirements of the Task Order agreement. The Contractor must receive a passing score as specified by the Task Order agreement to be in compliance with the contract.

9.1 Performance Evaluation (PE) Samples

9.1.1 If specified by the Task Order agreement, the PE sample(s) may be scheduled with the Contractor as frequently as on a Sample Delivery Group (SDG)-by-SDG basis. The PE samples will be sent by the Regional Client. PE samples will assist USEPA in monitoring Contractor performance.

9.1.2 PE samples will be provided as either single-blinds (recognizable as a PE sample but of unknown composition), or as double-blinds (not recognizable as a PE sample and of unknown composition). The Contractor will not be informed of either the compounds or the concentrations in the PE samples.

9.1.3 If required under the Task Order agreement the Contractor may receive the PE samples as either pressurized gas cylinders or full volume air samples in SUMMA Canisters from USEPA or a designated USEPA Contractor. The PE samples shall come with instructions concerning the unique preparation procedures, if any, required to reconstitute the PE samples (i.e., the required dilution of the PE sample concentrate). **PE samples are to be analyzed with the rest of the routine samples in the SDG.** The Contractor shall prepare and analyze the PE sample using the procedure described in the sample preparation and method analysis sections of Exhibit D. All contract required Quality Control (QC) shall also be met. The PE sample results are to be submitted in the SDG deliverable package per normal reporting procedures detailed in Exhibit B.

9.1.4 In addition to PE sample preparation and analysis, the Contractor shall be responsible for correctly identifying and quantitating the analytes included in each PE sample. When PE sample results are received by USEPA, the PE sample results will be evaluated for correct analytical identification and quantitation. The results of the PE sample evaluation will be provided to the Contractor via coded evaluation sheets by analyte. USEPA will notify the Contractor of unacceptable performance. USEPA reserves the right to adjust the PE sample acceptance windows to compensate for any unanticipated difficulties with a particular PE sample.

9.2 Audits

9.2.1 An audit is a unique analytical Case containing only PE samples. The audit samples will be ordered by the CO. Audit samples assist USEPA in monitoring Contractor performance.

9.2.2 Audit samples will be provided as single-blinds (recognizable as a PE sample but of unknown composition). The Contractor will not be informed of either the compounds or the concentrations in the PE samples.

9.2.3 The Contractor may receive the audit samples as either full volume samples or concentrates from USEPA or a designated USEPA Contractor. The audit samples shall come with instructions concerning the unique preparation procedures, if any, required to reconstitute the samples (i.e., the required dilution of the sample concentrate). The Contractor shall prepare and analyze the samples using the procedure described in the sample preparation and method analysis sections of Exhibit D. All contract required QC shall also be met. The sample results are to be submitted in the SDG deliverable package per normal reporting procedures detailed in Exhibit B.

9.2.4 In addition to audit sample preparation and analysis, the Contractor shall be responsible for correctly identifying and quantitating the compounds included in each audit sample. When audit sample results are received by USEPA, the sample results will be scored for correct analytical identification and quantitation. The audit sample scoring will be provided to the Contractor via coded evaluation sheets, by compound. USEPA will notify the Contractor of unacceptable performance.

9.2.5 In the case of unacceptable performance, the Contractor shall describe the deficiency(ies) and the action(s) taken to correct the deficiency(ies) in a corrective action letter to the PO within 14 days of receipt of notification from USEPA.

9.2.6 In the case of unacceptable performance, if new Standard Operating Procedures (SOPs) are required to be written, or if existing SOPs are required to be rewritten or amended because of deficiencies and subsequent corrective action implemented by the Contractor, the Contractor shall write/amend and submit the SOPs per the requirements listed in Exhibit E, Section 6.

10.0 ELECTRONIC DATA QUALITY ASSURANCE (QA) MONITORING AUDITS

10.1 Overview

Periodically, USEPA requests the instrument electronic data from Contractors for a specific Case to perform electronic data audits. Generally, electronic data submissions and audits are requested for the following reasons.

- Program overview;
- Indication of data quality problems;
- Support for on-site audits; and
- Specific Regional requests.

10.1.1 Depending upon the reason for an audit, the instrument electronic data from a recent Case, a specific Case, or a Performance Evaluation (PE) sample may be requested. Electronic data audits provide a mechanism to assess adherence to contractual requirements and to ensure the consistency of data reported on the hardcopy/electronic deliverables with that generated on analytical instruments. This function provides external monitoring of Program Quality Control (QC) requirements and checks adherence of the Contractor to internal QA procedures. In addition, electronic data audits enable USEPA to evaluate the utility, precision, and accuracy of the analytical methods.

10.1.2 The Contractor shall store all raw and processed electronic analytical data in appropriate instrument manufacturer's format, uncompressed, and with no security codes. The data shall include all necessary data files

for a complete reconstruction of the previously submitted hardcopy and electronic deliverable data package. All associated raw data files in the instrument manufacturer proprietary software format must be submitted if those files contain data or instrumental parameters regarding any analysis and/or correction applied to an instrument or analytical result. This instrument electronic data shall include data for all samples and all QC samples, including but not limited to: blanks; Laboratory Control Samples (LCSs); initial calibrations; initial and continuing calibration verification standards; and instrument performance check solutions [4-Bromofluorobenzene (BFB) as well as all Contractor-generated spectral libraries and quantitation reports required to generate the data package. In addition, the Contractor shall supply raw data for the Method Detection Limit (MDL) studies and values for the year in which the Sample Delivery Group (SDG) was analyzed. The Contractor shall maintain a written reference logbook of data files of the EPA Sample Number, calibration data, standards, and blanks. The logbook shall include EPA Sample Numbers, and standard and blank IDs, identified by Case and SDG.

10.1.3 The Contractor is required to retain the instrument electronic data for 3 years after submission of the reconciled Complete SDG File (CSF). Electronic media shipped to the USEPA designated recipient must be fully usable by the recipient. Diskettes must be MS-DOS formatted, 3.5-inch, high density, 1.44 MB and tapes must be either 4 mm or 8 mm. Alternative means for delivery of electronic data, including compact disks (CDs), may be utilized by the Contractor upon prior written approval from USEPA. When submitting electronic instrument data to USEPA, the following materials shall be delivered in response to the request.

10.1.3.1 All associated raw data files for all analytical samples, all QC samples, blanks, LCSs, initial calibrations, initial and continuing calibration verification standards, and instrument performance check solutions (BFB).

10.1.3.2 All processed data files and quantitation output files associated with the raw data files described in Section 10.1.3.1.

10.1.3.3 All associated identifications and calculation files (method files) used to generate the data submitted in the data package. This includes, but is not limited to, results files, acquisition files, calibration files, and method files.

10.1.3.4 All Contractor-generated Mass Spectral library files (NIST/EPA/NIH and/or Wiley, or equivalent, library not required).

10.1.3.5 A copy of the Contractor's reference logbook relating data files to EPA Sample Number, BFB, calibration data, standards, and blanks. The logbook shall include EPA Sample Numbers and laboratory file identifiers for all samples, blanks, and standards, identified by Case and SDG.

10.1.3.6 A printout of the directory of all files in each directory, including all subdirectories and the files contained therein.

10.1.3.7 A copy (hardcopy) of the completed Sample Data Package.

10.1.3.8 A statement attesting to the completeness of the electronic instrument data submission signed and dated by the Contractor's Laboratory Manager. The Contractor shall also provide a statement attesting that the data reported have not been altered in any way. These statements shall be part of a cover sheet that includes the following information relevant to the data tape submission:

- Contractor name;

- Date of submission;
- Case Number;
- SDG Number;
- Instrument make and model number;
- Instrument operating software name and version;
- Data software name and version used for acquisition, re-quantitation, and hardcopy/report generation;
- Data system computer;
- System operating software;
- Data system network;
- Data backup software;
- Data backup hardware;
- Data analysis software;
- Media type and volume of data (in MB) backed up; and
- Names and telephone numbers of two Contractor contacts for further information regarding the submission.

10.2 Submission of the Instrument Electronic Data

Upon request of the Contracting Officer (CO), the Contractor shall send the required instrument electronic data and all necessary documentation to the designated recipient within 7 days of notification.

10.3 Responding to the Electronic Data Audit Report

After completion of the electronic data audit, USEPA may send a copy of the electronic data audit report to the Contractor or may discuss the electronic data audit report at an on-site laboratory evaluation. In a detailed letter to the CO, the Contractor shall discuss the corrective actions implemented to resolve the deficiencies listed in the electronic data audit report within 14 days of receipt of the report or on-site laboratory evaluation.

10.3.1 If new Standard Operating Procedures (SOPs) are required to be written or if existing SOPs are required to be rewritten or amended because of the deficiencies and the subsequent corrective action implemented by the Contractor, the Contractor shall write/amend and submit the SOPs per the requirements listed in Exhibit E, Section 6.

11.0 DATA PACKAGE AUDITS

11.1 Overview

Data package audits are performed by USEPA for program overview and specific Regional concerns. Standardized procedures have been established to assure uniformity of the auditing process. Data packages are periodically selected from recently received Cases. They are evaluated for the technical quality of hardcopy raw data, Quality Assurance (QA), and adherence to contractual requirements. This function provides external monitoring of program Quality Control (QC) requirements. Data package audits are used to assess the technical quality of the data and evaluate overall Contractor performance. Audits provide USEPA with an in-depth inspection and evaluation of the Sample Data Package with regard to achieving QA/QC acceptability. A thorough review of the raw data is completed, including: all instrument readouts used for the sample results; instrument printouts; quantitation reports; chromatograms; spectra; library searches and other documentation for deviations from the contractual requirements; a check for transcription and calculation errors; a review of the qualifications of the Contractor personnel involved with the Case; and a review of the latest version of all Standard Operating Procedures (SOPs) on file.

11.2 Responding to the Data Package Audit Report

11.2.1 After completing the data package audit, USEPA will send a copy of the data package audit report to the Contractor or discuss the data package audit report on an on-site laboratory evaluation. In a detailed letter to the Contracting Officer (CO), the Contractor shall discuss the corrective actions implemented to resolve the deficiencies listed in the data package audit report within 14 days of receipt of the report.

11.2.2 An alternate delivery schedule may be proposed by the Contractor, but it is the sole decision of USEPA, represented either by the CO, to approve or disapprove the alternate delivery schedule. If an alternate delivery schedule is proposed, the Contractor shall describe, in a letter to the PO, why the Contractor is unable to meet the delivery schedule listed in this section. The CO will not grant an extension for greater than 14 days for the Contractor's response letter to the Sample Data Package report. The Contractor shall proceed and not assume that an extension will be granted until so notified by the CO.

11.2.3 If new SOPs are required to be written or SOPs are required to be amended because of the deficiencies and the subsequent corrective action implemented by the Contractor, the Contractor shall write/amend and submit the SOPs per the requirements listed in Exhibit E, Section 6.

12.0 ON-SITE LABORATORY EVALUATIONS

12.1 Overview

At a frequency dictated by a Contractor's performance, the Contracting Officer (CO) or an authorized representative will conduct an on-site laboratory evaluation. On-site laboratory evaluations are carried out to monitor the Contractor's ability to meet selected terms and conditions specified in the contract. The evaluation process incorporates two separate categories: Quality Assurance (QA) On-Site Evaluation and Evidentiary Audit.

12.2 Quality Assurance On-Site Evaluation

Quality Assurance Evaluators inspect the Contractor's facilities to verify the adequacy and maintenance of instrumentation, the continuity, experience and education of personnel, and the acceptable performance of analytical and Quality Control (QC) procedures for adherence to the contract requirements.

12.2.1 The Contractor shall expect that items to be monitored will include, but are not limited to, the following items:

- Size, cleanliness, and organization of the facility;
- Quantity, age, availability, scheduled maintenance, and performance of instrumentation;
- Availability, appropriateness, and utilization of the Quality Assurance Plan (QAP) and Standard Operating Procedures (SOPs);
- Staff qualifications and experience, and personnel training programs;
- Analysis of Performance Evaluation (PE) sample(s);
- Reagents, standards, and sample storage facilities;
- Standard preparation logbooks and raw data;
- Bench sheets and analytical logbook maintenance and review; and
- Review of the Contractor's sample analysis/data package inspection/data management procedures.

12.2.2 Prior to an on-site evaluation, various documentation pertaining to performance of the specific Contractor is integrated into a profile package for discussion during the evaluation. Items that may be included are: previous on-site reports; audit and/or Performance Evaluation (PE) sample score results; Regional review of data; Contractor performance information provided by the Region; Regional QA materials; data audit reports; and data trend reports.

12.3 Evidentiary Audit

Evidence auditors conduct an on-site laboratory evaluation to determine if Contractor policies and procedures are in place to satisfy evidence handling requirements as stated in Exhibit F. The evidence audit is comprised of a procedural audit, an audit of written SOPs, and an audit of analytical project file documentation.

12.3.1 Procedural Audit. The Contractor shall perform analysis of PE sample(s) in the presence of the USEPA-designated team during the procedural audit. The procedural audit will be comprised of everything from sample receipt to data package assembly and completion. This includes the review and

examination of actual SOPs and accompanying documentation for the following Contractor operations: sample receiving; sample storage; sample identification; sample security; sample tracking (from receipt to completion of analysis); analytical project file organization and assembly; and proper disposal of samples and co-generated wastes.

12.3.2 Written SOPs Audit. The written SOPs audit consists of review and examination of the written SOPs to determine if they are accurate and complete for the following Contractor operations: sample receiving; sample storage; sample identification; sample security; sample tracking (from receipt to completion of analysis); and analytical project file organization and assembly.

12.3.3 Analytical Project File Evidence Audit. The analytical project file evidence audit consists of review and examination of the analytical project file documentation. The auditors review the files to determine:

- The accuracy of the document inventory;
- The completeness of the file;
- The adequacy and accuracy of the document numbering system;
- Traceability of sample activity;
- Identification of activity recorded on the documents; and
- Error correction methods.

12.4 Discussion of the On-Site Team's Findings

The QA and evidentiary auditors discuss their findings with the PO and/or authorized representatives prior to debriefing the Contractor. During the debriefing, the auditors present their findings and recommendations for corrective actions necessary to the Contractor personnel. A report which discusses deficiencies found during the on-site audit will be sent to the Contractor to provide further clarification of findings. In a detailed letter to the PO, the Contractor shall discuss the deficiencies and the subsequent corrective actions implemented by the Contractor to resolve the deficiencies within 14 days of receipt of report or the on-site laboratory evaluation.

12.4.1 If new SOPs are required to be written or if existing SOPs are required to be rewritten or amended because of the deficiencies and the subsequent corrective action implemented by the Contractor, the Contractor shall write/amend and submit the SOPs per the requirements listed in Exhibit E, Section 6.

13.0 DATA MANAGEMENT

13.1 Overview

Data management procedures are defined as procedures specifying the acquisition or entry, update, correction, deletion, storage, and security of computer-readable data and files. These procedures shall be in written form and contain a clear definition for all databases and files used to generate or resubmit deliverables. Key areas of concern include: system organization (including personnel and security); documentation operations; traceability; and Quality Control (QC).

13.1.2 Data manually entered from hardcopy shall be subject to QC checks and the error rates estimated. Systems shall prevent entry of incorrect or out-of-range data and alert data entry personnel of errors. In addition, data entry error rates shall be estimated and recorded on a monthly basis by re-entering a statistical sample of the data entered and calculating discrepancy rates by data element.

13.2 Documenting Data Changes

The record of changes in the form of corrections and updates to data originally generated, submitted, and/or resubmitted shall be documented to allow traceability of updates. Documentation shall include the following for each change.

- Justification or rationale for the change.
- Initials of the person making the change(s). Data changes shall be implemented and reviewed by a person or group independent of the source generating the deliverable.
- Documentation of changes shall be retained according to the schedule of the original deliverable.
- Resubmitted deliverables shall be re-inspected as a part of the Contractor's internal inspection process prior to resubmission. The entire deliverable, not just the changes, shall be inspected.
- The Laboratory Manager shall approve changes to originally submitted deliverables.
- Documentation of data changes may be requested by Contractor auditors.

13.3 Life Cycle Management (LCM) Procedures

LCM procedures shall be applied to computer software systems developed by the Contractor to be used to generate and edit contract deliverables. Such systems shall be thoroughly tested and documented prior to utilization.

13.3.1 A software test and acceptance plan including test requirements, test results, and acceptance criteria shall be developed, followed, and available in written form.

13.3.2 System changes shall not be made directly to production systems generating deliverables. Changes shall be made first to a development system and tested prior to implementation.

13.3.3 Each version of the production system will be given an identification number, date of installation, date of last operation, and will be archived.

13.3.4 System and operations documentation shall be developed and maintained for each system. Documentation shall include a user's manual and an operations and maintenance manual.

13.3.5 This documentation shall be available for on-site review and/or upon written request by the Project Officer (PO).

13.4 Personnel Responsibilities

Individual(s) responsible for the following functions shall be identified.

- System operation and maintenance, including documentation and training;
- Database integrity, including data entry, data updating and QC; and
- Data and system security, backup, and archiving.

EXHIBIT F

CHAIN-OF-CUSTODY, DOCUMENT CONTROL, AND WRITTEN STANDARD OPERATING PROCEDURES

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Exhibit F – Chain-of-Custody, Document Control,
and Written Standard Operating Procedures

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1.0 INTRODUCTION

1.1 A sample is physical evidence collected from a facility or from the environment. Controlling evidence is an essential part of the hazardous waste investigation effort. To ensure that the US Environmental Protection Agency's (USEPA) sample data and records supporting sample-related activities are admissible and have weight as evidence in future litigation, Contractors are required to maintain USEPA samples under chain-of-custody and to account for all samples and supporting records of sample handling, preparation, and analysis. Contractors shall maintain sample identity, sample custody, and all sample-related records according to the requirements in this exhibit.

1.2 Purpose of the Evidence Requirements

The purpose of the evidence requirements include:

- Ensuring traceability of samples while in the possession of the Contractor;
- Ensuring custody of samples while in the possession of the Contractor;
- Ensuring the integrity of sample identity while in the possession of the Contractor;
- Ensuring sample-related activities are recorded on documents or in other formats for USEPA sample receipt, storage, preparation, analysis, and disposal;
- Ensuring all laboratory records for each specified Sample Delivery Group (SDG) will be accounted for when the project is completed; and
- Ensuring that all laboratory records directly related to USEPA samples are assembled and delivered to USEPA or, prior to delivery, are available upon USEPA's request.

2.0 STANDARD OPERATING PROCEDURES (SOP)

The Contractor shall implement the following SOPs for sample receiving; sample identification; sample security; sample storage; sample tracking and document control; computer-resident sample data control; and Complete Sample Delivery Group (SDG) File (CSF) and Portable Document Format (PDF) file organization and assembly to ensure accountability of USEPA sample chain-of-custody, as well as control of all USEPA sample-related records.

2.1 Sample Receiving

2.1.1 The Contractor shall designate a Sample Custodian responsible for receiving USEPA samples.

2.1.2 The Contractor shall designate a representative to receive USEPA samples in the event that the Sample Custodian is not available.

2.1.3 Upon receipt, the condition of shipping containers and sample containers shall be inspected and recorded on Form DC-1 by the Sample Custodian or a designated representative.

2.1.4 Upon receipt, the condition of the custody seals (intact/broken) shall be inspected and recorded on Form DC-1 by the Sample Custodian or a designated representative.

2.1.5 The Sample Custodian or a designated representative shall verify and record on Form DC-1 the agreement or disagreement of information recorded on all documents received with samples and information recorded on sample containers.

2.1.6 The Sample Custodian or a designated representative shall verify and record the following information on Form DC-1 as samples are received and inspected:

- Presence or absence and condition of custody seals on shipping and/or sample containers;
- Custody seal numbers when present;
- Condition of the sample canisters;
- Presence or absence of airbills or airbill stickers;
- Airbill or airbill sticker numbers;
- Presence or absence of Traffic Report/Chain of Custody Records (TR/COCs) or Packing Lists;
- Sample tags listed/not listed on TR/COCs;
- Date of receipt;
- Time of receipt;
- Designated Sample Numbers;
- Canister ID;
- Presence or absence of sample tags;
- Sample tag numbers;
- Assigned laboratory numbers;
- Remarks regarding condition of sample shipment, etc.;

- Samples delivered by hand; and
- Problems and discrepancies.

2.1.7 The Sample Custodian or a designated representative shall sign, date, and record the time on all accompanying forms, when applicable, at the time of sample receipt (e.g., TR/COCs or packing lists, and airbills).

NOTE: Initials are not acceptable.

2.1.8 The Contractor shall contact the Contracting Officer (CO) to resolve problems and discrepancies including, but not limited to: absent documents, conflicting information, absent or broken custody seals; and unsatisfactory sample condition (e.g., leaking sample container).

2.1.9 The Contractor shall record the resolution of all problems and discrepancies communicated through the TOPO.

2.2 Sample Identification

2.2.1 The Contractor shall maintain the identity of USEPA samples throughout the laboratory.

2.2.2 Each sample shall be labeled with the EPA Sample Number or a unique laboratory sample identification number.

2.3 Sample Security

2.3.1 The Contractor shall demonstrate that USEPA sample custody is maintained from receiving through retention or disposal. A sample is in custody if:

- It is in your possession; or
- It is in your view after being in your possession; or
- It is locked in a secure area after being in your possession; or
- It is in a designated secure area (secure areas shall be accessible only to authorized personnel).

2.3.2 The Contractor shall demonstrate security of designated secure areas.

2.4 Sample Storage

The Contractor shall designate storage areas for USEPA samples and prepared samples.

2.5 Sample Tracking and Document Control

2.5.1 The Contractor shall record all activities performed on USEPA samples.

2.5.2 Titles that identify the recorded activities shall be printed on each page of all laboratory documents. Activities include, but are not limited to: sample receipt, sample storage, sample preparation, and sample analysis. When a document is a record of analysis, the instrument type and parameter group shall be included in the title.

2.5.3 When columns are used to organize information recorded on laboratory documents, the information recorded in the columns shall be identified in a column heading.

2.5.4 Reviewers' signatures shall be identified on laboratory documents when reviews are conducted.

NOTE: Individuals recording review comments on computer-generated raw data are not required to be identified unless the written comments address data validity.

2.5.5 The laboratory name shall be identified on preprinted laboratory documents.

2.5.6 Each laboratory document entry shall be dated as MM/DD/YYYY (e.g., 01/01/2007) and signed by the individual(s) responsible for performing the recorded activity at the time the activity is recorded.

2.5.7 Notations on laboratory documents shall be recorded in ink.

2.5.8 Corrections to laboratory data reporting forms and raw data shall be made by drawing single lines through the errors and entering the correct information. Information shall not be obliterated or rendered unreadable. Corrections and additions to information shall be signed (or initialed) and dated.

2.5.9 Unused portions of laboratory documents shall be lined-out.

2.5.10 Pages in bound and unbound logbooks shall be sequentially numbered.

2.5.11 Instrument-specific run logs shall be maintained to enable the reconstruction of run sequences.

2.5.12 Logbook entries shall be in chronological order.

2.5.13 Logbook entries shall include only one SDG per page, except in the event where the SDGs “share” Quality Control (QC) samples (e.g., instrument run logs and extraction logs).

2.5.14 Information inserted into laboratory documents shall be affixed permanently in place. The individual responsible for inserting information shall sign and date across the insert and logbook page at the time information is inserted.

2.5.15 The Contractor shall document disposal or retention of USEPA samples, remaining portions of samples, and prepared samples.

2.5.16 Each page in bound and unbound logbooks shall be dated (MM/DD/YYYY) and signed (no initials) at the bottom by the individual recording the activity (if a single entry is made on a page) or by the last individual recording information on the page (if multiple entries are on the same page).

2.6 Computer-Resident Sample Data Control

2.6.1 Contractor personnel responsible for original data entry shall be identified at the time of data input.

2.6.2 The Contractor shall make changes to electronic data in a manner that ensures that the original data entry is preserved, the editor is identified, and the revision date is recorded.

2.6.3 The Contractor shall routinely verify the accuracy of manually entered data, electronically entered data, and data acquired from instruments.

2.6.4 The Contractor shall routinely verify documents produced by the electronic data collection system to ensure accuracy of the information reported.

2.6.5 The Contractor shall ensure that the electronic data collection system is secure.

2.6.5.1 The electronic data collection system shall be maintained in a secure location.

2.6.5.2 Access to the electronic data collection system functions shall be limited to authorized personnel through utilization of software security techniques (e.g., log-ons or restricted passwords).

2.6.5.3 Electronic data collection systems shall be protected from the introduction of external programs or software (e.g., viruses).

2.6.6 The Contractor shall designate archive storage areas for electronic data and the software required to access the data.

2.6.7 The Contractor shall designate an individual responsible for maintaining archives of electronic data, including the software.

2.6.8 The Contractor shall maintain the archives of electronic data and necessary software in a secure location (secure areas shall be accessible only to authorized personnel).

2.7 Complete Sample Delivery Group File (CSF) Organization and Assembly

2.7.1 The Contractor shall designate a Document Control Officer responsible for the organization and assembly of the CSF.

2.7.2 The Contractor shall designate a representative responsible for the organization and assembly of the CSF in the event that the Document Control Officer is not available.

2.7.3 The Contractor shall maintain documents relating to the CSF in a secure location.

2.7.4 All original laboratory forms and copies of SDG-related logbook pages shall be included in the CSF.

2.7.5 Copies of laboratory documents in the CSF shall be photocopied in a manner to provide complete and legible replicates.

2.7.6 Documents relevant to each SDG including, but not limited to, the following shall be included in the CSF:

- Logbook pages;
- Bench sheets;
- Mass spectra;
- Chromatograms;
- Screening records;
- Analytical records;
- Reanalysis records;
- Records of failed or attempted analysis;
- Custody records;
- Sample tracking records;
- Raw data summaries;
- Computer printouts;
- Correspondence;
- FAX originals;
- Library search results; and
- Other.

2.7.7 The Document Control Officer or a designated representative shall ensure that sample tags are encased in clear plastic bags before placing them in the CSF.

2.7.8 CSF documents shall be organized and assembled on an SDG-specific basis.

2.7.9 Original documents which include information relating to more than one SDG (e.g., TR/COCs, calibration logs) shall be filed in the CSF of the lowest SDG number, and copies of these originals shall be placed in the other CSF(s). The Document Control Officer or a designated representative shall record the following statement on the copies in (indelible) dark ink:

COPY
ORIGINAL DOCUMENTS ARE INCLUDED IN CSF _____

_____
Signature

_____
Date

2.7.10 All CSFs shall be submitted with a completed Form DC-2. All resubmitted CSFs shall be submitted with a new or revised Form DC-2.

2.7.11 Each item in the CSF and resubmitted CSFs shall be inventoried and assembled in the order specified on Form DC-2. Each page of the CSF shall be stamped with a sequential number. Page number ranges shall be recorded in the columns provided on Form DC-2. Intentional gaps in the page numbering sequence shall be recorded in the "Comments" section on Form DC-2. When inserting new or inadvertently omitted documents, the Contractor shall identify them with unique accountable numbers. The unique accountable numbers and the locations of the documents shall be recorded in the "Other Records" section on Form DC-2.

2.7.12 Before shipping each CSF, the Document Control Officer or a designated representative shall verify the agreement of information recorded on all documentation and ensure that the information is consistent and the CSF is complete.

2.7.13 The Document Control Officer or a designated representative shall document the shipment of deliverable packages including what was sent, to whom the package was sent, the date, and the carrier used.

2.7.14 Shipments of deliverable packages, including resubmittals, shall be sealed with custody seals by the Document Control Officer or a designated representative in a manner such that opening the packages would break the seals.

2.7.15 Custody seals shall be signed and dated by the Document Control Officer or a designated representative when sealing deliverable packages.

2.8 Data in PDF Organization and Assembly

2.8.1 The Contractor shall designate a Document Control Officer responsible for the organization and assembly of the PDF file.

2.8.2 The Contractor shall designate a representative responsible for the organization and assembly of the PDF file in the event that the Document Control Officer is not available.

2.8.3 The Contractor shall maintain documents relating to the PDF file in a secure location.

2.8.4 In addition to all required deliverables identified in the laboratory’s contract and the Statement of Work (SOW), the laboratory shall provide a complete copy of the hardcopy deliverable in PDF on a Compact Disc (CD).

2.8.5 The PDF file should be organized in accordance to directions provided in Exhibit B, "Reporting Requirements and Order of Data Deliverables" of the SOW. The PDF file shall be bookmarked for ease of data retrieval and navigation.

2.8.6 Organic data shall be bookmarked using a hierarchal bookmark structure (i.e., an overview or "parent" bookmark, and a subordinate or "child" bookmark nested underneath the "parent" bookmark). Refer to Exhibit B, Section 2.8, Table 2 for the specific hierarchal bookmark structure.

2.8.7 Before shipping each PDF file, the Document Control Officer or a designated representative shall verify the agreement of information recorded in the PDF file and ensure that the information is consistent and the PDF file is complete.

2.8.8 The Document Control Officer or a designated representative shall document the shipment of deliverable packages including what was sent, to whom the package was sent, the date, and the carrier used.

2.8.9 Shipments of deliverable packages, including resubmittals, shall be sealed with custody seals by the Document Control Officer or a designated representative in a manner such that opening the packages would break the seals.

2.8.10 Custody seals shall be signed and dated by the Document Control Officer or a designated representative when sealing deliverable packages.

3.0 WRITTEN STANDARD OPERATING PROCEDURES (SOP)

The Contractor shall develop and implement the following written SOPs for sample receiving, sample identification, sample security, sample storage, sample tracking and document control, computer-resident sample data control, and Complete Sample Delivery Group (SDG) File (CSF) and Portable Document Format (PDF) file organization and assembly to ensure accountability for USEPA sample chain-of-custody and control of all USEPA sample-related records.

3.1 Sample Receiving

3.1.1 The Contractor shall have written SOPs for sample receiving that accurately reflect the procedures used by the laboratory.

3.1.2 The written SOPs for sample receiving shall ensure that the procedures listed below are in use at the laboratory.

3.1.2.1 The condition of shipping containers and sample containers are inspected and recorded on Form DC-1 upon receipt by the Sample Custodian or a designated representative.

3.1.2.2 The condition of custody seals are inspected and recorded on Form DC-1 upon receipt by the Sample Custodian or a designated representative.

3.1.2.3 The agreement or disagreement of information recorded on shipping documents with information recorded on sample containers is verified and recorded on Form DC-1 by the Sample Custodian or a designated representative.

3.1.2.4 The following information is recorded on Form DC-1 by the Sample Custodian or a designated representative as samples are received and inspected:

- Presence or absence and condition of custody seals on shipping and/or sample containers;
- Custody seal numbers, when present;
- Condition of the sample canisters;
- Presence or absence of airbill or airbill stickers;
- Airbill or airbill sticker numbers;
- Presence or absence of Traffic Report/Chain of Custody Records (TR/COCs) or Packing Lists;

- Sample tag numbers listed/not listed on TR/COCs;
- Date of receipt;
- Time of receipt;
- Designated Sample Numbers;
- Canister ID;
- Presence or absence of sample tags;
- Sample tag numbers;
- Assigned laboratory numbers;
- Samples delivered by hand; and
- Problems and discrepancies.

3.1.2.5 The Sample Custodian or a designated representative shall sign, date, and record the time on all accompanying forms (e.g., TR/COCs or packing lists, and airbills), when applicable, at the time of sample receipt.

NOTE: Initials are not acceptable.

3.1.2.6 The Contractor shall contact the Task Order Project Officer (TOPO) to resolve problems and discrepancies including, but not limited to: absent documents; conflicting information; absent or broken custody seals; and unsatisfactory sample condition (e.g., leaking sample container).

3.1.2.7 The Contractor shall record resolution of problems and discrepancies communicated through the TOPO.

3.2 Sample Identification

3.2.1 The Contractor shall have written SOPs for sample identification that accurately reflect the procedures used by the laboratory.

3.2.2 The written SOPs for sample identification shall ensure that the procedures listed below are in use at the laboratory.

3.2.2.1 The identity of USEPA samples and prepared samples is maintained throughout the laboratory when:

- The Contractor assigns unique laboratory sample identification numbers, the written SOPs shall include a description of the procedure used to assign these numbers;
- The Contractor uses prefixes or suffixes in addition to laboratory sample identification numbers, the written SOPs shall include the definitions; and
- The Contractor uses methods to uniquely identify fractions/parameter groups and matrix type, the written SOPs shall include a description of these methods.

3.2.2.2 Each sample and sample preparation container is labeled with the EPA sample number or a unique laboratory sample identification number.

3.3 Sample Security

3.3.1 The Contractor shall have written SOPs for sample security that accurately reflects the procedures used by the laboratory.

3.3.2 The written SOPs for sample security shall include the items listed below.

3.3.2.1 Procedures that ensure the following:

- Sample custody is maintained; and
- The security of designated secure areas is maintained.

3.3.2.2 A list of authorized personnel who have access to locked storage areas.

3.4 Sample Storage

3.4.1 The Contractor shall have written SOPs for sample storage that accurately reflect the procedures used by the laboratory.

3.4.2 The written SOPs for sample storage shall describe locations, contents, and identities of all storage areas for USEPA samples and prepared samples in the laboratory.

3.5 Sample Tracking and Document Control

3.5.1 The Contractor shall have written SOPs for sample tracking and document control that accurately reflect the procedures used by the laboratory.

3.5.2 The written SOPs for sample tracking and document control shall include the items listed below.

3.5.2.1 Examples of all laboratory documents used during sample receiving, sample storage, sample transfer, sample analyses, CSF organization and assembly, and sample retention or disposal.

3.5.2.2 Procedures that ensure the following:

- All activities performed on USEPA samples are recorded;
- Titles that identify the activities recorded are printed on each page of all laboratory documents;
- Information recorded in columns is identified with column headings;
- Reviewers' signatures are identified on laboratory documents;
- The laboratory name is included on preprinted laboratory documents;
- Laboratory document entries are signed and dated as MM/DD/YYYY (e.g., 01/01/2007);
- Entries on all laboratory documents are recorded in ink;
- Corrections and additions to laboratory documents are made by drawing single lines through the errors, entering the correct information, and initialing and dating the new information;
- Unused portions of laboratory documents are lined-out;
- Pages in bound and unbound logbooks are sequentially numbered;
- Instrument-specific run logs are maintained to enable the reconstruction of run sequences;
- Logbook entries are recorded in chronological order;
- Entries are recorded for only one SDG on a page, except in the events where SDGs "share" Quality Control (QC) samples (e.g., instrument run logs and extraction logs);

- Each page in bound and unbound logbooks shall be dated as (MM/DD/YYYY) and signed (no initials) at the bottom by the individual recording the activity (if a single entry is made on a page) or by the last individual recording information on the page (if multiple entries are on the same page);
- Information inserted in laboratory documents is affixed permanently, signed, and dated across the insert; and
- The retention or disposal of USEPA samples, remaining portions of samples, and prepared samples is documented.

3.6 Computer-Resident Sample Data Control

3.6.1 The Contractor shall have written SOPs for computer-resident sample data control that accurately reflects the procedures used by the laboratory.

3.6.2 The written SOPs for computer-resident sample data control shall include the items listed below.

3.6.2.1 Procedures which ensure the following:

- Contractor personnel responsible for original data entry are identified;
- Changes to electronic data are made such that the original data entry is preserved, the editor is identified, and the revision date is recorded;
- The accuracy of manually entered data, electronically entered data, and data acquired from instruments is verified;
- Report documents produced by the electronic data collection system are routinely verified to ensure the accuracy of the information reported;
- Off-site backup and storage of electronic data is maintained;
- Electronic data collection system security is maintained; and
- Archives of electronic data and accompanying software are maintained in a secure location.

3.6.2.2 Descriptions of archive storage areas for the electronic data and the software required to access data archives.

3.6.2.3 A list of authorized personnel who have access to electronic data collection system functions and to archived data.

3.7 CSF Organization and Assembly

3.7.1 The Contractor shall have written SOPs for CSF organization and assembly that accurately reflect the procedures used by the laboratory.

3.7.2 The written SOPs for CSF organization and assembly shall ensure that the procedures listed below are in use at the laboratory.

- Documents relating to the CSF are maintained in a secure location.
- All original laboratory forms and copies of SDG-related logbook pages are included in the CSF.
- Laboratory documents are photocopied in a manner to provide complete and legible replicates.

- All documents relevant to each SDG are included in the CSF.
- Sample tags are encased in clear plastic bags by the Document Control Officer or a designated representative before placing them in the CSF.
- The CSF is organized and assembled on an SDG-specific basis.
- In the event that an original document contains information relating to more than one SDG, the original documents are filed in the CSF of the lowest SDG number and copies are referenced to the originals.
- Each CSF is submitted with a completed Form DC-2, and resubmitted CSFs are submitted with a new or revised Form DC-2.
- Each page of the CSF is stamped with a sequential number and the page number ranges are recorded in the columns provided on Form DC-2. Intentional gaps in the page numbering sequence are recorded in the "Comments" section of Form DC-2. Inserted documents are recorded in the "Other Record" section of Form DC-2.
- Consistency and completeness of the CSF is verified by the Document Control Officer or a designated representative.
- Shipments of deliverable packages are documented by the Document Control Officer or a designated representative.
- Deliverable packages are shipped by the Document Control Officer or a designated representative using custody seals in a manner such that opening the packages would break the seals.
- Custody seals are signed and dated by the Document Control Officer or a designated representative before placing them on deliverable packages.

3.8 PDF File Organization and Assembly

3.8.1 The Contractor shall have written SOPs for PDF file organization and assembly that accurately reflect the procedures used by the laboratory.

3.8.2 The written SOPs for PDF file organization and assembly shall ensure that the procedures listed below are in use at the laboratory.

- PDF files are maintained in a secure location.
- The PDF file is organized and assembled as specified in Exhibit B, Section 2.8 and Exhibit F, Section 2.8.
- Completeness and compliance of the PDF file is verified by the Document Control Officer or a designated representative.
- Shipments of deliverable packages are documented by the Document Control Officer or a designated representative.
- Deliverable packages are shipped by the Document Control Officer or a designated representative using custody seals in a manner such that opening the packages would break the seals.
- Custody seals are signed and dated by the Document Control Officer or a designated representative before placing them on deliverable packages.

EXHIBIT G

GLOSSARY OF TERMS

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ABSOLUTE PRESSURE – Pressure measured with reference to absolute zero pressure, usually expressed in units of kPa or psi.

ALKANE - Any hydrocarbon with the generic formula C_nH_{2n+2} (straight-chain or branched) or C_nH_{2n} (cyclic) that contains only C-H and C-C single bonds.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) - A developer and provider of voluntary consensus standards.

ANALYSIS DATE/TIME - The date and military time (24-hour clock) of the injection of the sample, standard, or blank into the Gas Chromatograph/Mass Spectrometer (GC/MS) or GC system.

ANALYTE - The element or ion an analysis seeks to determine; the element of interest.

ANALYTICAL METHOD - Specifies the procedures for sample preparation, instrument calibration, sample analysis, and result calculations.

ANALYTICAL REFERENCE STANDARD - Standards purchased from private chemical supply houses used to prepare calibration standards, Contract Required Quantitation Limit (CRQL) Check Standards (CRI), and Continuing Calibration Verification (CCV) standards.

ANALYTICAL SAMPLE - Any solution or media introduced into an instrument on which an analysis is performed, excluding instrument calibration, Initial Calibration Verification (ICV), Initial Calibration Blank (ICB), Continuing Calibration Verification (CCV), Continuing Calibration Blank (CCB), and tunes. Note the following are all defined as analytical samples: undiluted and diluted samples (USEPA and non-USEPA), matrix spike samples, duplicate samples, serial dilution samples, analytical spike samples, post-digestion spike samples, Interference Check Samples (ICSs), Contract Required Quantitation Limit (CRQL) Check Standards (CRIs), Laboratory Control Samples (LCSs), Performance Evaluation (PE) samples, Preparation Blanks (PBs), and cyanide MIDRANGE samples.

ANALYTICAL SEQUENCE - The actual instrumental analysis of the samples from the time of instrument calibration through the analysis of the final Continuing Calibration Verification (CCV) or Continuing Calibration Blank (CCB). All sample analyses during the analytical sequence are subject to the QC protocols set forth in Exhibits D and E of this contract unless otherwise specified in the individual methods.

ANALYTICAL SERVICES BRANCH (ASB) - The division of United States Environmental Protection Agency’s (USEPA) Office of Superfund Remediation and Technology Innovation (OSRTI) responsible for the overall management of the Contract Laboratory Program (CLP).

ANALYTICAL SPIKE - A spike that is fortified just prior to analysis by adding a known quantity of the analyte to an aliquot of the prepared sample.

AUTOZERO - Zeroing the instrument at the proper wavelength. It is equivalent to running a standard blank with the absorbance set at zero.

BACKGROUND CORRECTION - A technique to compensate for variable background contribution to the instrument signal in the determination of trace elements.

BAR GRAPH SPECTRUM - A plot of the mass-to-charge ratio (m/e) versus relative intensity of the ion current.

BASELINE - Analysis used to reset the baseline during mercury or cyanide runs.

BATCH - A group of samples prepared at the same time in the same location using the same method.

BLANK - An analytical sample designed to assess specific sources of contamination. See the individual definitions for types of blanks.

BREAKDOWN - A measure of the decomposition of certain analytes (DDT and Endrin) into by-products.

4-BROMOFLUOROBENZENE (BFB) - The compound chosen to establish mass spectral instrument performance check for volatile (VOA) analyses.

CALIBRATION - The establishment of an analytical curve based on the absorbance, emission intensity, or other measured characteristic of known standards. The calibration standards must be prepared using the same type of reagents or concentration of acids as used in the sample preparation.

CALIBRATION BLANK - A blank solution containing all of the reagents and in the same concentration as those used in the analytical sample preparation. This blank is not subjected to the preparation method.

CALIBRATION FACTOR (CF) - A measure of the Gas Chromatographic response of a target analyte to the mass injected.

CALIBRATION STANDARDS - A series of known standard solutions used by the analyst for calibration of the instrument (i.e., preparation of the analytical curve). The solutions may or may not be subjected to the preparation method but contain the same matrix (i.e., the same amount of reagents and/or preservatives) as the sample preparations to be analyzed.

CASE - A finite, usually predetermined number of samples collected over a given time period from a particular site. Case numbers are assigned by the Sample Management Office (SMO). A Case consists of one or more Sample Delivery Groups (SDGs).

CHARACTERIZATION - A determination of the approximate concentration range of compounds of interest used to choose the appropriate analytical protocol.

CAS – Chemical Abstracts Service.

CLOSING CONTINUING CALIBRATION VERIFICATION - Last analytical standard run every 12 hours to verify the initial calibration accuracy of the system.

CO – Contracting Officer.

CONCENTRATION LEVEL (trace, low, or medium) - Characterization of sample fractions as trace concentration, low concentration, or medium concentration is made on the basis of the laboratory's preliminary screen, not on the basis of information entered on the Traffic Report/Chain of Custody Record (TR/COC)by the sampler.

CONTAMINATION - A component of a sample or an extract that is not representative of the environmental source of the sample. Contamination may stem from other samples, sampling equipment, while in transit, from laboratory reagents laboratory environment, or analytical instruments.

CONTRACT COMPLIANCE SCREENING (CCS) - A screening of electronic and hardcopy data deliverables for completeness and compliance with the contract. This screening is done under USEPA direction by the Sample Management Office (SMO) contractor.

CONTRACT LABORATORY PROGRAM (CLP) - Supports the USEPA's Superfund effort by providing a range of state-of-the-art chemical analytical services of known quality. This program is directed by the Analytical Services Branch (ASB) of the Office of Superfund Remediation and Technology Innovation (OSRTI) of USEPA.

CONTINUING CALIBRATION VERIFICATION (CCV) - A single parameter or multi-parameter standard solution prepared by the analyst and used to verify the stability of the instrument calibration with time, and the instrument performance during the analysis of samples. The CCV can be one of the calibration standards. However, all parameters being measured by the particular system must be represented in this standard and the standard must have the same matrix (i.e., the same amount of reagents and/or preservatives) as the samples. The CCV should have a concentration in the middle of the calibration range and shall be run at the beginning of the day prior to the analysis of samples, and for every 10 analytical samples or every 2 hours, whichever is more frequent.

CONTRACT COMPLIANCE SCREENING (CCS) - A screening of electronic and hardcopy data deliverables for completeness and compliance with the contract. This screening is done under USEPA direction by the SMO Contractor.

CONTRACT REQUIRED QUANTITATION LIMIT (CRQL) - Minimum level of quantitation acceptable under the contract Statement of Work (SOW).

CONTRACT REQUIRED QUANTITATION LIMIT (CRQL) CHECK STANDARD (CRI) - A single parameter or multi-parameter standard solution prepared at the CRQL and used to verify the instrument calibration at low levels.

CONTROL LIMITS - A range within which specified measurement results must fall to be compliant. Control limits may be mandatory, requiring corrective action if exceeded, or advisory, requiring that noncompliant data be flagged.

CRITICAL LEVEL (L_c) - An estimate of the smallest amount or concentration of analyte that can be distinguished from a blank at 99% confidence. Values above this level should not represent false positives.

CRYOGEN — A refrigerant used to obtain sub-ambient temperatures in the VOC concentrator and/or on front of the analytical column. Typical cryogens are liquid nitrogen (bp: -195.8°C), liquid argon (bp: -185.7°C), and liquid carbon dioxide (bp: -79.5°C).CYANIDE (Total) - Cyanide ion and complex cyanides converted to hydrocyanic acid (HCN) by reaction in a reflux system of a mineral acid in the presence of magnesium ion.

DATE - MM/DD/YYYY - Where MM = 01 for January, 02 for February, 12 for December; DD = 01 to 31; YYYY = 2005, 2006, 2007, etc.

DAY - Unless otherwise specified, day shall mean calendar day.

DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP) - Compound chosen to establish mass spectral instrument performance check for semivolatile analysis.

DEUTERATED MONITORING COMPOUNDS (DMCs) - Compounds added to every calibration standard, blank, and sample used to evaluate the efficiency of the extraction/purge-and-trap procedures, and the performance of the Gas Chromatograph/Mass Spectrometer (GC/MS) systems. DMCs are isotopically labeled (deuterated) analogs of native target compounds. DMCs are not expected to be naturally detected in the environmental media.

DIGESTION LOG - An official record of the sample preparation (digestion).

DIRECT ANALYSIS - Analysis of a sample, standard, or blank that has not been taken through a preparation procedure (digestion or distillation).

DISSOLVED METALS - Analyte elements in a water/aqueous sample which will pass through a 0.45 micrometer (μm) filter.

DRD – Data Receipt Date.

DUPLICATE - A second aliquot of a sample that is treated the same as the original sample in order to determine the precision of the method.

DUPLICATE PRECISION — precision determined from the analysis of the Continuing Calibration Verification standard and the Laboratory Control Sample taken from the same standard canister. The duplicate precision is determined as the absolute value of the difference between the canister analyses divided by their average value and expressed as a percentage.

DYNAMIC CALIBRATION — Calibration of an analytical system using calibration gas standard concentrations in a form identical or very similar to the samples to be analyzed and by introducing such standards into the inlet of the sampling or analytical system from a manifold through which the gas standards are flowing.

DYNAMIC DILUTION — Means of preparing calibration mixtures in which standard gas(es) from pressurized cylinders are continuously blended with humidified zero air in a manifold so that a flowing stream of calibration mixture is available at the inlet of the analytical system.

EDD – Electronic Data Deliverable.

EXTRACTABLE - A compound that can be partitioned into an organic solvent from the sample matrix and is amenable to Gas Chromatography.

EXTRACTED ION CURRENT PROFILE (EICP) - A plot of ion abundance versus time (or scan number) for ion(s) of specified mass(es).

FIELD BLANK - Any sample that is submitted from the field and is identified as a blank. This includes trip blanks, rinsates, equipment blanks, etc.

FIELD QC - Any Quality Control (QC) samples submitted from the field to the laboratory. Examples include, but are not limited to: field blanks, field duplicates, and field spikes.

FIELD SAMPLE - A portion of material obtained from an assigned site to be analyzed that is contained in single or multiple containers and identified by a unique EPA Sample Number.

GAS CHROMATOGRAPH (GC) - The instrument used to separate analytes on a stationary phase within a chromatographic column. The analytes are volatized directly from the sample (VOA water and low-soil), volatized from the sample extract (VOA medium soil), or injected as extracts (SVOA, PEST, and ARO). In VOA and SVOA analysis, the compounds are detected by a Mass Spectrometer (MS).In Pesticide and Aroclor analysis, the compounds are detected by an Electron Capture Detector (ECD).

GAS CHROMATOGRAPH/MASS SPECTROMETER - A specialized form of Gas Chromatography(GC) used in conjunction with Mass Spectrometry (MS). GC/MS is considered the method of choice for the unequivocal identification of many volatile and semivolatile organic compounds.

GAUGE PRESSURE – Pressure marked with reference to the surrounding atmospheric pressure, usually expressed in unt of kPa or psi. Zero gauge pressure is equal to atmospheric (barometric) pressure.

HAP – Hazardous air pollutant.

HOLDING TIME - The elapsed time expressed in days from the date of receipt of the sample by the Contractor until the date of its analysis.

INDEPENDENT STANDARD - A Contractor-prepared standard solution that is composed of analytes from a different source than those used in the standards for the calibration.

INDUCTIVELY COUPLED PLASMA-ATOMIC EMISSION SPECTROSCOPY (ICP-AES) – A technique for the simultaneous or sequential multi-element determination of elements in solution. The basis of the method is the measurement of atomic emission by an optical spectroscopic technique. Characteristic atomic line emission spectra are produced by excitation of the sample in a radio frequency inductively coupled plasma.

INDUCTIVELY COUPLED PLASMA-MASS SPECTROMETRY (ICP-MS) - A technique for the multi-element determination of elements in solution. The basis of the technique is the detection of atomic ions produced by an ICP and sorted by mass-to-charge (m/z) ratio.

IN-HOUSE - At the Contractor's facility.

INITIAL CALIBRATION - Analysis of analytical standards for a series of different specified concentrations; used to define the quantitative response, linearity, and dynamic range of the response of the Mass Spectrometer (MS) or Electron Capture Detector (ECD) to the target compounds.

INITIAL CALIBRATION - Analysis of analytical standards for a series of different specified concentrations; used to define the quantitative response, linearity, and dynamic range of the instrument to target analytes.

INITIAL CALIBRATION VERIFICATION (ICV) - Solution(s) prepared from stock standard solutions, metals, or salts obtained from a source separate from that utilized to prepare the calibration standards. The ICV is used to verify the concentration of the calibration standards and the adequacy of the instrument calibration. The ICV should be traceable to NIST or other certified standard sources when USEPA ICV solutions are not available.

INJECTION - Introduction of the analytical sample into the instrument excitation system to measure absorbance, emission, or concentration of an analyte. May also be referred to as exposure.

INSTRUMENT BLANK - A blank designed to determine the level of contamination associated with the analytical instruments.

INSUFFICIENT QUANTITY - When there is not enough volume (water sample) or weight (soil/sediment) to perform any of the required operations: sample analysis or extraction, Percent Moisture (%Moisture), Matrix Spike and Matrix Spike Duplicate (MS/MSD), etc. Exhibit D provides guidance for addressing this situation.

INSUFFICIENT QUANTITY - When there is not enough volume (water/aqueous sample) or weight (soil/sediment) to perform any of the required operations: sample analysis, percent solids, etc. Exhibit D provides guidance for addressing this problem.

INTEGRATION SCAN RANGE - The scan number of the scan at the beginning of thearea of integration to the scan number at the end of the area of integration.Performed in accordance with Exhibit D Trace and Low/Medium VOA and SVOA.

INTEGRATION TIME RANGE - The Retention Time (RT) at the beginning of the are aof integration to the RT at the end of the area of integration.

INTERFERANTS - Substances which affect the analysis for the element of interest.

INTERFERENCE CHECK SAMPLE (ICS) - A solution containing both interfering and analyte elements of known concentration that can be used to verify background and interelement correction factors.

INTERFERENTS - Substances which affect the analysis for the element of interest.

INTERNAL STANDARD - A non-target element added to a sample at a known concentration after preparation but prior to analysis. Instrument responses to internal standards are monitored as a means of assessing overall instrument performance.

INTERNAL STANDARDS - Compounds added to every standard, blank, Matrix Spike and Matrix Spike Duplicate (MS/MSD), sample (for volatiles), and sample extract (for semivolatiles) at a known concentration, prior to analysis. Instrument responses to internal standards are used as the basis for quantitation of the target compounds.

LABORATORY - Synonymous with Contractor, as used herein.

LABORATORY CONTROL SAMPLE (LCS) - A control sample of known composition. LCSs are analyzed using the same sample preparation, reagents, and analytical methods employed for the USEPA samples received. An internal laboratory Quality Control (QC) sample used to monitor the capability of the Contractor to perform the analytical method. For the purpose of this SOW, a replicate of the Continuing Calibration Verification standard that is analyzed immediately after the method blank in the analytical sequence.

LABORATORY CONTROL SAMPLE ACCURACY — the concentration determined by analysis of a laboratory control sample divided by the nominal value expressed as a percentage.

LABORATORY RECEIPT DATE (LRD) - The date on which a sample is received at the Contractor’s facility, as recorded on the shipper’s delivery receipt and Sample Traffic Report/Chain of Custody Record. Also referred to as VTSR (Validated Time of Sample Receipt).

LIMIT OF DETECTION (L_d) - An estimate of the smallest value that protects against false negatives; the smallest value that must be present to be detected. The lowest possible value for the confident reporting of a non-detect.

LIMIT OF QUANTITATION (L_q) - An estimate of the lowest concentration that produces quantitatively reliable results. For the purposes of this contract, this is defined as two times the Limit of Detection.

m/z - Mass to charge ratio; synonymous with "m/e".

MS-SCAN — Mass spectrometric mode of operation in which the gas chromatograph (GC) is coupled to a mass spectrometer (MS) programmed to SCAN all ions repeatedly over a specified mass range.

MS-SIM — Mass spectrometric mode of operation in which the GC is coupled to a MS that is programmed to scan a selected number of ions repeatedly [i.e., selected ion monitoring (SIM) mode].

MATRIX - The predominant material of which the sample to be analyzed is composed. For the purpose of this Statement of Work (SOW), a sample matrix is either water/aqueous, soil/sediment, wipe, or small (e.g., 37 mm) air filter. Matrix is not synonymous with phase (liquid or solid).

MATRIX EFFECT - In general, the effect of a particular matrix (water or soil/sediment) on the constituents with which it contacts. Matrix effects may prevent efficient purging/extraction of target analytes, and may affect Deuterated Monitoring Compound (DMC) and surrogate recoveries. In addition, non-target analytes may be extracted from the matrix causing interferences.

MATRIX SPIKE - Aliquot of a sample (water/aqueous or soil) taken from one of the field samples to be analyzed within an SDG, fortified (spiked) with known quantities of specific compounds, and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery.

MATRIX SPIKE DUPLICATE - A second aliquot of the same sample as the Matrix Spike (above) that is spiked in order to determine the precision of the method.

METHOD BLANK - An analytical control consisting of all reagents, internal standards, and surrogate standards [or Deuterated Monitoring Compounds (DMCs) for Trace VOA, Low/Medium VOA, and SVOA], that is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background, and reagent contamination.

METHOD DETECTION LIMIT (MDL) - The concentration of a target parameter that, when a sample is processed through the complete method, produces a signal with99 percent probability that it is different from the blank. For 7 replicates of the sample, the mean value must be 3.14s above the blank, where "s" is the standard deviation of the 7 replicates.

MIDRANGE - A distilled standard at a concentration approximately equivalent to the midpoint of the calibration curve used to verify the reliability of the distillation procedure.

NARRATIVE (SDG Narrative) - Portion of the data package which includes laboratory, contract, Case, and Sample Number identification, and descriptive documentation of any problems encountered in processing the samples, along with corrective action taken and problem resolution. Complete Sample Delivery Group (SDG) Narrative specifications are included in Exhibit B.

OPENING CONTINUING CALIBRATION VERIFICATION - First analytical standard run every 12 hours to verify the initial calibration of the system.

PERCENT DIFFERENCE (%D) - As used in this Statement of Work (SOW) and elsewhere to compare two values, the difference between the two values divided by one of the values.

PERCENT DIFFERENCE (%Difference) - As used in this analytical method and elsewhere to compare two values, the percent difference indicates both the direction and the magnitude of the comparison [i.e., the Percent Difference (%Difference) may be either negative, positive, or zero].

PERCENT MOISTURE (%Moisture) - An approximation of the amount of water in a soil/sediment sample made by drying an aliquot of the sample at 105°C. The Percent Moisture (%Moisture) determined in this manner also includes contributions from all compounds that may volatilize at or below 105°C, including water. Percent Moisture may be determined from decanted samples and from samples that are not decanted.

PERFORMANCE EVALUATION MIXTURE (PEM) - A calibration solution of specific analytes used to evaluate both recovery and Percent Breakdown (%Breakdown) as a measure of performance.

PERFORMANCE EVALUATION (PE) SAMPLE - A sample of known composition provided by USEPA for Contractor analysis. Used by USEPA to evaluate Contractor performance.

PREPARATION BLANK - An analytical control that contains reagent water and reagents, which is carried through the entire preparation and analytical procedure.

PREPARATION LOG - An official record of the sample preparation (digestion or distillation).

PRIMARY QUANTITATION ION - A contract specified ion used to quantitate a target analyte.

PROTOCOL - Describes the exact procedures to be followed with respect to sample receipt and handling, analytical methods, data reporting and deliverables, and document control. Used synonymously with analytical method.

PURGE-AND-TRAP (DEVICE) - Analytical technique (device) used to isolatevolatile (purgeable) organics by stripping the compounds from water or soil by a stream of inert gas, trapping the compounds on an adsorbent such as a porouspolymer trap, and thermally desorbing the trapped compounds onto the gaschromatographic column.

PURGEABLES - Volatile compounds.

QA/QC – Quality Assurance/Quality Control.

QAP – Quality Assurance Plan.

QUALITY ASSURANCE TECHNICAL SUPPORT (QATS) Laboratory - A Contractor-operated facility operated under the QATS contract, awarded and administered by USEPA.

QUALITATIVE ACCURACY — The degree of measurement accuracy required to correctly identify compounds with an analytical system.

QUANTITATIVE ACCURACY — The degree of measurement accuracy required to correctly measure the concentration of an identified compound with an analytical system with known uncertainty.

REAGENT WATER - Water in which an interferant is not observed at or above the minimum quantitation limit of the parameters of interest. The purity of this water must be equivalent to ASTM Type II reagent water of specification D119377, "Standard Specification for Reagent Water".

REAGENT WATER - The purity of this water must be equivalent to ASTM Type II reagent water of Specification D1193-99e1, "Standard Specification for Reagent Water".

RECONSTRUCTED ION CHROMATOGRAM (RIC) - A mass spectral graphical representation of the separation achieved by a Gas Chromatograph (GC); a plot of total ion current versus Retention Time (RT).

REFERENCE MATERIAL - Standards, typically provided by USEPA, used to verify method and instrument performance. Examples include Initial Calibration Verification (ICV) standards, Interference Check Solution (ICS) standards, and Laboratory Control Samples (LCS).

RELATIVE PERCENT DIFFERENCE (RPD) - As used in this Statement of Work (SOW) and elsewhere to compare two values, the relative percent difference is based on the mean of the two values, and is reported as an absolute value (i.e., always expressed as a positive number or zero).

RELATIVE RESPONSE FACTOR (RRF) - A measure of the relative mass spectral response of an analyte compared to its internal standard. RRFs are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.

RELATIVE RETENTION TIME (RRT) - The ratio of the Retention Time (RT) of a compound to that of a standard (such as an internal standard).

REPLICATE PRECISION — Precision determined from two canisters filled from the same air mass over the same time period and determined as the absolute value of the difference between the analyses of canisters divided by their average value and expressed as a percentage (see Section 12 for performance criteria for replicate precision).

REPRESENTATIVE - Alternate or designee who has the knowledge and authority to perform a specific task.

REPRESENTATIVE - Alternate or designee who has the knowledge and authority to perform a specific task.

RESLOPE - An analysis used to re-align the calibration curve during mercury or cyanide runs.

RESOLUTION - Also termed Separation or Percent Resolution, the separation between peaks on a chromatogram, calculated by dividing the depth of the valley between the peaks by the peak height of the smaller peak being resolved, multiplied by 100.

RESOLUTION CHECK MIXTURE - A solution of specific analytes used to determine resolution of adjacent peaks; used to assess instrumental performance.

RESPONSE (Instrumental Response) - A measurement of the output of the Gas Chromatograph (GC) detector [Mass Spectrometer (MS), Electron Capture Detector (ECD), or Flame Ionization Detector (FID)] in which the intensity of the signal is proportionate to the amount (or concentration) detected. Measured by peak area or peak height.

RETENTION TIME (RT) - The time a target analyte is retained on a GC column before elution. The identification of a target analyte is dependent on a target compound's RT falling within the specified RT window established for that compound. The RT is dependent on the nature of the column's stationary phase, column diameter, temperature, flow rate, and other parameters.

ROUNDING RULES - If the figure is greater than or equal to 5, round up, otherwise round down. As an example, 11.443 is rounded down to 11.44 and 11.455 is rounded up to 11.46. If a series of multiple operations is to be performed (add, subtract, divide, multiply), all figures are carried through the calculations. Then the final answer is rounded to the proper number of significant figures. See forms instructions (Exhibit B) for exceptions.

RUN - A continuous analytical sequence consisting of prepared samples and all associated Quality Assurance (QA) measurements as required by the contract Statement of Work (SOW). A run begins with the instrument calibration or tune.

SAMPLE - A portion of material to be analyzed that is contained in single or multiple containers and identified by a unique sample number.

SAMPLE DELIVERY GROUP (SDG) - A unit within a sample Case that is used to identify a group of samples for delivery. An SDG is defined by the following, whichever occurs first:

- Each Case of field samples received, or
- Each 20 field samples [excluding Performance Evaluation (PE) samples] within a Case, or
- Each 7 calendar day period (3 calendar day period for 7 day turnaround) during which field samples in a Case are received (said period beginning with the receipt of the first sample in the SDG).
- In addition, all samples and/or sample fractions assigned to an SDG must have been scheduled under the same contractual turnaround time. Preliminary Results have **no impact** on defining the SDG.

Samples may be assigned to SDGs by matrix (i.e., all soil samples in one SDG, all water samples in another) at the discretion of the laboratory.

SAMPLE MANAGEMENT OFFICE (SMO) - A Contractor-operated facility operated under the SMO contract, awarded and administered by USEPA.

SAMPLE NUMBER (EPA SAMPLE NUMBER) - A unique identification number designated by USEPA for each sample. The EPA sample number appears on the Sample Traffic Report/Chain of Custody Record which documents information on that sample.

SDG NARRATIVE - Portion of the data package which includes laboratory, contract, Case, sample number identification, and descriptive documentation of any problems encountered in processing the samples, along with corrective action taken and problem resolution. Complete SDG Narrative specifications are included in Exhibit B.

SECONDARY QUANTITATION ION - Contract specified ion(s) to be used in quantitation of target analytes when interferences prevent the use of the primary quantitation ion.

SICP – Selected Ion Current Profile.

SEMIVOLATILE COMPOUNDS - Compounds amenable to analysis by extraction of the sample with an organic solvent. Used synonymously with Base/Neutral and Acid(BNA) compounds.

SENSITIVITY - The slope of the analytical curve (i.e., functional relationship between instrument response and concentration).

SERIAL DILUTION - The dilution of a sample by a factor of five. When corrected by the dilution factor, the diluted sample must agree with the original undiluted sample within specified limits. Serial dilution may reflect the influence of interferents.

SIM – Selected Ion Monitoring.

SOP - Standard Operating Procedure.

SOW - Statement of Work.

STANDARD ANALYSIS - An analytical determination made with known quantities of target compounds; used to determine response factors.

STANDARD ANALYSIS - An analytical determination made with known quantities of target analytes.

STOCK SOLUTION - A standard solution which can be diluted to derive other standards.

STORAGE BLANK - Reagent water (two 40.0 mL aliquots) stored with volatile samples in an SDG. It is analyzed after all samples have been analyzed in the SDG and is used to determine the level of contamination acquired during storage.

SULFUR BLANK - A modified method blank that is prepared only when some of the samples in a batch are subjected to sulfur cleanup. It is used to determine the level of contamination associated with the sulfur cleanup procedure. When all of the samples are subjected to sulfur cleanup, then the method blank serves this purpose. When none of the samples are subjected to sulfur cleanup, no sulfur blank is required.

SURROGATES (Surrogate Standard) - For pesticides and Aroclors, compounds added to every blank, sample, Matrix Spike and Matrix Spike Duplicates (MS/MSDs), and standard. Surrogates are used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in environmental media.

TARGET ANALYTE LIST (TAL) - A list of Inorganic Analytes (metals and cyanide) as designated in Exhibit C.

TARGET COMPOUND LIST (TCL) - A list of compounds as designated in Exhibit C for analysis.

TOPO – Task Order Project Officer.

TENTATIVELY IDENTIFIED COMPOUNDS (TIC) - Compounds detected in samples that are not target compounds, internal standards, Deuterated Monitoring Compounds (DMCs), or surrogates. Up to 30 peaks, not including those identified as alkanes (those greater than 10% of the peak area or height of the nearest internal standard) are subjected to mass spectral library searches for tentative identification.

TIME - When required to record time on any deliverable item, time shall be expressed as Military Time [i.e., a 24-hour clock (0000-2359)].

TRAFFIC REPORT/CHAIN OF CUSTODY RECORD (TR/COC) - An USEPA sample identification form filled out by the sampler, which accompanies the sample during shipment to the laboratory and is used for documenting sample identity, sample chain-of-custody, and sample receipt by the laboratory.

TWELVE-HOUR TIME PERIOD - The 12-hour time period for Gas Chromatograph/Mass Spectrometer (GC/MS) system instrument performance check, standards calibration (initial or continuing calibration), and method blank analysis begins at the moment of injection of the Decafluorotriphenylphosphine (DFTPP)or 4-Bromofluorobenzene (BFB) analysis that the laboratory submits as documentation of instrument performance. The time period ends after 12 hours have elapsed according to the system clock. For pesticide and Arocloranalyses performed by Gas Chromatography/Electron Capture Detection (GC/ECD), the 12-hour time period in the analytical sequence begins at the moment of injection of the instrument blank that precedes sample analyses, and ends after 12 hours have elapsed according to the system clock.

TUNE - Analysis of a solution containing a range of isotope masses to establish ICP-MS accuracy, resolution, and precision prior to calibration.

USEPA OSRTI ASB PROGRAM MANAGER (ASB PM) - The USEPA OSRTI ASB Official who manages the CLP.

USEPA REGIONAL CLP PROJECT OFFICER (CLP PO) - The Regional USEPA official responsible for monitoring laboratory performance and/or requesting analytical data or services from a CLP laboratory.

VALIDATED TIME OF SAMPLE RECEIPT (VTSR) - The date on which a sample is received at the Contractor’s facility, as recorded on the shipper’s delivery receipt and Traffic Report/Chain of Custody Record.

VOLATILE ORGANIC COMPOUNDS (VOCs) - Compounds amenable to analysis by the purge-and-trap technique. Used synonymously with purgeable compounds.

EXHIBIT H

FORMAT FOR ELECTRONIC DATA DELIVERABLES

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Table of Contents

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1.0 FORMAT CHARACTERISTICS

1.1 This constitutes an implementation of the Staged Electronic Data Deliverable (SEDD) based on analytical results and ancillary information required by the contract. Because this implementation is specific to the contract, not all data elements listed in the cross-program Document Type Definition (DTD) are required. This implementation is based on SEDD Specifications 5.2 and 5.0 that can be found at:

http://www.epa.gov/superfund/programs/clp/sedd-docs.htm

1.1.1 The SEDD deliverable consists of an eXtensible Markup Language (XML) file(s) compliant with the XML specification 1.0 of the World Wide Web Consortium (W3C). The deliverable must be well-formed based on the W3C XML specification and must be valid based on the DTD.

1.1.2 The Contractor shall create the deliverable using the UTF-8 (Unicode Transformation Format - 8 bit) character set.

1.1.3 The initial line of the deliverable shall be: <?xml version="1.0" encoding="UTF-8"?>.

1.1.4 The second line of the deliverable shall be a DOCTYPE line that contains the filename of the DTD. The DOCTYPE line shall be <!DOCTYPE Header SYSTEM "SEDD_5-2_GENERAL_2a_1.dtd"> or <!DOCTYPE Header SYSTEM "GENERAL_2a_1.dtd"> where "Header" denotes the name of the root element, and "SEDD_5-2_GENERAL_2a_1.dtd" (for a Specification 5.2 deliverable) or "GENERAL_2a_1.dtd" (for a Specification 5.0 deliverable) denotes the filename of the DTD.

1.1.5 The use of XML comment lines is permitted at any position in the file after the first two lines.

1.2 This implementation includes detailed specifications for the required format of the content of each data element for each fraction. The content of each data element is specified as either literal (contained in quotes) which must appear exactly as shown (without quotes), or as a variable for which descriptions and formats are listed. Exhibit H, Section 2.0 describes requirements for each data element.

1.2.1 For this implementation, numeric data elements may contain numeric digits, a decimal place, and a leading minus sign. Values without a leading minus sign are assumed to be positive. Values must be reported to the specified precision or significance.

1.2.2 The values reported by the Contractor are used for data assessment. The Contractor shall not use rounded intermediate values in calculating the final result, and no rounding shall be performed until reaching the final result.

1.2.3 The completeness of analytical data provided in the EDD will be verified against the analytical data requested on the Traffic Report/Chain of Custody (TR/COC). The laboratory code, case number, contract number, SDG number, sample number, and fraction shall be identical in the EDD and the TR/COC and the SDG coversheet submitted by the Contractor for the SDG.

1.2.4 The following variables must be present where required and correct: QC Type; instrument ID; analysis date and time; method ID; collected date; matrix; client analysis ID; client analyte ID; preparation batch; percent recovery.

2.0 DATA ELEMENTS

2.1 The Staged Electronic Data Deliverable (SEDD) consists of data elements arranged hierarchically by data nodes (parent elements). Figure 1 depicts the data node hierarchy. Each data element consists of a start tag, content, and an end tag. An element may contain other elements (child elements).

NOTE: There shall be no more than one occurrence of each child element within a node, unless the child element also behaves as a parent element. For example, in each SamplePlusMethod node, there may be only one occurrence of the element ClientSampleID, but there may be more than one occurrence of the element Analysis.

The tags, nodes, and hierarchy are specified in the Document Type Definition (DTD) against which the deliverable will be validated (see Exhibit H, Section 5.0). The frequency requirements for each of the data nodes applicable to this implementation are described below.

2.1.1 Header Node

One Header node must be reported for each fraction.

2.1.2 SamplePlusMethod Node

Each Header node must contain one SamplePlusMethod node for each field sample, field blank (including equipment and trip blanks), Performance Evaluation (PE) sample, method blank, Laboratory Control Sample (LCS), any diluted analysis of the preceding samples, any re-analyses of the preceding samples, and non-client sample analyzed.

2.1.3 ReportedResult Node

Each SamplePlusMethod node must contain a ReportedResult node for each target compound.

2.1.4 ContactInformation Node (Required for Specification 5.2 deliverables)

Each Header node must contain one ContactInformation node.

2.1.5 Analysis Node

Each SamplePlusMethod node must contain one Analysis node.

2.1.6 Analyte Node

Each Analysis node under a SamplePlusMethod node must contain one Analyte node for each target compound, Tentatively Identified Compound (TIC), and internal standard.

2.1.7 PreparationPlusCleanup Node

Each Analysis node under a SamplePlusMethod node must contain one PreparationPlusCleanup node to link the Method Blank and the LCS to the appropriate field samples.

2.1.8 Characteristic Node (Required for Specification 5.2 deliverables)

Each SamplePlusMethod and PreparationPlusCleanup node may contain one or more Characteristic nodes, one for each sample characteristic that must be reported for a sample at time of receipt, or after preparation.

2.1.9 AnalyteGroup Node (For Specification 5.2 deliverables)

Not required.

2.2 Detailed instructions for the content of each data element are provided in Tables 1 and 2. The following is an explanation of the data fields contained in each table.

2.2.1 Node and Data Elements

This field reports each node in bold text, followed by its data elements. If an entire node is not required, then none of its data elements are listed.

2.2.2 Applicability

This field reports the samples, blanks, and standards for which each node and data element is required. An "X" in a column indicates that the node or element is required. Sample refers to field samples, field blanks, PE samples and their dilutions and re-analyses unless otherwise noted. Abbreviations used in this field are defined in Table 3.

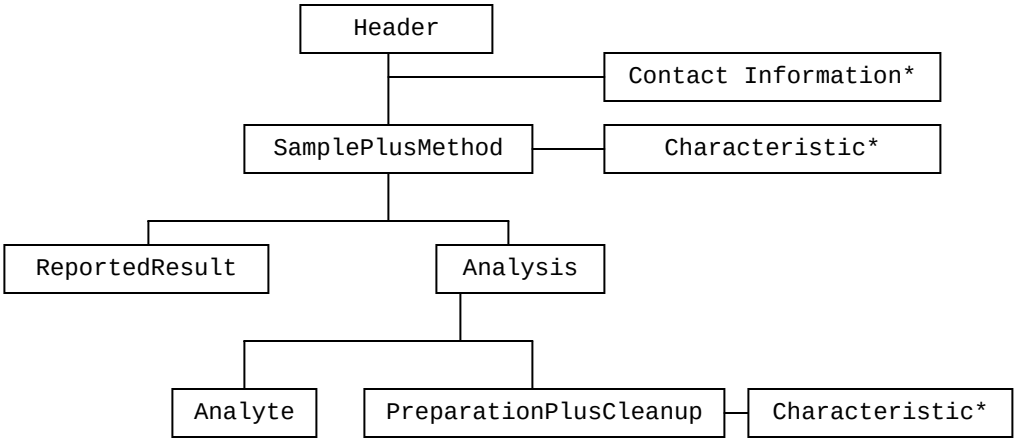

Figure 1: Data Node Hierarchy for
Level 2a Deliverable

NOTE: Data Nodes marked with "*" are required only for SEDD Version 5.2.

2.2.3 Instructions

This field describes the required format and content of each data element. The content of each data element is specified as either literal (contained in quotes), or as a variable for which description and format is listed. Abbreviations used in this field are defined in Table 3.

3.0 BATCHES

3.1 This implementation requires the use of the following batches from the Staged Electronic Data Deliverable (SEDD) Specification: "LabReportingBatch"; "PreparationBatch".

3.1.1 The "LabReportingBatch" links all samples reported in the same Sample Delivery Group (SDG). Report the SDG Number.

3.1.2 The "PreparationBatch" links samples prepared together. All samples analyzed, including method blanks and Laboratory Control Samples (LCS) that are prepared together must have the same content for the "PreparationBatch" element.

4.0 DELIVERABLE

4.1 Each Sample Delivery Group (SDG) shall be submitted as a separate compressed (zipped) file

4.2 The Contractor will utilize a designated website (provided in its Laboratory Welcome Package) to electronically submit their Electronic Data Deliverable (EDD) to the Sample Management Office (SMO). USEPA may approve alternative electronic means of file delivery. Written permission must be obtained from the USEPA Analytical Services Branch (ASB) prior to the use of any alternative means.

4.3 The Contractor must follow the delivery instructions in Exhibit B of this Statement of Work (SOW) and deliver their hardcopy and EDD to SMO concurrently. If one of these items is delivered on a later date, the Data Receipt Date (DRD) for the SDG will be the later of the two dates.

4.4 Information in the electronic deliverable must correspond to information submitted in the hardcopy raw data package and on Quality Control (QC) summary forms. If information in the raw data or on the forms is changed, the information in the electronic deliverable shall be changed accordingly. An electronic deliverable containing the changed information for the SDG shall be resubmitted along with the hardcopy at no additional cost to the USEPA.

4.5 The format for the file name shall be Case number_SDG number_contract number_submission number_DTD used_.zip. For example, the first submission of SDG number ABC12, Case number 12345, contract 68-W-0000 would be named 12345_ABC12_68-W-0000_1_SEDD_5-2_GENERAL_2a_1.zip.

5.0 DOCUMENT TYPE DEFINITION (DTD)

5.1 Introduction

The deliverable will be validated against DTD SEDD_5-2_GENERAL_2a_1 or DTD GENERAL_2a_1. The deliverable must not contain any tags not included in the DTD, and must conform to the hierarchical structure modeled in the DTD.

5.2 SEDD Specification 5.2 General Stage 2a DTD

```
<?xml version="1.0" encoding="UTF-8"?>
<!—SEDD_5-2_GENERAL_2a_1.dtd 02/01/2008 Based on SEDD Specification 5.2 -->
<!-- Acronym Description -->
<!-- EDD   - Electronic Data Deliverable -->
<!-- ID    - Identity -->
<!-- Lab   - Laboratory -->
<!-- QC    - Quality Control -->
<!-- RPD   - Relative Percent Difference -->
<!ELEMENT Header (
          ClientID|
          ClientName|
          Comment|
          DateFormat|
          EDDID|
          EDDImplementationID|
          EDDImplementationVersion|
          EDDVersion|
          GeneratingSystemID|
          GeneratingSystemVersion|
          LabContract|
          LabContractModificationDescription|
          LabContractModificationID|
          LabDataPackageID|
          LabDataPackageName|
          LabDataPackageVersion|
          LabID|
          LabName|
          LabNarrative|
          LabQualifiersDefinition|
          LabReportedDate|
          ProjectID|
          ProjectName|
          SiteID|
          SiteName|
          ContactInformation|
          SamplePlusMethod
                   )*>
<!ELEMENT Analysis (
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          AliquotAmountUnits|
          AnalysisDuration|
          AnalysisDurationUnits|
          AnalysisGroupID|
          AnalysisType|
          Analyst|
          AnalyzedAmount|
          AnalyzedAmountUnits|
          AnalyzedDate|
```

```
                ClientAnalysisID|
                ClientMethodCode|
                ClientMethodID|
                ClientMethodModificationDescription|
                ClientMethodModificationID|
                ClientMethodName|
                ClientMethodSource|
                ClientMethodVersion|
                Column|
                ColumnInternalDiameter|
                ColumnInternalDiameterUnits|
                ColumnLength|
                ColumnLengthUnits|
                Comment|
                ConfirmationAnalysisID|
                DetectorID|
                DetectorType|
                DilutionFactor|
                Efficiency|
                HeatedPurge|
                Inclusion|
                InjectionVolume|
                InjectionVolumeUnits|
                InstrumentID|
                LabAnalysisID|
                LabFileID|
                LabID|
                LabMethodID|
                LabMethodName|
                LabName|
                MethodCode|
                MethodID|
                MethodModificationDescription|
                MethodModificationID|
                MethodName|
                MethodSource|
                MethodVersion|
                PreparationBatch|
                ProcedureID|
                ProcedureName|
                ReferenceDate|
                ResultBasis|
                Temperature|
                TemperatureUnits|
                Wavelength|
                WavelengthUnits|
                Yield|
                PreparationPlusCleanup|
                Analyte|
                AnalyteGroup
                          )*>
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                AnalysisType|
                Comment|
                Analyte|
                AnalyteGroup
                          )*>
```

```
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          AnalyteType|
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          ClientAnalyteID|
          ClientAnalyteName|
          Comment|
          DetectionLimit|
          DetectionLimitType|
          DetectionLimitUnits|
          DifferenceErrorRatio|
          Efficiency|
          ExpectedResult|
          ExpectedResultUnits|
          Inclusion|
          LabAnalyteID|
          LabQualifiers|
          LotNumber|
          PeakID|
          PercentRecovery|
          PercentRecoveryLimitHigh|
          PercentRecoveryLimitLow|
          PercentRecoveryLimitType|
          PercentRecoveryType|
          QuantitationLimit|
          QuantitationLimitType|
          QuantitationLimitUnits|
          ReportingLimit|
          ReportingLimitType|
          ReportingLimitUnits|
          Result|
          ResultLimitHigh|
          ResultLimitLow|
          ResultLimitType|
          ResultType|
          ResultUncertainty|
          ResultUnits|
          StandardSource|
          Wavelength|
          WavelengthUnits
                    )*>
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          AnalyteName|
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          ClientAnalyteName|
          Comment|
          LabAnalyteID|
          LabQualifiers|
          Result|
          ResultType|
          ResultUncertainty|
```

```
                ResultUnits
                        )*>
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                CharacteristicUnits|
                Comment
                       )*>
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                LabAddress2|
                LabCity|
                LabCountry|
                LabID|
                LabName|
                LabPointOfContact|
                LabPointOfContactElectronicAddress|
                LabPointOfContactTitle|
                LabPointOfContactType|
                LabState|
                LabTelephoneNumber|
                LabZipCode
                        )*>
      <!ELEMENT Handling (
                Analyst|
                ClientMethodCode|
                ClientMethodID|
                ClientMethodModificationDescription|
                ClientMethodModificationID|
                ClientMethodName|
                ClientMethodSource|
                ClientMethodVersion|
                Comment|
                HandledDate|
                HandlingBatch|
                HandlingType|
                InitialAmount|
                InitialAmountUnits|
                LabID|
                LabMethodID|
                LabMethodName|
                LabName|
                MethodCode|
                MethodID|
                MethodModificationDescription|
                MethodModificationID|
                MethodName|
                MethodSource|
                MethodVersion|
                ProcedureID|
                ProcedureName|
                SampleAmount|
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                Characteristic
                        )*>
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```

```
          AliquotAmountUnits|
          Analyst|
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          CleanupBatch|
          CleanupType|
          ClientMethodCode|
          ClientMethodID|
          ClientmethodModificationDescription|
          ClientMethodModificationID|
          ClientMethodName|
          ClientMethodSource|
          ClientMethodVersion|
          Comment|
          FinalAmount|
          FinalAmountUnits|
          InitialAmount|
          InitialAmountUnits|
          LabID|
          LabMethodID|
          LabMethodName|
          LabName|
          LotNumber|
          MethodCode|
          MethodID|
          MethodModificationDescription|
          MethodModificationID|
          MethodName|
          MethodSource|
          MethodVersion|
          PreparationBatch|
          PreparationPlusCleanupType|
          PreparationType|
          PreparedDate|
          ProcedureID|
          ProcedureName|
          Solvent|
          Characteristic
                    )*>
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          AnalyteGroupID|
          AnalyteName|
          AnalyteNameContext|
          AnalyteType|
          CASRegistryNumber|
          ClientAnalyteID|
          ClientAnalyteName|
          ClientDetectionLimit|
          ClientDetectionLimitUnits|
          ClientQuantitationLimit|
          ClientQuantitationLimitUnits|
          Comment|
          DetectionLimit|
          DetectionLimitType|
          DetectionLimitUnits|
          DifferenceErrorRatio|
          ExpectedResult|
```

```
                ExpectedResultUnits|
                LabAnalysisID|
                LabAnalyteID|
                LabQualifiers|
                LabResultStatus|
                PeakID|
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                PercentDifferenceLimitHigh|
                PercentDifferenceLimitLow|
                PercentDifferenceLimitType|
                PercentRecovery|
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                PercentRecoveryLimitLow|
                PercentRecoveryLimitType|
                PercentRecoveryType|
                QuantitationLimit|
                QuantitationLimitType|
                QuantitationLimitUnits|
                ReportingLimit|
                ReportingLimitType|
                ReportingLimitUnits|
                Result|
                ResultLimitHigh|
                ResultLimitLow|
                ResultLimitType|
                ResultType|
                ResultUncertainty|
                ResultUnits|
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                RetentionTimeUnits|
                RPD|
                RPDLimitHigh|
                RPDLimitType|
                RPDType
                            )*>
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                ClientMethodCode|
                ClientMethodID|
                ClientMethodModificationDescription|
                ClientMethodModificationID|
                ClientMethodName|
                ClientMethodSource|
                ClientMethodType|
                ClientMethodVersion|
                ClientName|
                ClientSampleID|
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                CollectedEndDate|
                Comment|
                Composite|
                CoolerID|
                CustodyID|
                EquipmentBatch|
                Filtered|
                LabContract|
```

```
            LabContractModificationDescription|
            LabContractModificationID|
            LabID|
            LabMethodID|
            LabMethodName|
            LabName|
            LabReceiptDate|
            LabReportingBatch|
            LabSampleID|
            LocationID|
            LocationName|
            MatrixID|
            MatrixMedium|
            MethodBatch|
            MethodCategory|
            MethodCode|
            MethodID|
            MethodLevel|
            MethodModificationDescription|
            MethodModificationID|
            MethodName|
            MethodSource|
            MethodType|
            MethodVersion|
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            OriginalLabSampleID|
            Preservative|
            ProjectID|
            ProjectName|
            QCCategory|
            QCLinkage|
            QCType|
            Quarantine|
            SamplingBatch|
            ShippingBatch|
            SiteID|
            SiteName|
            StorageBatch|
            Analysis|
            Characteristic|
            ReportedResult|
            Handling|
            AnalysisGroup
                      )*>

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<!ELEMENT CustodyID (#PCDATA)>
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<!ELEMENT DetectionLimitType (#PCDATA)>
<!ELEMENT DetectionLimitUnits (#PCDATA)>
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<!ELEMENT EDDImplementationID (#PCDATA)>
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<!ELEMENT EDDVersion (#PCDATA)>
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```
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<!ELEMENT HeatedPurge (#PCDATA)>
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<!ELEEMNT LabPointOfContactType (#PCDATA)>
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<!ELEMENT LabReportedDate (#PCDATA)>
<!ELEMENT LabReportingBatch (#PCDATA)>
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<!ELEMENT LabTelephoneNumber (#PCDATA)>
<!ELEMENT LabZipCode (#PCDATA)>
<!ELEMENT LocationID (#PCDATA)>
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<!ELEMENT MethodBatch (#PCDATA)>
<!ELEMENT MethodCategory (#PCDATA)>
<!ELEMENT MethodCode (#PCDATA)>
<!ELEMENT MethodID (#PCDATA)>
<!ELEMENT MethodLevel (#PCDATA)>
<!ELEMENT MethodModificationDescription (#PCDATA)>
```

```
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      <!ELEMENT MethodName (#PCDATA)>
      <!ELEMENT MethodSource (#PCDATA)>
      <!ELEMENT MethodType (#PCDATA)>
      <!ELEMENT MethodVersion (#PCDATA)>
      <!ELEMENT OriginalClientSampleID (#PCDATA)>
      <!ELEMENT OriginalLabSampleID (#PCDATA)>
      <!ELEMENT PeakID (#PCDATA)>
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      <!ELEMENT PercentDifferenceLimitHigh (#PCDATA)>
      <!ELEMENT PercentDifferenceLimitLow (#PCDATA)>
      <!ELEMENT PercentDifferenceLimitType (#PCDATA)>
      <!ELEMENT PercentRecovery (#PCDATA)>
      <!ELEMENT PercentRecoveryLimitHigh (#PCDATA)>
      <!ELEMENT PercentRecoveryLimitLow (#PCDATA)>
      <!ELEMENT PercentRecoveryLimitType (#PCDATA)>
      <!ELEMENT PercentRecoveryType (#PCDATA)>
      <!ELEMENT PreparationBatch (#PCDATA)>
      <!ELEMENT PreparationPlusCleanupType (#PCDATA)>
      <!ELEMENT PreparationType (#PCDATA)>
      <!ELEMENT PreparedDate (#PCDATA)>
      <!ELEMENT Preservative (#PCDATA)>
      <!ELEMENT ProcedureID (#PCDATA)>
      <!ELEMENT ProcedureName (#PCDATA)>
      <!ELEMENT ProjectID (#PCDATA)>
      <!ELEMENT ProjectName (#PCDATA)>
      <!ELEMENT QCCategory (#PCDATA)>
      <!ELEMENT QCLinkage (#PCDATA)>
      <!ELEMENT QCType (#PCDATA)>
      <!ELEMENT QuantitationLimit (#PCDATA)>
      <!ELEMENT QuantitationLimitType (#PCDATA)>
      <!ELEMENT QuantitationLimitUnits (#PCDATA)>
      <!ELEMENT Quarantine (#PCDATA)>
      <!ELEMENT ReferenceDate (#PCDATA)>
      <!ELEMENT ReportingLimit (#PCDATA)>
      <!ELEMENT ReportingLimitType (#PCDATA)>
      <!ELEMENT ReportingLimitUnits (#PCDATA)>
      <!ELEMENT Result (#PCDATA)>
      <!ELEMENT ResultBasis (#PCDATA)>
      <!ELEMENT ResultLimitHigh (#PCDATA)>
      <!ELEMENT ResultLimitLow (#PCDATA)>
      <!ELEMENT ResultLimitType (#PCDATA)>
      <!ELEMENT ResultType (#PCDATA)>
      <!ELEEMNT ResultUncertainty (#PCDATA)>
      <!ELEMENT ResultUnits (#PCDATA)>
      <!ELEMENT RetentionTime (#PCDATA)>
      <!ELEMENT RetentionTimeUnits (#PCDATA)>
      <!ELEMENT RPD (#PCDATA)>
      <!ELEMENT RPDLimitHigh (#PCDATA)>
      <!ELEMENT RPDLimitType (#PCDATA)>
      <!ELEMENT RPDType (#PCDATA)>
      <!ELEMENT SampleAmount (#PCDATA)>
      <!ELEMENT SampleAmountUnits (#PCDATA)>
      <!ELEMENT SamplingBatch (#PCDATA)>
      <!ELEMENT ShippingBatch (#PCDATA)>
      <!ELEMENT SiteID (#PCDATA)>
      <!ELEMENT SiteName (#PCDATA)>
```

```
<!ELEMENT Solvent (#PCDATA)>
<!ELEMENT StandardSource (#PCDATA)>
<!ELEMENT StorageBatch (#PCDATA)>
<!ELEMENT Temperature (#PCDATA)>
<!ELEMENT TemperatureUnits (#PCDATA)>
<!ELEMENT Wavelength (#PCDATA)>
<!ELEMENT WavelengthUnits (#PCDATA)>
<!ELEMENT Yield (#PCDATA)>
```

5.3 SEDD Specification 5.0 General Stage 2a DTD

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- GENERAL_2a_1.dtd 08/15/2003 Based on SEDD Specification Draft 5.0 -->
<!-- Acronym Description -->
<!-- EDD   - Electronic Data Deliverable -->
<!-- ID    - Identity -->
<!-- Lab   - Laboratory -->
<!-- QC    - Quality Control -->
<!-- RPD   - Relative Percent Difference -->
<!ELEMENT Header (
          EDDID|
          EDDVersion|
          EDDImplementationID|
          EDDImplementationVersion|
          GeneratingSystemID|
          GeneratingSystemVersion|
          LabDataPackageID|
          LabDataPackageName|
          LabDataPackageVersion|
          LabReportedDate|
          DateFormat|
          Comment|
          SamplePlusMethod
                  )*>
<!ELEMENT Analysis (
          AnalysisGroupID|
          AnalysisType|
          Analyst|
          AnalyzedAmount|
          AnalyzedAmountUnits|
          AnalyzedDate|
          ClientAnalysisID|
          ClientMethodID|
          Comment|
          ConfirmationAnalysisID|
          DetectorID|
          DetectorType|
          DilutionFactor|
          HeatedPurge|
          InstrumentID|
          LabAnalysisID|
          LabFileID|
          ProcedureID|
          ProcedureName|
          ResultBasis|
          PreparationPlusCleanup|
          Analyte
                   )*>
```

```
      <!ELEMENT AnalysisGroup (
               AnalysisGroupID|
               AnalysisType|
               Comment|
               Analyte
                        )*>
      <!ELEMENT Analyte (
               AnalyteName|
               AnalyteType|
               CASRegistryNumber|
               ClientAnalyteID|
               Comment|
               ExpectedResult|
               ExpectedResultUnits|
               LabQualifiers|
               PeakID|
               PercentRecovery|
               PercentRecoveryLimitHigh|
               PercentRecoveryLimitLow|
               PercentRecoveryLimitType|
               Result|
               ResultLimitHigh|
               ResultLimitLow|
               ResultLimitType|
               ResultType|
               ResultUnits
                        )*>
      <!ELEMENT Handling (
               Analyst|
               ClientMethodID|
               Comment|
               HandledDate|
               HandlingBatch|
               HandlingType|
               InitialAmount|
               InitialAmountUnits|
               ProcedureID|
               ProcedureName|
               PercentMoisture|
               PercentSolids|
               SampleAmount|
               SampleAmountUnits
                        )*>
      <!ELEMENT PreparationPlusCleanup (
               AliquotAmount|
               AliquotAmountUnits|
               Analyst|
               CleanedUpDate|
               CleanupBatch|
               CleanupType|
               ClientMethodID|
               Comment|
               FinalAmount|
               FinalAmountUnits|
               InitialAmount|
               InitialAmountUnits|
               PreparationBatch|
```

```
          PreparationType|
          PreparedDate|
          ProcedureID|
          ProcedureName
                    )*>
<!ELEMENT ReportedResult (
          AnalysisGroupID|
          AnalyteName|
          AnalyteType|
          CASRegistryNumber|
          ClientAnalyteID|
          Comment|
          DetectionLimit|
          DetectionLimitType|
          DetectionLimitUnits|
          ExpectedResult|
          ExpectedResultUnits|
          LabAnalysisID|
          LabQualifiers|
          PeakID|
          PercentDifference|
          PercentDifferenceLimitHigh|
          PercentDifferenceLimitLow|
          PercentDifferenceLimitType|
          PercentRecovery|
          PercentRecoveryLimitHigh|
          PercentRecoveryLimitLow|
          PercentRecoveryLimitType|
          QuantitationLimit|
          QuantitationLimitType|
          QuantitationLimitUnits|
          RPD|
          RPDLimitHigh|
          RPDLimitType|
          ReportingLimit|
          ReportingLimitType|
          ReportingLimitUnits|
          Result|
          ResultLimitHigh|
          ResultLimitLow|
          ResultLimitType|
          ResultType|
          ResultUnits|
          RetentionTime|
          RetentionTimeUnits
                    )*>
<!ELEMENT SamplePlusMethod (
          ClientMethodID|
          ClientMethodType|
          ClientSampleID|
          CollectedDate|
          Comment|
          Composite|
          CoolerID|
          CustodyID|
          EquipmentBatch|
          LabContract|
          LabID|
```

```
                LabName|
                LabReceiptDate|
                LabReportingBatch|
                LabSampleID|
                MatrixID|
                MethodLevel|
                MethodBatch|
                OriginalClientSampleID|
                OriginalLabSampleID|
                PercentMoisture|
                PercentSolids|
                pH|
                Preservative|
                ProjectID|
                ProjectName|
                QCCategory|
                QCLinkage|
                QCType|
                SamplingBatch|
                ShippingBatch|
                SiteID|
                SiteName|
                StorageBatch|
                Temperature|
                TemperatureUnits|
                Analysis|
                ReportedResult|
                Handling|
                AnalysisGroup
                          )*>

      <!ELEMENT AliquotAmount (#PCDATA)>
      <!ELEMENT AliquotAmountUnits (#PCDATA)>
      <!ELEMENT AnalysisGroupID (#PCDATA)>
      <!ELEMENT AnalysisType (#PCDATA)>
      <!ELEMENT Analyst (#PCDATA)>
      <!ELEMENT AnalyteName (#PCDATA)>
      <!ELEMENT AnalyteType (#PCDATA)>
      <!ELEMENT AnalyzedAmount (#PCDATA)>
      <!ELEMENT AnalyzedAmountUnits (#PCDATA)>
      <!ELEMENT AnalyzedDate (#PCDATA)>
      <!ELEMENT CASRegistryNumber (#PCDATA)>
      <!ELEMENT CleanedUpDate (#PCDATA)>
      <!ELEMENT CleanupBatch (#PCDATA)>
      <!ELEMENT CleanupType (#PCDATA)>
      <!ELEMENT ClientAnalysisID (#PCDATA)>
      <!ELEMENT ClientAnalyteID (#PCDATA)>
      <!ELEMENT ClientMethodID (#PCDATA)>
      <!ELEMENT ClientMethodType (#PCDATA)>
      <!ELEMENT ClientSampleID (#PCDATA)>
      <!ELEMENT CollectedDate (#PCDATA)>
      <!ELEMENT Comment (#PCDATA)>
      <!ELEMENT Composite (#PCDATA)>
      <!ELEMENT ConfirmationAnalysisID (#PCDATA)>
      <!ELEMENT CoolerID (#PCDATA)>
      <!ELEMENT CustodyID (#PCDATA)>
      <!ELEMENT DateFormat (#PCDATA)>
      <!ELEMENT DetectionLimit (#PCDATA)>
```

```
<!ELEMENT DetectionLimitType (#PCDATA)>
<!ELEMENT DetectionLimitUnits (#PCDATA)>
<!ELEMENT DetectorID (#PCDATA)>
<!ELEMENT DetectorType (#PCDATA)>
<!ELEMENT DilutionFactor (#PCDATA)>
<!ELEMENT EDDID (#PCDATA)>
<!ELEMENT EDDImplementationID (#PCDATA)>
<!ELEMENT EDDImplementationVersion (#PCDATA)>
<!ELEMENT EDDVersion (#PCDATA)>
<!ELEMENT EquipmentBatch (#PCDATA)>
<!ELEMENT ExpectedResult (#PCDATA)>
<!ELEMENT ExpectedResultUnits (#PCDATA)>
<!ELEMENT FinalAmount (#PCDATA)>
<!ELEMENT FinalAmountUnits (#PCDATA)>
<!ELEMENT GeneratingSystemID (#PCDATA)>
<!ELEMENT GeneratingSystemVersion (#PCDATA)>
<!ELEMENT HandledDate (#PCDATA)>
<!ELEMENT HandlingBatch (#PCDATA)>
<!ELEMENT HandlingType (#PCDATA)>
<!ELEMENT HeatedPurge (#PCDATA)>
<!ELEMENT InitialAmount (#PCDATA)>
<!ELEMENT InitialAmountUnits (#PCDATA)>
<!ELEMENT InstrumentID (#PCDATA)>
<!ELEMENT LabAnalysisID (#PCDATA)>
<!ELEMENT LabContract (#PCDATA)>
<!ELEMENT LabDataPackageID (#PCDATA)>
<!ELEMENT LabDataPackageName (#PCDATA)>
<!ELEMENT LabDataPackageVersion (#PCDATA)>
<!ELEMENT LabFileID (#PCDATA)>
<!ELEMENT LabID (#PCDATA)>
<!ELEMENT LabName (#PCDATA)>
<!ELEMENT LabQualifiers (#PCDATA)>
<!ELEMENT LabReceiptDate (#PCDATA)>
<!ELEMENT LabReportedDate (#PCDATA)>
<!ELEMENT LabReportingBatch (#PCDATA)>
<!ELEMENT LabSampleID (#PCDATA)>
<!ELEMENT MatrixID (#PCDATA)>
<!ELEMENT MethodBatch (#PCDATA)>
<!ELEMENT MethodLevel (#PCDATA)>
<!ELEMENT OriginalClientSampleID (#PCDATA)>
<!ELEMENT OriginalLabSampleID (#PCDATA)>
<!ELEMENT PeakID (#PCDATA)>
<!ELEMENT PercentDifference (#PCDATA)>
<!ELEMENT PercentDifferenceLimitHigh (#PCDATA)>
<!ELEMENT PercentDifferenceLimitLow (#PCDATA)>
<!ELEMENT PercentDifferenceLimitType (#PCDATA)>
<!ELEMENT PercentMoisture (#PCDATA)>
<!ELEMENT PercentRecovery (#PCDATA)>
<!ELEMENT PercentRecoveryLimitHigh (#PCDATA)>
<!ELEMENT PercentRecoveryLimitLow (#PCDATA)>
<!ELEMENT PercentRecoveryLimitType (#PCDATA)>
<!ELEMENT PercentSolids (#PCDATA)>
<!ELEMENT pH (#PCDATA)>
<!ELEMENT PreparationBatch (#PCDATA)>
<!ELEMENT PreparationType (#PCDATA)>
<!ELEMENT PreparedDate (#PCDATA)>
<!ELEMENT Preservative (#PCDATA)>
```

```
      <!ELEMENT ProcedureID (#PCDATA)>
      <!ELEMENT ProcedureName (#PCDATA)>
      <!ELEMENT ProjectID (#PCDATA)>
      <!ELEMENT ProjectName (#PCDATA)>
      <!ELEMENT QCCategory (#PCDATA)>
      <!ELEMENT QCLinkage (#PCDATA)>
      <!ELEMENT QCType (#PCDATA)>
      <!ELEMENT QuantitationLimit (#PCDATA)>
      <!ELEMENT QuantitationLimitType (#PCDATA)>
      <!ELEMENT QuantitationLimitUnits (#PCDATA)>
      <!ELEMENT RPD (#PCDATA)>
      <!ELEMENT RPDLimitHigh (#PCDATA)>
      <!ELEMENT RPDLimitType (#PCDATA)>
      <!ELEMENT ReportingLimit (#PCDATA)>
      <!ELEMENT ReportingLimitType (#PCDATA)>
      <!ELEMENT ReportingLimitUnits (#PCDATA)>
      <!ELEMENT Result (#PCDATA)>
      <!ELEMENT ResultBasis (#PCDATA)>
      <!ELEMENT ResultLimitHigh (#PCDATA)>
      <!ELEMENT ResultLimitLow (#PCDATA)>
      <!ELEMENT ResultLimitType (#PCDATA)>
      <!ELEMENT ResultType (#PCDATA)>
      <!ELEMENT ResultUnits (#PCDATA)>
      <!ELEMENT RetentionTime (#PCDATA)>
      <!ELEMENT RetentionTimeUnits (#PCDATA)>
      <!ELEMENT SampleAmount (#PCDATA)>
      <!ELEMENT SampleAmountUnits (#PCDATA)>
      <!ELEMENT SamplingBatch (#PCDATA)>
      <!ELEMENT ShippingBatch (#PCDATA)>
      <!ELEMENT SiteID (#PCDATA)>
      <!ELEMENT SiteName (#PCDATA)>
      <!ELEMENT StorageBatch (#PCDATA)>
      <!ELEMENT Temperature (#PCDATA)>
      <!ELEMENT TemperatureUnits (#PCDATA)>
```

6.0 DATA ELEMENT INSTRUCTION TABLES

6.1 Specification 5.2 Stage 2a

Table 1

Air Volatiles Data Element Instructions

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
Header	X	X	X	X	
ClientID	X	X	X	X	Report "1" for Region 1, "2" for Region 2, etc. For samples received from QATS, report "91".
ClientName					Not required.
Comment					Not required.
DateFormat	X	X	X	X	Report MMDDYYYYThh:mm:ss. All dates and times reported in the EDD must follow this format. If any part of the time is unknown, report "00" for the unknown hours, minutes, and seconds.
EDDID	X	X	X	X	Report "SEDD".
EDDImplementationID	X	X	X	X	Report "SEDD_5.2_GENERAL_2a" (This is the DTD used).
EDDImplementationVersion	X	X	X	X	Report "1" (This is the version of the DTD used).
EDDVersion	X	X	X	X	Report "5.2".
GeneratingSystemID	X	X	X	X	Report name of generating software or vendor.
GeneratingSystemVersion	X	X	X	X	Report software version number.
Lab Contract	X	X	X	X	Report the Task Order number.
LabContractModificationDescription					Not required.
LabContractModificationID					Not required.
LabDataPackageID	X	X	X	X	Report the Sample Delivery Group (SDG).
LabDataPackageName	X	X	X	X	Report "VOA" or "SIM_VOA" as appropriate.
LabDataPackageVersion	X	X	X	X	Report "1", then increment with each resubmission.
LabID					Report the Agency-assigned Lab Code.
Lab Name	X	X	X	X	Report the Lab Name.
LabNarrative	X	X	X	X	Report the text of the Lab Narrative.
LabQualifiersDefinition	X	X	X	X	Use the format 'Qualifier:Definition' to report each qualifier used. Use a ';' to separate the definitions of multiple qualifiers.
LabReportedDate	X	X	X	X	Report the date this data was reported to the client.
ProjectID	X	X	X	X	Report the Case Number.
ProjectName					Not required.
SiteID					Not required.
SiteName					Not required.
SamplePlusMethod	**X**	**X**	**X**	**X**	
ClientID	X				Report "1" for Region 1, "2" for Region 2, etc. For samples received from QATS, report "91".
ClientMethodCategory					Not required.
ClientMethodCode					Not required.

Table 1

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
ClientMethodID	X	X	X	X	Report "SAV01.X".
ClientMethodModificationDescription					Not required.
ClientMethodModificationID	X	X	X		Report the Task Order number.
ClientMethodName					Not required.
ClientMethodSource	X	X	X	X	Report "USEPA_CLP".
ClientMethodType	X	X	X	X	Report "GC/MS".
ClientMethodVersion	X	X	X	X	Report month and year the SOW was issued.
ClientName					Not required.
ClientSampleID	X	X	X	X	Report the Sample Number.
CollectedDate	X				Report the date and time the sample was collected.
CollectedEndDate					Not required.
Comment					Not required.
Composite					Not required.
CoolerID					Not required.
CustodyID	X				Report the Traffic Report/Chain of Custody Form number.
EquipmentBatch					Not required.
Filtered					Not required.
LabContract	X	X	X		Report the Contract number.
LabContractModificationDescription					Not required.
LabContractModificationID					Not required.
LabID	X	X	X	X	Report the Agency-assigned Lab Code.
LabMethodID					Not required.
LabMethodName					Not required.
LabName	X	X	X	X	Report the Lab Name.
LabReceiptDate	X				Report the date and time the sample was received.
LabReportingBatch	X	X	X	X	Links all samples analyzed to this deliverable. Report the SDG number.
LabSampleID	X	X	X	X	Report the Lab Sample ID as assigned by the lab.
LocationID					Not required.
LocationName					Not required.
MatrixID	X	X	X	X	Report "AIR".
MatrixMedium	X	X	X	X	Report "Air”.
MethodBatch					Not required.
MethodCategory					Not required.
MethodCode					Not required.
MethodID	X	X	X	X	Report "SAV01.X".

Table 1

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
MethodLevel					Not required.
MethodModificationDescription					Not required.
MethodModificationID					Not required.
MethodName					Not required.
MethodSource	X	X	X	X	Report "USEPA_CLP".
MethodType	X	X	X	X	Report "GC/MS".
MethodVersion	X	X	X	X	Report month and year the SOW was issued.
OriginalClientSampleID	X				For dilutions and re-analyses, report the Sample Number of the original sample this sample was derived from.
OriginalLabSampleID					Not required.
Preservative					Not required.
ProjectID	X	X	X		Report the Case Number.
ProjectName					Not required.
QCCategory		X	X		Report "Blank" for MB; "Blank_Spike" for LCS;
QCLinkage		X	X		Report "PreparationBatch" for MB and LCS.
QCType	X	X	X		Report "Field_Sample" for field samples; "Field_Blank" for field, or equipment blanks; "PT_Sample" for PE samples; "Method_Blank" for MB; "Laboratory_Control_Sample" for LCS.
Quarantine					Not required.
SamplingBatch					Not required.
ShippingBatch					Not required.
SiteID					Not required.
SiteName					Not required.
StorageBatch					Not required.
Characteristic	**X**	**X**	**X**		
CharacteristicType	X				Report “Temperature” for temperature at time of sampling; “Pressure” for canister pressure; “Flow_Rate” for canister flow rate.
CharacteristicValue	X				Report the temperature, pressure, and flow rate as provided by the samplers.
CharacteristicUnits	X				Report units as provided by the samplers.
Comment					Not required.
ContactInformation	**X**	**X**	**X**	**X**	
LabAddress1	X	X	X	X	Report the street address of the laboratory.

Table 1

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
LabAddress2	X	X	X	X	If applicable, report any additional address information (e.g., suite, maildrop). Otherwise leave blank.
LabCity	X	X	X	X	Report the city in which the laboratory is located.
LabCountry	X	X	X	X	Report the country in which the laboratory is located.
LabID	X	X	X	X	Report the Agency-assigned Lab Code.
LabName	X	X	X	X	Report the Lab Name.
LabPointOfContact	X	X	X	X	Report the name of the person at the laboratory serving as the point of contact.
LabPointOfContactElectronicAddress	X	X	X	X	Report the email address of the point of contact.
LabPointOfContactTitle	X	X	X	X	Report the title of the point of contact
LabPointOfContactType					Not required.
LabState	X	X	X	X	Report the state or province in which the laboratory is located.
LabTelephoneNumber	X	X	X	X	Report the 10-digit phone number for the laboratory.
LabZipCode	X	X	X	X	Report the ZIP or postal code.
Analysis	X	X	X	X	
AliquotAmount					Not required.
AliquotAmountUnits					Not required.
AnalysisDuration					Not required.
AnalysisDurationUnits					Not required.
AnalysisGroupID					Not required.
AnalysisType	X	X	X		Report "Initial", "Dilution-01", or "Reanalysis-01", then increment as necessary.
Analyst	X	X	X		Report the Analyst’s initials.
AnalyzedAmount					Not required.
AnalyzedAmountUnits					Not required.
AnalyzedDate	X	X	X	X	Report the date and time the sample was analyzed.
ClientAnalysisID					Not required.
ClientMethodCode					Not required.
ClientMethodID	X	X	X	X	Report "SAV01.X".
ClientMethodModificationDescription					Not required.
ClientMethodModificationID					Not required.
ClientMethodName					Not required.
ClientMethodSource	X	X	X	X	Report "USEPA_CLP".
ClientMethodVersion	X	X	X	X	Report month and year the SOW was issued.
Column	X	X	X		Report the column used.
ColumnInternalDiameter	X	X	X		Report the internal diameter in mm.
ColumnInternalDiameterUnits	X	X	X		Report “mm”.
ColumnLength	X	X	X		Report the length in meters .

Table 1

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
ColumnLengthUnits	X	X	X		Report “m”.
Comment					Not required.
ConfirmationAnalysisID					Not required.
DetectorID					Not required.
DetectorType					Not required.
DilutionFactor	X	X	X		Report the Dilution Factor used to the nearest tenth. Report "1.0" when no dilutions are used.
Efficiency					Not required.
HeatedPurge					Not required.
Inclusion					Not required.
InjectionVolume					Not required.
InjectionVolumeUnits					Not required.
InstrumentID	X	X	X	X	Report the laboratory identifier for the instrument used for this analysis.
LabAnalysisID	X	X	X	X	Report a unique identifier.
LabFileID	X	X	X	X	Report the lab file ID.
LabID					Not required.
LabMethodID					Not required.
LabMethodName					Not required.
LabName					Not required.
MethodCode					Not required.
MethodID	X	X	X	X	Report "SAV01.X".
MethodModificationDescription					Not required.
MethodModificationID					Not required.
MethodName					Not required.
MethodSource	X	X	X	X	Report "USEPA_CLP".
MethodVersion	X	X	X	X	Report month and year the SOW was issued.
PreparationBatch					Not required.
ProcedureID					Not required.
ProcedureName					Not required.
ReferenceDate					Not required.
ResultBasis					Not required.
Temperature					Not required.
TemperatureUnits					Not required.
WaveLength					Not required.
WaveLengthUnits					Not required.
Yield					Not required.
AnalysisGroup					**Not required.**

Table 1

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
Handling					Not required.
ReportedResult	X	X	X		
AnalysisGroupID					Not required.
AnalyteGroupID					Not required.
AnalyteName	X	X	X		Report analytes as they appear in the CAS Registry.
AnalyteNameContext	X	X	X		Report "CAS".
AnalyteType	X	X	X		Report "Target" for all target compounds.
CASRegistryNumber	X	X	X		Report CAS Numbers as they appear in the SOW.
ClientAnalyteID	X	X	X		Report CAS number.
ClientAnalyteName	X	X	X		Report analytes as they appear in the SOW.
ClientDetectionLimit					Not required.
ClientDetectionLimitUnits					Not required.
ClientQuantitationLimit	X	X	X		Report the CRQL.
ClientQuantitationLimitUnits	X	X	X		Report "ppbv”.
Comment					Not required.
DetectionLimit	X	X	X		Report the Method Detection Limit (MDL) adjusted for dilution to two significant figures.
DetectionLimitType	X	X	X		Report "MDL_sa ".
DetectionLimitUnits	X	X	X		Report "ppbv”.
DifferenceErrorRatio					Not required.
ExpectedResult		X			Report the true value for LCS.
ExpectedResultUnits		X			Report "ppbv”.
LabAnalysisID	X	X	X		Report the unique identifier from the analysis this reported result was derived from.
LabAnalyteID					Not required.
LabQualifiers	X	X	X		Report flags as specified in the SOW.
LabResultStatus					Not required.
PeakID					Not required.
PercentDifference					Not required.
PercentDifferenceLimitHigh					Not required.
PercentDifferenceLimitLow					Not required.
PercentDifferenceLimitType					Not required.
PercentRecovery		X			Report the Percent Recovery.
PercentRecoveryLimitHigh		X			Report the upper limit for the Percent Recovery.
PercentRecoveryLimitLow		X			Report the lower limit for the Percent Recovery.
PercentRecoveryLimitType		X			Report "Method".
PercentRecoveryType					Not required.

Table 1

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
QuantitationLimit	X	X	X		Report the CRQL adjusted for dilution to two significant figures.
QuantitationLimitType	X	X	X		Report "CRQL_sa".
QuantitationLimitUnits	X	X	X		Report "ppbv”.
ReportingLimit					Not required.
ReportingLimitType					Not required.
ReportingLimitUnits					Not required.
Result	X	X	X		Report the final calculated result for detects that meet all technical acceptance criteria.
ResultLimitHigh					Not required.
ResultLimitLow					Not required.
ResultLimitType					Not required.
ResultType	X	X	X		Report "=" for all detected analytes that meet technical acceptance criteria. Report "Not_Detected" for non-detects.
ResultUncertainty					Not required.
ResultUnits	X	X	X		Report "ppbv”.
RetentionTime	X	X	X		Report the retention time in decimal minutes for all detects that meet all technical acceptance criteria.
RetentionTimeUnits	X	X	X		Report "Minutes".
RPD					Not required.
RPDLimitHigh					Not required.
RPDLimitType					Not required.
RPDType					Not required.
PreparationPlusCleanup	X	X	X		
AliquotAmount	X	X	X		Report the amount pulled through the trap in liters or milliliters.
AliquotAmountUnits	X	X	X		Report "L” or “mL".
Analyst	X	X	X		Report the Analyst’s initials.
CleanedUpDate					Not required.
CleanUpBatch					Not required.
CleanUpType					Not required.
ClientMethodCode					Not required.
ClientMethodID					Not required.

Table 1

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
ClientMethodModificationDescription					Not required.
ClientMethodModificationID					Not required.
ClientMethodName					Not required.
ClientMethodSource	X	X	X		Report "USEPA_CLP".
ClientMethodVersion	X	X	X		Report month and year the SOW was issued.
Comment					Not required.
FinalAmount					Not required.
FinalAmountUnits					Not required.
InitialAmount					Not required.
InitialAmountUnits					Not required.
LabID					Not required.
LabMethodID					Not required.
LabMethodName					Not required.
LabName					Not required.
LotNumber					Not required.
MethodCode					Not required.
MethodID	X	X	X		Report "SAV01.X".
MethodModificationDescription					Not required.
MethodModificationID					Not required.
MethodName					Not required.
MethodSource	X	X	X		Report "USEPA_CLP".
MethodVersion	X	X	X		Report month and year the SOW was issued.
PreparationBatch	X	X	X		Links all samples to their MB and LCS. Report a unique identifier for each batch.
PreparationPlusCleanupType	X	X	X		Report "Preparation".
PreparationType					Not required.
PreparedDate	X	X	X		Report the date and time the sample was pulled through the trap.
ProcedureID					Not required.
ProcedureName					Not required.
Solvent					Not required.
Analyte	X	X	X		
AnalyteGroupID					Not required.
AnalyteName	X	X	X		Report analytes as they appear in the CAS registry.
AnalyteNameContext	X	X	X		Report "CAS".

Table 1

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
AnalyteType	X	X	X		Report "Target" for all target compounds, "Internal_Standard" for internal standards, and "TIC" for tentatively identified compounds.
CASRegistryNumber	X	X	X		Report the CAS Number as it appears in the SOW.
ClientAnalyteID	X	X	X		Report CAS number.
ClientAnalyteName	X	X	X		Report the analytes as they appear in the SOW.
Comment					Not required.
DetectionLimit	X	X	X		Report the Method Detection Limit (MDL).
DetectionLimitType	X	X	X		Report "MDL".
DetectionLimitUnits	X	X	X		Report "ppbv”.
DifferenceErrorRatio					Not required.
Efficiency					Not required.
ExpectedResult	X	X	X		Report the concentration of internal standards added.
ExpectedResultUnits	X	X	X		Report "ppbv”.
Inclusion					Not required.
LabAnalyteID					Not required.
LabQualifiers	X	X	X		Report qualifiers as specified in the SOW.
LotNumber	X	X	X		Report the vendor/manufacturer assigned lot number for this internal standard.
PeakID					Not required.
PercentRecovery					Not required.
PercentRecoveryLimitHigh					Not required.
PercentRecoveryLimitLow					Not required.
PercentRecoveryLimitType					Not required.
PercentRecoveryType					Not required.
QuantitationLimit	X	X	X		Report the CRQL.
QuantitationLimitType	X	X	X		Report "CRQL".
QuantitationLimitUnits	X	X	X		Report "ppbv”.
ReportingLimit					Not required.
ReportingLimitType					Not required.
ReportingLimitUnits					Not required.
Result	X	X	X		For targets and TICs, report the final calculated result.
ResultLimitHigh					Not required.
ResultLimitLow					Not required.
ResultLimitType					Not required.

Table 1

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
ResultType	X	X	X		Report "=" for all detected analytes that meet technical acceptance criteria, "Not_Detected" for non-detects.
ResultUncertainty					Not required.
ResultUnits	X	X	X		Report "ppbv”.
StandardSource	X	X	X		Report the vendor/manufacturer for this standard.
Wavelength					Not required.
WavelengthUnits					Not required.
AnalyteGroup					Not required

Table 2

Air Volatiles Data Element Instructions

6.2 SEDD Specification 5.0 Stage 2a

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
Header	**X**	**X**	**X**	**X**	
Comment					Not required.
DateFormat	X	X	X	X	Report MMDDYYYYThh:mm:ss. All dates and times reported in the EDD must follow this format. If any part of the time is unknown, report "00" for the unknown hours, minutes, and seconds.
EDDID	X	X	X	X	Report "SEDD".
EDDImplementationID	X	X	X	X	Report "GENERAL_2a" (This is the DTD used).
EDDImplementationVersion	X	X	X	X	Report "1" (This is the version of the DTD used).
EDDVersion	X	X	X	X	Report "5.0".
GeneratingSystemID	X	X	X	X	Report name of generating software or vendor.
GeneratingSystemVersion	X	X	X	X	Report software version number.
LabDataPackageID	X	X	X	X	Report the Sample Delivery Group (SDG).
LabDataPackageName	X	X	X	X	Report "VOA" or "VOA_SIM".
LabDataPackageVersion	X	X	X	X	Report "1", then increment with each resubmission.
LabReportedDate	X	X	X	X	Report the date this data was reported to the client.
SamplePlusMethod	**X**	**X**	**X**	**X**	
ClientMethodID	X	X	X	X	Report "SAV01.X".
ClientSampleID	X	X	X	X	Report the Sample Number.
CollectedDate	X				Report the date and time the sample was collected.
Comment					Not required.
Composite					Not required.
CoolerID					Not required.
CustodyID	X				Report the Traffic Report/Chain of Custody Form number.
EquipmentBatch					Not required.
LabContract	X	X	X		Report the Contract number.
LabID	X	X	X	X	Report the Agency-assigned Lab Code.
LabName	X	X	X	X	Report the Lab Name.
LabReceiptDate	X				Report the date and time the sample was received.
LabReportingBatch	X	X	X	X	Links all samples analyzed to this deliverable. Report the SDG number.
LabSampleID	X	X	X	X	Report the Lab Sample ID as assigned by the lab.
MatrixID	X	X	X	X	Report "AIR".
MethodBatch					Not required.
MethodLevel					Not required.
OriginalClientSampleID	X				For dilutions and re-analyses, report the Sample Number of the original sample this sample was derived from.
OriginalLabSampleID					Not required.
PercentMoisture					Not required.

Table 2

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
PercentSolids					Not required.
pH					Not required.
Preservative					Not required.
ProjectID	X	X	X		Report the Case Number.
ProjectName					Not required.
QCCategory		X	X		Report "Blank" for MB; "Blank_Spike" for LCS;
QCLinkage		X	X		Report "PreparationBatch" for MB and LCS.
QCType	X	X	X		Report "Field_Sample" for field samples; "Field_Blank" for field, equipment, or trip blanks; "PT_Sample" for Performance Evaluation Samples; "Method_Blank" for MB; "Laboratory_Control_Sample" for LCS.
SamplingBatch					Not required.
ShippingBatch					Not required.
SiteID					Not required.
SiteName					Not required.
StorageBatch					Not required.
Temperature	X				Report the temperature at the time of sample collection as provided by the sampler.
TemperatureUnits	X				Report as provided by sampler.
Analysis	X	X	X	X	
AnalysisGroupID					Not required.
AnalysisType	X	X	X		Report "Initial", "Dilution-01", or "Reanalysis-01", then increment as necessary.
Analyst	X	X	X		Report the Analyst’s initials.
AnalyzedAmount					Not required.
AnalyzedAmountUnits					Not required.
AnalyzedDate	X	X	X	X	Report the date and time the sample was analyzed.
ClientAnalysisID					Not required.
ClientMethodID	X	X	X	X	Report "SAV01.X".
Comment					Not required.
ConfirmationAnalysisID					Not required.
DetectorID					Not required.
DetectorType					Not required.
DilutionFactor	X	X	X		Report the Dilution Factor used to the nearest tenth. Report "1.0" when no dilutions are used.
HeatedPurge					Not required.
InstrumentID	X	X	X	X	Report the laboratory identifier for the instrument used for this analysis.
LabAnalysisID	X	X	X	X	Report a unique identifier.
LabFileID	X	X	X	X	Report the Lab File ID.
ProcedureID					Not required.

Table 2

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
ProcedureName					Not required.
ResultBasis					Not required.
AnalysisGroup					Not required.
Handling					Not required.
ReportedResult	X	X	X		
AnalysisGroupID					Not required.
AnalyteName	X	X	X		Report analytes as they appear in the CAS Registry.
AnalyteType	X	X	X		Report "Target" for all target compounds.
CASRegistryNumber	X	X	X		Report CAS Numbers as they appear in the SOW.
ClientAnalyteID	X	X	X		Report CAS number.
Comment					Not required.
DetectionLimit	X	X	X		Report the Method Detection Limit (MDL)adjusted for dilutiono to two significant figures.
DetectionLimitType	X	X	X		Report "MDL_sa".
DetectionLimitUnits	X	X	X		Report "ppbv.
ExpectedResult		X			Report the true value for LCS.
ExpectedResultUnits		X			Report "ppbv”.
LabAnalysisID	X	X	X		Report the unique identifier from the analysis this reported result was derived from.
LabQualifiers	X	X	X		Report flags as specified in the SOW.
PeakID					Not required.
PercentDifference					Not required.
PercentDifferenceLimitHigh					Not required.
PercentDifferenceLimitLow					Not required.
PercentDifferenceLimitType					Not required.
PercentRecovery		X			Report the Percent Recovery.
PercentRecoveryLimitHigh		X			Report the upper limit for the Percent Recovery.
PercentRecoveryLimitLow		X			Report the lower limit for the Percent Recovery.
PercentRecoveryLimitType		X			Report "Method".
QuantitationLimit	X	X	X		Report the CRQL adjusted for dilution to two significant figures.
QuantitationLimitType	X	X	X		Report "CRQL_sa".
QuantitationLimitUnits	X	X	X		Report "ppbv”.
ReportingLimit					Not required.
ReportingLimitType					Not required.
ReportingLimitUnits					Not required.

Table 2

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
Result	X	X	X		Report the final calculated result for detects that meet all technical acceptance criteria.
ResultLimitHigh					Not required.
ResultLimitLow					Not required.
ResultLimitType					Not required.
ResultType	X	X	X		Report "=" for all detected analytes that meet technical acceptance criteria. Report "Not_Detected" for non-detects.
ResultUnits	X	X	X		Report "ppbv”.
RetentionTime	X	X	X		Report the retention time in decimal minutes for all detects that meet all technical acceptance criteria.
RetentionTimeUnits	X	X	X		Report "Minutes".
RPD					Not required.
RPDLimitHigh					Not required.
RPDLimitType					Not required.
PreparationPlusCleanup	X	X	X		
AliquotAmount	X	X	X		Report the amount pulled throughthe trap in liters or milliliters.
AliquotAmountUnits	X	X	X		Report "L" or “mL”.
Analyst	X	X	X		Report the Analyst’s initials.
CleanedUpDate					Not required.
CleanUpBatch					Not required.
CleanUpType					Not required.
ClientMethodID					Not required.
Comment					Not required.
FinalAmount					Not required.
FinalAmountUnits					Not required.
InitialAmount					Not required.
InitialAmountUnits					Not required.
PreparationBatch	X	X	X		Links all samples to their MB and LCS. Report a unique identifier for each batch.
PreparationType					Not required.
PreparedDate	X	X	X		Report the date and time the sample was pulled throughthe trap.
ProcedureID					Not required.
ProcedureName					Not required.

Table 2

Air Volatiles Data Element Instructions (Cont.)

Node and Data Elements	Sample	LCS	MB	NCS	Instructions
Analyte	X	X	X		
AnalyteName	X	X	X		Report analytes as they appear in the SOW.
AnalyteType	X	X	X		Report "Target" for all target compounds, "Internal_Standard" for internal standards, and “TIC" for tentatively identified compounds.
CASRegistryNumber	X	X	X		Report the CAS Number as it appears in the SOW.
ClientAnalyteID	X	X	X		Report CAS number.
Comment					Not required.
ExpectedResult	X	X	X		Report the concentration of internal standards added.
ExpectedResultUnits	X	X	X		Report "ppbv".
LabQualifiers	X	X	X		Report qualifiers as specified in the SOW.
PeakID					Not required.
PercentRecovery					Not required.
PercentRecoveryLimitHigh					Not required.
PercentRecoveryLimitLow					Not required.
PercentRecoveryLimitType					Not required.
Result	X	X	X		For targets and TICs, report the final calculated result.
ResultLimitHigh					Not required.
ResultLimitLow					Not required.
ResultLimitType					Not required.
ResultType	X	X	X		Report "=" for all detected analytes that meet technical acceptance criteria, "Not_Detected" for non-detects.
ResultUnits	X	X	X		Report "ppbv".

Table 3

Abbreviations Used in the Instructions

Abbreviation	Definition
C	Celsius
CAS	Chemical Abstracts Service
CRQL	Contract Required Quantitation Limit
DTD	Document Type Definition
EDD	Electronic Data Deliverable
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
ID	Identifier
Lab	Laboratory
LCS	Laboratory Control Sample
MB	Method Blank
NCS	Non-Client (ZZZZZZ) Sample
PE	Performance Evaluation
QC	Quality Control