EPA NEW ENGLAND

ENVIRONMENTAL DATA REVIEW SUPPLEMENT
For
Regional Data Review Elements and Superfund Specific Guidance/Procedures

U.S. EPA NEW ENGLAND

Quality Assurance Unit
Office of Environmental Measurement and Evaluation

April 22, 2013

Preface

This document is intended to be used in conjunction with the *EPA New England Environmental Data Review Program Guidance* (1). As a regional implementation document, the *EPA New England Environmental Data Review Supplement*:

- Provides region-specific guidance for reviewing and reporting sample results generated for data collection activities (Note: review of previously collected or existing data is addressed in the *EPA New England Environmental Data Review Program Guidance*);
- Describes Superfund data review including:
  - adoption of the National Functional Guidelines criteria;
  - use of automated procedures;
  - incorporation of the *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*; and
  - use of a 2-Tiered data review approach dependent on project objectives.

- Includes instructions for using the regional Performance Evaluation Sample Program.

Table of Contents

Section	*Title*	*Page*

Section	*Title*	*Page*

Figures

Tables

Equations

Attachments

Chapter 1
Regional Data Review Elements

1.1 Introduction

The *EPA New England (NE) Environmental Data Review Program Guidance* (1) is applicable to all environmental data supporting EPA NE decisions. This *EPA New England Environmental Data Review Supplement* (hereafter, *DR Supplement*) provides region-specific guidance for reviewing environmental data generated by or for the Region and is designed to augment guidance provided in the *EPA NE Environmental Data Review Program Guidance*.

The guidance supplements national or program guidance, including the Superfund *National Functional Guidelines* (NFG) available at: http://www.epa.gov/superfund/programs/clp/guidance.htm whenever so directed. In addition, it may be used when national program guidance does not exist or when data review procedures are not specified in quality assurance project plans (QAPPs) or other quality assurance (QA) documentation. The *DR Supplement* establishes processes to ensure that region-specific quality control (QC) criteria and actions are applied consistently to data generated by and for the Region.

1.2 Data Review Using the Graded Approach

Basing the level of data review on project objectives and the needs of the data user, the Region adopts a graded approach to review data. The Region encourages the use of professional judgment when reviewing measurement data. Data reviewers should be highly trained chemists and scientists experienced in and knowledgeable of the applicable analytical methods and data review procedures. Therefore, the Region anticipates that professional judgment applied by data reviewers to accept, qualify or reject sample results will be defensible and documented with scientific rationale.

Using the graded approach, the Region applies tiered procedures for reviewing Superfund data (refer to Chapter 3). In addition, the Region applies validation labels in accordance with the *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (7), (refer to Chapter 3), to provide consistent review procedures and QA/QC activities evaluated for data review.

1.3 Regional Review Requirements

Regional expectations are that QA and QC sample results associated with project activities will be routinely evaluated to determine the quality of the sample data prior to decision making, and that procedures for reviewing data will be documented in a QAPP or equivalent QA documentation.

Each QC sample and QA activity provides specific information pertinent to data quality elements, including precision, accuracy/bias, representativeness, comparability and sensitivity.

QA/QC samples and activities include but are not limited to:

- conducting a completeness check to confirm that all required sampling and analytical documents and records are present in the data package to ensure sufficient documentation for data defensibility;
- applying preservation and holding time procedures to ensure sample integrity;
- submitting performance evaluation samples (PESs) for analysis with sample sets to assess bias and accuracy of the results;
- requiring procedures for calibration and calibration check samples to ensure accurate quantitation of results;
- including and/or analyzing blanks (laboratory and equipment) with sample sets to assess contamination and bias of the results;
- sampling and analyzing duplicates (laboratory and field) to determine precision;
- including the use of spike samples (matrix, deuterated monitoring compounds, etc.) to assess accuracy and bias;
- including the use of instrument and system check samples to assess accuracy;
- including the use of sensitivity checks to access detection and reporting limits; and,
- including the use of Method Detection Limit (MDL) determinations to determine quantitative reporting accuracy.

1.3.1 Method QC Acceptance Limits versus Project-Specific Acceptance Criteria for Data Review

In most cases, EPA-approved methods include QC acceptance limits that must be met to demonstrate that the measurement system is capable of producing scientifically acceptable data. When method QC acceptance limits are not achieved by the laboratory, the system is considered "out of control". The laboratory may take corrective actions and reprepare/reanalyze the samples as applicable; or it may qualify or reject sample results.

Note: For many projects, the method QC acceptance limits are used as data review criteria by the reviewers.

In addition to method QC acceptance limits, program and/or project-specific review criteria may be applied to sample results. These data review criteria and actions are provided in program procedures and guidance, and project-specific QA documentation. Based on data quality objectives (DQOs), project-specific data review procedures define acceptance criteria for QC samples (e.g., blanks, duplicates) and describe actions the reviewer should take when criteria are not met. Actions may include accepting, estimating (UJ or J) or rejecting (R) laboratory reported data. Qualification of data usually includes applying "flags" to laboratory reported results.

1.3.2 Regional Data Qualifier Flags

Data qualifiers or "flags" indicate that sample results may not meet the established data acceptance criteria. During final data review, qualifiers are assessed to ensure that data are usable for their intended purpose. The Region uses the following data qualifier flags:

U The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit (SQL) or Contract Required Quantitation Limit (CRQL). The SQL/CRQL accounts for sample specific dilution factors, percent solids results or sample sizes that deviate from those required by the method. SQLs are also referred to as Sample Reporting Limits (SRLs) and Contract Required Quantitation Limits (CRQLs) for Superfund CLP generated data.

J The associated numerical value is an estimated quantity. The analyte was positively identified and the associated numerical value is the approximate concentration (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the SQL).

J+ The associated numerical value is estimated; associated QC data indicate a positive bias.

J- The associated numerical value is estimated; associated QC data indicate a negative bias.

Note: J+ and J- qualifiers should only be used when QC results indicate an unambiguous direction of bias. For example, when all QC results are acceptable except for low spiked compound recoveries, then the data reviewer may qualify the associated data using 'J-'. Also, there can be cumulative bias information, for example, when a PE compound has a low recovery and the compound is recovered low in the matrix spike. The data reviewer may apply 'J-' to all the associated data and describe the cumulative low recoveries on the data summary table (DST) with a footnote.

UJ The analyte was analyzed for, but was not detected at a level greater than or equal to the SQL. The sample quantitation limit is an estimated quantity.

NJ The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents an estimated quantity.

R The data are unusable (analyte may or may not be present). Re-sampling and analysis are necessary for verification. The R replaces the numerical value or SQL.

C This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

X This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

EB, TB, BB An analyte that was identified in an aqueous equipment blank (EB), trip blank (TB), or bottle blank (BB) that was used to assess field contamination associated with soil/sediment samples. **These qualifiers should only be applied to soil/sediment sample results.**

If other data qualifier flags are used, they must be defined in the generic program or project-specific QAPP and on the Data Summary Table.

1.4 Data Review Reporting

The outcomes of data review are documented to support Agency actions. The documentation of data quality decisions (e.g., to use or not to use data) is an essential element of data review. The Region applies the graded approach when documenting the data review process.

For the Superfund Program, data review must be documented in a formal Data Review Report in accordance with the format specified in Chapter 2, Section 2.3.

For other programs, including the Water Program, the results of the data review process may be documented in a formal Data Review Report similar to the Superfund Program; or, data review may be presented in a narrative format as part of the final project report. If a narrative format will be used, it should be defined in the generic program or project-specific QAPP. The narrative should summarize the review procedures and outcomes; discuss the application of data qualifiers based on field and laboratory QA/QC results; and, identify any limitations on the use of the data.

1.5 Data Usability Reporting

Depending on the type and complexity of the environmental project, a formal, separate Data Usability Assessment Report may be required. Typically however, data usability is discussed in conjunction with data review results as part of the project final report. In either case, the QA planning document (e.g., QAPP, SAP) should define how data usability will be documented and reported.

Data usability reporting should include an evaluation and summary of data usability relative to the project objectives, and should include the following:

- description of the project QA/QC activities and DQOs;
- procedures used for reviewing and evaluating data, including acceptance criteria, the definition of data qualifiers, and the statistical methods of data analysis, if applicable;
- tabular summary of data used and not used, including the rationale for the data not used;
- narrative summary of the representativeness evaluation relative to the sampling design, data completeness, and matrix homogeneity; and,
- discussion of the limitations or restrictions of the data use regarding bias, precision, comparability and sensitivity and taking into consideration the general assessment factors as discussed in Section 12 of the *EPA NE Data Review Program Guidance* (1).

Statements regarding the use of the data are recommended. Examples include:

- *The data meet the project quality criteria and can be used without restriction;*
- *Data were rejected based on failure to meet project quality criteria and should not be used for project decisions/actions; or*
- *Some data were qualified based on failure to meet project quality criteria and may contribute an unacceptable level of uncertainty to project decisions/actions and, therefore, the data should be used with caution.*

Note: These are example opening statements that must be followed by a summary of the specific data evaluated, the acceptance criteria, and the evaluation outcome. The rationale must be documented for using or not using the data.

1.6 Supplemental Regional Data Review Procedures

Data review procedures are specific to the national program and/or project. The Region applies national program data review guidance where it exists, including Superfund Program guidance. The Region applies region-specific review criteria and actions described in the following Section to supplement national program data review guidance (e.g. Superfund NFGs). **Where noted, Regional data review criteria and actions supersede Superfund NFG procedures for data review.** Refer to Chapter 3 Tiered Superfund Organic and Inorganic Data Review for specific guidance.

Chapter 2
Regional Superfund Data Review Procedures

2.1 Introduction

Except where noted in this Chapter the Region adopts USEPA Contract Laboratory Program (CLP) NFG review criteria and actions for organic and inorganic chemical Superfund data as described in the most recent guidance available at: http://epa.gov/superfund/programs/clp/guidance.htm. The NFG should be followed, as applicable, for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) data generated through national contracts and by non-CLP (e.g., Potential Responsible Party (PRP)) laboratories.

In addition, the Region adopts the *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (7). This guidance provides consistent terminology and ensures that EPA decision makers can readily determine the data review procedures that have been applied to laboratory analytical data regardless of the region, program office, or contractor providing the review.

2.2 Manual versus Automated Data Review

The Region uses both manual and automated data review procedures. Data generated by non-CLP laboratories may be reviewed manually or with automated procedures using commercially available data review software programs that apply NFG criteria and actions, as applicable. Data review procedures applied to non-CLP data, including review criteria, actions and qualifiers, must be documented in the generic program or project specific QAPP. Reviewers of non-CLP data should document their review on manually generated worksheets/checklists or electronically generated data review reports as appropriate, and then generate a Data Review Report utilizing the format described in Section 2.3.

2.2.1 Automated Data Review of CLP Data and Associated EXES Reports

Data generated through national contracts (i.e., CLP) that produce Staged Electronic Data Deliverable (SEDD) formats will undergo automated data review and qualification by the Superfund national program office (NPO) based on the NFG criteria. Automated review generates Electronic Data Exchange and Evaluation System (EXES) Reports that electronically document the data review process for calibration and QC sample checks. EXES Reports should be used to the extent possible for the review of CLP data.

EXES Reports may be accessed through the SMO Portal at https://epasmoweb.fedcsc.com. First time users will need to register for access which may take 24-48 hours. For assistance with registering or general questions contact the Contract Laboratory Program Support Services (CLPSS) Help Desk either by email at CLPSSHelpDesk@fedcsc.com or by telephone M-F, 9-5 ET at (703)818-4200.

2.2.2 Exceptions to Automated EXES Review Requiring Additional Manual Review

There are several types of QC samples and review criteria that are either not addressed in the EXES review or not adequately addressed. These parameters must be evaluated manually to meet EPA NE requirements, depending on the DQOs. Tier levels of data review are specified in Section 3. They include the following and are addressed in the sections indicated:

- Field Blanks (Section 2.5 and 2.6)
- Performance Evaluation Samples (Section 2.7)
- Field Duplicates (Sections 2.8 and 2.9)
- Percent Solids in Sediment and Soil Samples (Section 2.10)
- Pesticide and Aroclor Clean-up Procedures (Section 2.11)
- Organic Matrix Spike/Matrix Spike Duplicate (Section 2.12)

Tables 2-1, 2-2 and 2-3 provide summaries of region-specific guidance for data review.

2.2.2.1 Manual Review when Professional Judgment is Specified

When the NFG qualification procedures specify professional judgment, the reviewer must manually evaluate the data to determine whether to accept, estimate (J, UJ) or reject (R) sample results. Reviewers should always document the qualification rationale on the associated worksheet/checklist or EXES Report.

2.2.2.2 Manual Review for CLP Modified Analyses

Manual review and data qualification may be necessary for some CLP Modified Analyses (MAs), depending on the specific modification. Generally, EXES performs all applicable checks for additional MA analytes as it does for the routine CLP target analytes, with the modified analysis requirements supplementing the SOW requirements. For example, MAs with adjusted CRQLs, EXES review procedures evaluate against the modified CRQLs. It is recommended to compare a percentage of the EXES and hard copy results.

Note: Wipe sample analyses require manual review of the calculations/final results as much of the data are not captured in EXES.

2.2.2.3 Manual Review for Laboratory Resubmittals

When resubmittals are part of the data review process, the original automated EXES Reports may not be accurate. In this situation, the reviewer must manually qualify the sample results based on the resubmitted data. The reviewer should use professional judgment, based on the extent of resubmissions, to determine whether or not the entire data set should be re-uploaded to regenerate new EXES Reports. The reviewer may request regenerated EXES Reports at: CCSsupport@fedcsc.com and copy the EPA NE Data Review (DR) Chemist on the request (Refer to Attachment 2-2). It should be noted that regenerating the reports will eliminate any edits, manual and electronic, that may have been made previously through the EXES Data Manager.

Table 2-1: Summary of Regional Review Criteria, Evaluation and Actions for Superfund Data – Trace VOA, Low/Medium VOA, SVOA, Pesticides and Aroclors
(Trace VOA and Low/Medium VOA/SVOA by GC/MS, Pesticides and Aroclors by GC/ECD)

Evaluation Parameter	Tier 1 Organic Data Review Qualification	Tier 1 Plus & Tier 2 Organic Data Review Qualification			
		Trace VOA	VOA/SV	Pesticides	Aroclors
Data Review Report	Section 2.3[2]	Section 2.3[2]			
Data Completeness	Section 2.4[2]	Section 2.4[2]			
Preservation and Technical Holding Times	NFG[1]	NFG[1]			
Instrument Performance Check/ Instrument Stability	NFG[1]	NFG[1]			
Initial and Continuing Calibrations	NFG[1]	NFG[1]			
Blanks	NFG[1] Only includes qualification of data based on Laboratory Blank results	NFG[1] & Section 2.5[2] Includes Manual data review of Equipment, Trip and Bottle blank results			
Surrogates/DMCs	NFG[1]	NFG[1]			
Matrix Spike and Matrix Spike Duplicate Samples	NFG[1]	NFG[1] & Section 2.12[2]			
PE Samples	Data not qualified based on PES score results*	Section 2.7[2]			
Field Duplicates and Replicates and Oversight Split Samples	Data not qualified based on field duplicate precision	Section 2.8[2]			
Internal Standards	NFG[1]	NFG[1]			
Target Analyte Identification	NFG[1]	NFG[1]			
Target Analyte Quantitation[3] and SQLs	NFG[1]	NFG[1]			
% Solids	Data not qualified based on % Solids	Section 2.10[2]			
TICs	NFG[1]	NFG[1]		NA	NA
Laboratory Control Samples	NFG[1]	NA	NA	NFG[1]	NFG[1]

System Performance		NFG[1]	NFG[1]			
GC/MS Confirmation		NFG[1]	NA	NA	NFG[1]	NFG[1]
Clean up Procedures	Florisil	NFG[1]	NA	NA	NFG[1]	NA
	Gel Permeation	NFG[1]	NA	NFG[1]	NFG[1]	NFG[1]
	Sulfur Removal	NFG[1]	NA	NA	Section 2.11[2]	Section 2.11[2]

*If PES Score Results indicate accuracy issues, the reviewer should contact the project manager.

[1] USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008, OSWER 9240.1-48, USEPA-540-R-08-01 (12).

[2] *EPA NE Environmental Data Review Supplement*, Chapter 2 Sections, as indicated in the table.

[3] When multiple analyses, reruns, re-extractions, and dilutions, are performed on a sample, the reviewer should use professional judgment to determine which results to report and clearly identify the analyses with a footnote on the Data Summary Table.

NA – Not Applicable

Table 2-2: Summary of Regional Review Criteria, Evaluation and Actions for Superfund Data – Inorganics

(Metals by ICP-AES and ICP-MS, Mercury by CVAA, and Cyanide by Spectrophotometry)

Evaluation Parameter	Tier 1 Inorganic Data Review Qualification	Tier 1 Plus & Tier 2 Inorganic Data Review Qualification
Data Review Report	Section 2.3[2]	Section 2.3[2]
Completeness	Section 2.4[2]	Section 2.4[2]
Preservation and Holding Times	NFG[1]	NFG[1]
ICP-MS Tune Analysis	NFG[1]	NFG[1]
Calibration	NFG[1]	NFG[1]
Blanks	NFG[1] Only includes qualification of data based on Laboratory Blank results	NFG[1] & Section 2.6[2] Includes Manual data review of Equipment, Trip and Bottle blank results
ICP Interference Check Sample (ICS)	NFG[1]	NFG[1]
Laboratory Control Sample	NFG[1]	NFG[1]
Duplicate Sample Analysis	NFG[1]	NFG[1]
Field Duplicates, Replicates and Split Sampling Oversight	Data not qualified based on field duplicate precision	Section 2.9[2]
Spike Sample Analysis	NFG[1]	NFG[1]
ICP Serial Dilution	NFG[1]	NFG[1]
ICP-MS Internal Standards (IS)	NFG[1]	NFG[1]
PE Samples	Data not qualified based on PES score results*	Section 2.7[2]
Percent Solids	Data not qualified based on % Solids	Section 2.10[2]

*If PES Score Results indicate accuracy issues, the reviewer should contact the project manager.

[1] USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010, OSWER 9240.1-51, USEPA-540-R-10-011 (13).

[2] *EPA NE Environmental Data Review Supplement*, Chapter 2 Sections, as indicated in the table.

Table 2-3: Summary of Regional Review Criteria, Evaluation and Actions for Superfund Data – Dioxins/Furans and PCB Congeners and Total Homologues by HRGC/HRMS

Evaluation Parameter	Tier 2 Data Review	
	Dioxins/Furans	PCB Congeners/ Total Homologues
Data Review Report	Section 2.3[2]	Section 2.3[2]
Data Completeness	Section 2.4[2]	Section 2.4[2]
Holding Times, Storage, and Preservation	NFG[1]	NFG[1]
PE Samples	Section 2.7[2]	Section 2.7[2]
System Performance Checks	NFG[1]	TBD
High Resolution GC/High Resolution MS Initial Calibration	NFG[1]	TBD
HRGC/HRMS Calibration Verification	NFG[1]	TBD
Method Blank Analysis	NFG[1] & Section 2.5[2]	TBD & Section 2.5[2]
LCS Analysis	NFG[1]	TBD
Sample Dilution	NFG[1]	TBD
Identification Criteria	NFG[1]	TBD
Compound Quantitation	NFG[1]	TBD
Second Column Confirmation and Isomer Specificity	NFG[1]	TBD
Toxicity Equivalent Quantity Determination	NFG[1]	TBD
Estimated Detection Limit (EDL) and Estimated Maximum Possible Concentration (EMPC)	NFG[1]	TBD
Labeled Compound Recoveries	NFG[1]	TBD
Field Duplicates and Replicates and Oversight Split Samples	Section 2.8[2]	Section 2.8[2]
% Solids	Section 2.10[2]	Section 2.10[2]
Overall Assessment of Data	NFG[1]	TBD

TBD = To be determined pending NPO guidance development.
[1]USEPA CLP National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs), September 2011, OSWER 9240.1-53, USEPA-540-R-11-016 (14).
[2] *EPA NE Environmental Data Review Supplement*, Chapter 2 Sections, as indicated in the table.

2.3 Data Review Reporting Guidance

2.3.1 Objective

Data review results must be reported using a standardized format to ensure consistent and accurate reporting for data users. A streamlined approach for reporting Superfund data has been developed and supersedes previous formats.

2.3.2 Data Review Report Format

Both automated and manual review processes use the streamlined data reporting format. The reporting procedure includes a "one page" Data Review Report with attachments (Refer to Section 2.3.2.2).

2.3.2.1 "One Page" Data Review Report

- Only <u>one</u> SDG, or group of samples, is documented in each report.

- The "one page" Data Review Report is formatted as a letter addressed and sent to the end user. The report contents are described below.

- The subject heading must include: the contractor Work Assignment (WA) or Task Order (TO) number, the case number and Sample Delivery Group (SDG) number, the laboratory name and location, the site name and location, the associated data validation Stage Level and Regional Tier level of Review (Refer to Chapter 3), the parameters evaluated, the total number of samples per matrix per parameter (parenthetically identify the field duplicates), the sample matrix and field sample numbers analyzed for each parameter, the parameter, matrix and sample number for each type of blank, and the parameter, matrix, and sample number for each PES. See the following example report included as Attachment 2-2.

- The first paragraph must include the name of the Field Sampling Contractor (FSC) , the reference information for the data review procedures, the title of the QAPP and/or SAP, or other project planning document, and the associated analytical method(s) and/or laboratory SOP(s).

- The second paragraph must list the QC parameters (checks) that were evaluated through review. QC parameters that met criteria should be asterisked (*) in the left hand margin of the parameter name. Similarly, QC parameters that were not applicable to the analytical methods should be noted with N/A (not applicable) in the left hand margin of the parameter name.

- Following the list of QC parameters the reviewer should indicate whether or not: 1) electronic data review reports were reviewed with notations for review findings documented, 2) data review worksheets/checklists were generated for a manual review of the data, or 3) a combination of electronic reports and

worksheets/checklists were used depending on the project objectives which may result in automated and manual data review procedures.

- The next paragraph is titled Overall Evaluation of Data and Potential Usability Issues.

  - The first element in this section is a list of the DQOs from the QAPP, SAP or other project planning document.
  - Following the list of objectives, include a statement listing the PESs and a brief summary of the score results, particularly the outliers.
  - Following the PES discussion, include a statement indicating the overall quality of the data. Include statements such as "*Data review indicated minor data quality problems"* or "*Data review indicated major data quality problems"*.
  - This introductory statement is then followed by a brief description of the elements which establish the basis for the statement. Expected statements include: "*All iron results were qualified due to method blank contamination"* or "*Acetone results were qualified due to an inaccurate calibration".* Items included in this paragraph identify and summarize qualification on the Data Summary Tables which impact usability. This explanation provides an overview of data usability which combines analyte-specific statements and usability assessment. The descriptions should be listed by analytical parameter (i.e., Trace Volatiles, Semivolatiles, etc.; or ICP-AES, Mercury, etc.) Rejected results or technical decisions based on professional judgment to reject results should be included here.
  - The last sentence in the paragraph must indicate whether or not the results are usable for the site objectives. If the data are not usable, include the rationale and notify the end user immediately.

2.3.2.2 Data Review Report Attachments

Attachments to the data review report include:

1. **Data Summary Tables (Data Spreadsheets)**
   Data Summary Tables (typically in spreadsheet format) include the results and qualifiers for the field samples. Sample results are displayed side by side which facilitates review by the end user. Qualifier footnotes must be provided for significant and multiple qualifiers which impact data usability. The qualifier footnotes must clearly identify the reason for qualification.

2. **Data Review Documentation**
   The rationale for qualifying data must be documented in attachments to the Data Review Report. Data review must demonstrate that sample results have been assessed against evaluation parameters specific to the analytical method (e.g., Tables

2-1, 2-2, 2-3). Reviewers must ensure that method and review criteria are current, accurate and documented.

Various tools can be used to document data review; automated electronic reports such as EXES Reports, worksheets, checklists or other method-specific formats. EXES Reports should be used and attached to the Data Review Report whenever available. When manual review is performed, data review worksheets, checklists or an alternate recording format must be generated by the reviewing organization to document data anomalies, rationale and decisions for data qualification. (Refer to Attachment 2-3 for example data review worksheets.) Depending on the data review procedures, a combination of electronic reports, worksheets, checklists or alternate recording format may be provided as applicable.

3. **Support Documentation**
   Support documentation includes records of communication between the data reviewer and the lab or the reviewer and the sampler (email messages and/or telephone logs); field notes; PES Scoring Evaluation Report (hereafter PES Score Report); and a copy of the CSF Audit (DC-2) Form as applicable.

2.3.3 Distribution and Archival of Data Review Documentation

2.3.3.1 Hardcopy Report

When complete the Data Review Report is signed by the reviewer and submitted to the site manager. **Note:** Only the site manager receives the complete report including EXES Reports and/or worksheets and supporting documentation. These complete Data Review Reports are maintained in the Federal Records Center as applicable.

2.3.3.2 Electronic Reporting

A portable document format (.pdf) copy of the Data Review Report, including the one-page report and data summary table(s), is e-mailed to the EPA NE Data Review Chemist (Refer to Attachment 2-1 for contact information).

Another .pdf copy of the Data Review Report and the PES score results is e-mailed to the laboratory's CLP Project Officer (PO). A distribution list will be periodically provided by EPA.

2.4 Complete Sample Delivery Group File Completeness Review Guidance

The *Region I CSF Completeness Evidence Audit Program* July 1991 has expired and is replaced by guidance in this Section. CSF completeness checks are conducted to ensure that laboratory documentation will be sufficient to assess and verify the quality of the data in terms of project objectives.

2.4.1 Complete Sample Delivery Group File (CSF)

The CSF consists of the original Sample Delivery Group (SDG) Package generated by the contract laboratory and all other related documentation including but not limited to original shipping documents, CLP DC-1 Form, and communication records (e.g., e-mails, telephone logs). The laboratory assembles the CSF and completes the CSF Inventory Sheet (DC-2 Form**)** to index all documents submitted. The laboratory submits the CSF, including the completed DC-2 Form, directly to the Region. The Organic, SOM01.2, and Inorganic, ISM01.3, DC-1 and DC-2 Forms are provided at:

- SOM01.2 at http://www.epa.gov/superfund/programs/clp/download/som/som11a-c.pdf, pages 187-194 for SOM01.2
- ISM01.3 at http://www.epa.gov/superfund/programs/clp/download/ism/ism12a-c.pdf, pages 77-79 for ISM01.3

2.4.2 Regional CSF Tracking Procedure

The CSF is received by the Regional Sample Control Center (RSCC) from the laboratory under custody. Signed and dated custody seals are affixed to the CSF whenever it is transferred by the RSCC. The CSF is considered transferred whenever it changes location upon shipment or hand-delivery; for example, when the CSF is shipped from the laboratory to the RSCC or from the RSCC to the FSC. The FSC is responsible for tracking the CSF when CLP data packages are transferred for data review.

The CSF Tracking Procedure is initiated when the CSF is received at the RSCC by the Sample Control Coordinator (SCC). The SCC initiates the EPA NE Receipt/Transfer Form (Figure 2-1) which remains with the CSF to record transfer. The Form is not intended as a COC record; rather it provides internal tracking information for the RSCC. The original is sent with the CSF to the FSC and a copy is kept by the RSCC for approximately 2 months. The procedure includes the following steps:

1. Inspect the unopened CSF shipment. Determine if custody seals are present or absent. If present, determine whether custody seals are intact or broken.

2. Open the CSF shipment and complete the Receipt/Transfer Form. The case and SDG numbers are completed by the SCC.
    a) Receipt Date - Enter the date that the CSF was received;
    b) Received By - Enter the name and initials of the receiver who opened the CSF, and list the affiliation, i.e., RSCC, name of FSC, ESAT;

c) CSF Activity - List the CSF activity. For example, the SCC will list the activity as "CSF Receipt".
d) Custody Seals - Indicate whether the custody seals were present and intact; and,
e) Released - If the CSF must be transferred to a new location, identify the organization the package will be released to and the date of release, i.e., shipment date or hand-delivery date.

3. When the CSF is received by an individual or organization, it is anticipated that internal tracking procedures/organizational document control procedures are implemented via the documented procedures that have been established and that the CSF is submitted to the EPA when the activities are complete or at the end of the contract.

Figure 2-1: EPA NE CSF RECEIPT/TRANSFER FORM

Case: _____ SDG #: _____

Receipt Date	Received By: Name Affiliation	Initials		CSF Activity	Custody Seals Present/Intact	Released: To	Date
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		
					Y N Y N		

2.4.3 Tracking Laboratory Resubmittals

2.4.3.1 Hardcopy Resubmittals

All hardcopy laboratory resubmittals requested during the completeness check are shipped under custody seal to either the RSCC or directly to the responsible FS contractor.

When the laboratory sends resubmittals to the RSCC, a Receipt/Transfer Form will be initiated by the SCC. The resubmittals and Receipt/Transfer Form will be shipped to the FSC. The FSC will complete the appropriate section of the Receipt/Transfer Form and indicate the "CSF Activity" as "Resubmittals".

When the laboratory sends hardcopy resubmittals directly to the FSC, the FSC is responsible for documenting the receipt of resubmittals and following organizational document control procedures to ensure that the proper version of the resubmittal is used for data review (alternatively the EPA Receipt/Transfer Form may be used).

If the FSC receives resubmittals from both the laboratory and the RSCC, the FSC is responsible for verifying that the resubmittals received from the RSCC are the same as those received directly from the laboratory. The FSC may then discard and recycle the set of resubmittals received from the RSCC. If the two sets of resubmittals are not the same, the FSC should contact the laboratory to determine which set of resubmittals is correct.

Upon receipt of hardcopy resubmittals, the reviewer should document receipt and follow organizational document control procedures. All laboratory resubmittals should be maintained with the CSF.

2.4.3.2 Electronic Resubmittals

Electronic resubmittals may consist of electronic media such as a CD or documents attached to an e-mail. Upon receipt of electronic resubmittals from the laboratory (e.g., corrected data reports or additional raw data), the reviewer should document their receipt and follow document control procedures required by their organization to ensure the proper version of the resubmittal is used for data review. All laboratory electronic resubmittals (if originals are not provided) should be maintained with the CSF. Documents received as e-mail attachments should be printed and maintained with the CSF.

2.4.4 CSF Completeness Review Procedure

Data reviewers verify that all documents are present as indicated by the laboratory on the DC-2 Form and that all pages in the CSF are accounted for on the DC-2 Form. EPA FSCs are responsible for conducting the completeness review on data packages they receive.

The reviewer documents the completeness review on the original signed DC-2 Form. The reviewer should annotate the DC-2 Form to indicate that the completeness check is conducted "For" EPA or "For the" Region. When laboratory resubmittals are received, perform the completeness check for the resubmitted sections using only the re-submitted DC-2 Form. The reviewer should generate e-mail and/or telephone communication logs whenever the laboratory is contacted for resubmittals or clarification. Copies of all communication records should be included in the Data Review Report Support Documentation.

Complete the following steps and document findings on the DC-2 Form. If the DC-2 Form is not included with the CSF, contact the laboratory by e-mail or telephone for submission of the DC-2 Form and document the communication. (Resubmittal of just the DC-2 Form is not required to be maintained under custody.) Note: Whenever a CLP laboratory is contacted for resubmittals, the EPA NE RSCC must be copied on the request. Only the lead EPA FSC or their designated backup may contact the CLP laboratory and only after receipt of the data package. The FSC must not request reanalyses directly from the laboratory; reanalysis requests must be submitted to the R1 RSCC.

1. Review the documents in the CSF. Compare the document page numbers to the page numbers listed on the DC-2 Form. Ensure that all documents are accounted for and legible. If extra pages were included with the CSF but were not listed on the DC-2 Form, or if page numbers listed on the DC-2 Form were incorrect, request a corrected DC-2 Form. Generate a communication record (i.e., e-mail or telephone log).

2. If the documents are present and legible, place a check in the EPA column for those items. If any pages are missing, inaccurate, or illegible, do not put a check in the EPA column. Request resubmittal of the pages from the laboratory and complete a communication record.

3. Confirm that the traffic report is present. If "no", leave the EPA column blank, request resubmittal of the pages from the laboratory, and complete a communication record. Check whether the traffic report was signed and dated. If "yes", place a check in the EPA column. If "no", leave EPA column blank and indicate the non-compliance on the DC-2 Form. Do not request a laboratory resubmittal of the traffic report if it was present but not signed or dated.

4. Verify that airbills, sample tags, the DC-1 Form, the SDG cover sheet and miscellaneous shipping/receiving records are present. If "no", leave the EPA column blank, request resubmittals from the laboratory, and complete a communication record. Check whether the airbills, chain of custody records and SDG cover sheets were signed and dated. If "yes", place a check in the "For" EPA/Region column. If "no", leave the EPA column blank and indicate the noncompliance directly on the DC-2 Form. Do not request

laboratory resubmittals of these documents if they were present but not signed and dated. Check whether the sample log-in sheet/ DC-1 Form is complete and accurate. If "yes", place a check in the EPA column. If "no", leave the EPA column blank and indicate the non-compliance directly on the DC-2 Form. Do not request laboratory resubmittals of these documents if they were present but not complete or accurate.

5. Confirm that laboratory documentation is present. This includes miscellaneous shipping/receiving records, communication records, internal laboratory sample transfer/tracking sheets, screening records, and all instrument output, including strip charts from screening activities, and sample preparation and analysis records. **Confirm that EPA sample numbers, SDG numbers, and Case numbers are correctly referenced on the documents submitted by the laboratory**. If "yes", place a check in the EPA columns. If "no", leave the EPA columns blank, request that the laboratory resubmit the correct documents and record the communication.

6. For additional documents listed, confirm that EPA sample numbers, SDG numbers, and Case numbers are correctly referenced on all documents submitted by the laboratory. If "yes", place a check in the EPA columns. If "no", leave EPA columns blank, request that the laboratory resubmit the correct documents, and complete a communication record.

7. The reviewer signs the "Audited by" section at the bottom of each DC-2 Form. The reviewer's printed name, title, and date is also completed. In addition, the reviewer should indicate their company name/contract below the "Printed Name/Title" line.

8. **When requested resubmittals and a revised DC-2 Form are received from the laboratory, document the completeness review on the revised DC-2 Form.** The original DC-2 Form should not be used to record the receipt of resubmittals.

2.5 Organic – Blank Contamination Data Review Guidance

All blank sample results should be evaluated manually for contamination in accordance with the most recent NFG blank criteria. **Note:** This represents a change from previous EPA NE data validation guidance which included the application of a "5x or 10x" rule in accepting, qualifying or rejecting sample results based on blank contamination.

Apply the NFG criteria and actions based on the highest blank contamination associated with the samples. PES contamination is not used to qualify data.

- In determining the highest blank contamination, evaluate all blanks including method, clean-up, instrument, storage, bottle, trip and equipment rinsate blanks.

- If the blank action for an analyte is determined using the concentration from an equipment, trip or bottle blank, then the positive values in the equipment, trip or bottle blank should be reported unqualified on the Data Summary Tables. However, if the blank action is determined from a laboratory blank (e.g., method, clean-up, storage, or instrument blank), then the positive values in the equipment, trip or bottle blanks should be qualified.

- For aqueous equipment, trip and bottle blanks, if an analyte is present in the non-aqueous sample and is also present in the associated aqueous equipment blank, trip blank or bottle blank, then flag that sample result as EB, TB, or BB, respectively, to indicate to the end user that an indeterminate amount of sampling error has potentially impacted the sample results.

2.6 Inorganic – Blank Contamination Data Review Guidance

All blank sample results should be evaluated manually for contamination in accordance with the most recent NFG blank criteria. **Note:** This represents a change from previous EPA NE data validation guidance which recommended the application of a 5x rule in accepting, qualifying or rejecting sample results based on blank contamination.

Apply the NFG criteria and actions based on the highest blank contamination associated with each sample. PES contamination is not used to qualify data.

- In determining the highest blank contamination, evaluate all blanks including preparation/method, calibration/instrument, bottle, and equipment rinsate blanks.

- Initial and continuing calibration blank contamination within an analytical sequence applies to all samples analyzed in that sequence. Use professional judgment to apply contamination only to a specific subset of samples.

- If the blank action for an analyte is determined using the concentration from an equipment or bottle blank, then the positive values in the equipment or bottle blank should be reported unqualified on the Data Summary Tables. However, if the blank action is determined from a laboratory blank (e.g., preparation or calibration blank), then the positive values in the equipment and bottle blanks should be qualified.

- For aqueous equipment and bottle blanks, if an analyte is present in the non-aqueous sample and is also present in the associated aqueous equipment blank or bottle blank, then flag that sample result as EB or BB, respectively, to indicate to the end user that an indeterminate amount of sampling error has potentially impacted the sample results.

2.7 Performance Evaluation Sample Data Review Guidance

2.7.1 Objective

Performance Evaluation Samples (PESs) are analyzed with a set of environmental samples to provide information on the overall accuracy and bias of the analytical method and laboratory performance. EPA NE operates a PES Program, described in Chapter 4, for the Superfund Program, through the OEME QA Unit. PESs are evaluated for false negatives, false positives, and target analyte quantitation. In general, the most serious problem a PES can expose is the failure of the laboratory to properly detect and identify a PES analyte. This failure is known as a false negative. False negatives significantly increase the "uncertainty" surrounding site decisions made concerning the "cleanliness" or contamination present at a site. Another problem revealed by PES analysis is the laboratory's erroneous detection of target and non-target analytes that were not spiked into the PES, otherwise known as false positives. False positives should always be evaluated in conjunction with blank data to ascertain the probable source(s) of contamination.

The PES results may provide information on the magnitude and direction of quantitative bias for the analytical method, including sample preparation and analysis. Sample data that are biased high or low can impact site decisions, especially when field sample results are at or near project action levels.

Ideally, the PES matrix is the same as the field samples being evaluated. However, for some matrices, PESs may not be available. In these situations, a PES of a dissimilar matrix may be analyzed with the field samples to assess laboratory performance on the analysis; however, when using a dissimilar matrix PES, sample preparation cannot be assessed. The reviewer should use professional judgment when evaluating samples with a dissimilar matrix PES.

2.7.2 Criteria

PESs obtained through the National Superfund PES Program are typically single blind samples; a quality control sample that is identified to the laboratory as a PES, but the composition and concentration are not known to the laboratory. In accordance with regional procedures, a PES should be sent with each batch of samples/SDG (20 samples or less) of the same or similar matrix (aqueous or solid) submitted to a laboratory. A PES should be submitted to the laboratory and analyzed for each matrix, parameter, and concentration level of environmental samples, unless an EPA or non-EPA PES (commercially available) does not exist for the particular matrix, parameter, or concentration level.

Sample results for EPA Superfund PESs are submitted by the FSC or EPA Field Sampling Personnel to the QA Unit for scoring at the time of data package receipt. PES results must meet statistically-derived acceptance limits.

For non-EPA PESs, true values and acceptance criteria should be provided by the manufacturer, and these acceptance criteria should be scientifically defensible and fully documented. PES results must meet statistically-derived acceptance limits.

2.7.3 Evaluation and Action – EPA Superfund PES

2.7.3.1 Verify that an appropriate PES (correct matrix, parameter, and concentration level) is analyzed at the required frequency for each SDG in accordance with Chapter 4, the Performance Evaluation Sample (PES) Program, and/or the EPA-approved SAP and/or QAPP. Appropriateness can be determined by consulting the *U.S. EPA Superfund PES Catalog* and the PES Score Report.

a. If a required PES was not analyzed at the required frequency for the correct matrix, parameter, or concentration level, then the reviewer should use professional judgment to determine if the sample data should be accepted, qualified or rejected.

b. If the PES results were not submitted with the data package, then the reviewer should contact the laboratory to obtain the PES raw data and/or tabulated results. If a PES was not submitted to the laboratory by the sampler, then the reviewer should contact the sampler to confirm the omission and document the omission in the Data Review Report.

2.7.3.2 Evaluate the PES Score Report to determine how many of the analytes meet or exceed PES acceptance criteria.

a. Do not report PES results on the Data Summary Table; rather, attach the PES Score Report to the Data Review Report Support Documentation.

2.7.3.3 Evaluate each PES "Analyte Missed" to assess the potential for low bias and false negative sample results. Sample data should be qualified based on "Analyte Missed" reported on the PES Score Report. If a PES analyte is not identified in the PES, then the reviewer should;

a. Estimate (J-) positive detects for the affected analyte in all samples associated with the PES to indicate potential low bias.

b. Reject (R) non-detects for the affected analyte in all samples associated with the PES to indicate that the data are unusable due to possible false negatives.

Based upon the chemical class, number of analytes that were not identified, and a review of the data objectives, the reviewer should use professional judgment to determine if all data generated by a particular method are unusable and, therefore, should be rejected. Rejected data should be returned to the laboratory and payment should be denied.

2.7.3.4 Evaluate each PES "Contaminant" (and "TIC Contaminant" for Organics) in conjunction with blank data to assess the potential for high bias and false positive sample results. Sample data should not be qualified based on the number of PES "Contaminants" identified on the PES Score Report <u>alone.</u>

a. If a PES "Contaminant" is detected in the PES and is also found in a blank, then the reviewer should evaluate and qualify sample data based on blank contamination.

b. If a PES "Contaminant" is detected in the PES but is not present in any blank, then that interference may be specific to the PES and no action should be taken.

2.7.3.5 Evaluate the PES results that were mis-quantified ("Action High"/"Action Low") to assess the potential for high and/or low bias in sample data. Sample data should be qualified based on the number and type of mis-quantified PES analytes ("Action High"/"Action Low") identified on the PES Score Report. **Sample data should not be qualified based on "Warning Low"/"Warning High" scores for PES analytes.**

a. If a PES analyte is scored "Action High", then the reviewer should:

- Estimate (J+) positive detects for the analyte in all samples associated with that PES to indicate potential high bias.

- Accept the quantitation limits for the analyte in all associated samples.

b. If a PES analyte is scored "Action Low", then the reviewer should:

- Estimate (J-) positive detects for the analyte in all samples associated with the PES to indicate potential low bias.

- Reject (R) the quantitation limits for the analyte in all associated samples to indicate that the data are unusable due to the possibility of false negatives.

c. If more than half of the PES analytes for a PES analyzed by a particular method are scored "Action High", then the reviewer should:

- Estimate (J+) <u>all</u> positive detects for all samples associated with the PES to indicate potential high bias.

- Accept <u>all</u> quantitation limits for non-detects in all samples associated with the PES.

d. If more than half of the PES analytes for a PES analyzed by a particular method are scored "Action Low", then the reviewer should:

- Estimate (J-) <u>all</u> positive detects in all samples associated with the PES to indicate potential low bias.

- Reject (R) the quantitation limits for <u>all</u> non-detects in all samples associated with the PES to indicate that the data are unusable due to the possibility of false negatives.

e. If more than half of the PES analytes for a particular method are scored "Action ___" in a PES, where some recoveries are "Action Low" and some recoveries are

"Action High", then the reviewer should use professional judgment to qualify or reject a particular analyte or all the analytes for samples associated with the PES.

f. Based upon the number of analytes mis-quantified and mis-identified and a review of the data objectives, the reviewer should use professional judgment to determine if the data set for an entire fraction or parameter is unusable and, therefore, should be rejected. Rejected data should be returned to the laboratory and non-payment should be considered.

2.7.3.6 For organic PES GC/MS results, evaluate "Non-spiked TIC" and "TIC MISSED" scores and qualify sample data accordingly. If TIC identification is required by the method or data objectives, then the reviewer should use:

- Professional judgment to accept, qualify or reject sample data based on "Non-spiked TIC" and "TIC MISSED" scores.

2.7.4 Evaluation and Action - Non-EPA PES

2.7.4.1 If the PES was obtained commercially, then the reviewer should use the vendor's criteria to evaluate the PES results. Confirm that PES acceptance criteria are documented and scientifically defensible (i.e., vendor's acceptance limits represent 99% confidence intervals) and the criteria are included in the QAPP, if possible.

2.7.4.2 If the non-EPA PES acceptance criteria are not documented and/or scientifically defensible, then the reviewer should use professional judgment to qualify or reject sample data based on PES results.

2.7.4.3 Evaluate the PES analytes "missed" (present but not reported) to assess the potential for low bias and false negative sample results. Sample data should be qualified based on the PES analytes "missed" according to the vendor's acceptance criteria. If a PES analyte is not identified in the PES, then the reviewer should:

a. Estimate (J-) positive detects for the affected analyte in all samples associated with the PES to indicate potential low bias.

b. Reject (R) non-detects for the affected analyte in all samples associated with that PES to indicate that the data are unusable due to possible false negatives.

c. Based upon the number of analytes that were not identified and a review of the data objectives, the reviewer should use professional judgment to determine if all data generated by a particular method are unusable and, therefore, should be rejected. Rejected data should be returned to the laboratory and payment denied.

2.7.4.4 Evaluate the PES contaminants (reported but not spiked into PES) in conjunction with blank data to assess the potential for high bias and false positive sample results. Sample data should not be qualified based solely on the number of PES contaminants identified from the vendor's acceptance limits.

a. If a PES contaminant is detected in the PES and is also found in a blank, then the reviewer should evaluate and qualify sample data based upon blank contamination.

b. If a PES contaminant is detected in the PES but is not present in any blank, then that interference may be specific to the PES and no action should be taken.

2.7.4.5 Evaluate the PES analytes reported that were mis-quantified to assess the potential for high and/or low bias in sample results. When PES results do not meet vendor's PES acceptance limits, then the PES results should be used to qualify sample data for the specific analytes that are included in the PES sample.

a. If a PES analyte recovery is outside the Upper Limit of the vendor's documented acceptance limits (note: the reviewer should confirm that the vendor's acceptance limits represent 99% confidence intervals), then the reviewer should:

- Estimate (J+) positive detects for the affected analyte in all samples associated with the PES to indicate potential high bias.

- Accept non-detects for the affected analyte in all samples associated with the PES.

b. If a PES analyte recovery is outside the Lower Limit of the vendor's documented acceptance limits, then the reviewer should:

- Estimate (J-) positive detects for the affected analyte in all samples associated with the PES to indicate potential low bias.

- Reject (R) non-detects for the affected analyte in all samples associated with the PES to indicate that the data are unusable due to possible false negatives.

c. If more than half of the PES analyte recoveries for a PES analyzed by a particular method are outside the Upper Limit of the vendor's documented acceptance limits, then the reviewer should:

- Estimate (J+) <u>all</u> positive detects for all samples associated with the PES to indicate potential high bias.

- Accept <u>all</u> quantitation limits for non-detects in all samples associated with the PES.

d. If more than half of the PES analyte recoveries for a PES analyzed by a particular method are outside the Lower Limit of the vendor's documented acceptance limits, then the reviewer should:

- Estimate (J-) <u>all</u> positive detects in all samples associated with the PES to

indicate potential low bias.

- Reject (R) the quantitation limits for all non-detects in all associated samples to indicate that the data are unusable due to the possibility of false negatives.

e. If more than half of the PES analyte recoveries for a particular method are outside the vendor's documented acceptance limits in a PES, where some recoveries are low and some are high, then the reviewer should use professional judgment to qualify or reject data for a particular analyte, group of analytes, or the entire fraction for samples associated with the PES.

f. Based on the number of analytes mis-quantified or mis-identified and a review of the data objectives, the reviewer should use professional judgment to determine if the data set for an entire fraction or parameter is unusable and, therefore, should be rejected. Rejected data should be returned to the laboratory and payment denied.

Table 2-4: Qualification of Analytes Based on PES Results

Sample Results	PES < Lower Limit "Action Low" or "Analyte Missed"	PES "Within Limits" "Warning High/Warning Low"	PES > Upper Limit "Action High"
Detects	J-	A	J+
Non-Detects	R	A	A

Note: If more than half of the PES analytes fall within one of the above categories, then professional judgment may be used to apply the action to all analytes in all samples associated with that PES. Professional judgment should be used when PES results have a combination of low and high recoveries of spiked compounds.

2.8 Organic – Field Duplicates, Field Replicates and Oversight Split Sampling Data Review Guidance

2.8.1 Objective

Field duplicates measure the cumulative effects of both field and laboratory precision and thereby provide an indication of overall precision. Duplicate precision is evaluated by calculating a Relative Percent Difference (RPD) in accordance with the *Quality Assurance and Quality Control Environment Data Standard* (19); a lower RPD value demonstrates better precision. Typically, field duplicates have greater variability than laboratory duplicates. It is also expected that non-aqueous matrices will have a greater variance than aqueous matrices due to the heterogeneity of most non-aqueous matrices (e.g., soil and sediment matrices).

Occasionally project objectives require additional precision data. This may include the collection of three or more field replicate samples. Replicate precision is evaluated by calculating the Relative Standard Deviation (RSD), also referred to as the coefficient of variation (CV); a lower value for RSD demonstrates greater precision.

Oversight split sampling may be performed to monitor performance of another organization or contractor. Split sampling analyses are evaluated by calculating a Relative Percent Difference (RPD) similar to duplicates. Note: this equation assumes that values generated by EPA and those values generated by equivalent methods used by the PRP (or other entities) are equally accurate. The RPD calculation is used to assess data comparability.

2.8.2 Criteria

2.8.2.1 The frequency of field duplicate analysis must support the site-specific quality objectives and must be documented in the EPA-approved QAPP or SAP. The following regional criteria for field duplicates are provided as guidance. Site specific criteria may be established and applied as necessary.

Aqueous Organic Field Duplicates - For all analytes detected at concentrations greater than the sample quantitation limit (SQL) in both field duplicate samples of aqueous matrices, the absolute RPD should be less than or equal to 30 percent (RPD $\leq$ 30%).

Non-Aqueous Organic Field Duplicates - For all analytes detected at concentrations greater than or equal to the SQL in both field duplicate samples of non-aqueous matrices, the absolute RPD should be less than or equal to 50 percent (RPD $\leq$ 50%).

2.8.2.2 The frequency and evaluation criteria and actions of field replicate analysis and split sampling analysis must support the site-specific quality objectives and must be documented in the EPA-approved QAPP or SAP.

2.8.3 Evaluation and Actions

All potential impacts on the sample data resulting from field duplicate anomalies should be noted on data review worksheet/checklists. The reviewer should also document and justify all technical

decisions made based on professional judgment on the worksheet/checklists. Technical decisions resulting in rejection of data should also be documented in the Data Review Report.

Action applies only to the affected analyte in the organic duplicate sample pair.

2.8.3.1 Identify the samples which are field duplicates from the Chain-of-Custody Record and/or the Traffic Report. If field duplicates are not listed on the Chain-of-Custody Record or the Traffic Report, then the reviewer should:

- Contact the sampler to ascertain if field duplicates were collected. If the forms were completed incorrectly, or if field duplicates were not collected, then the reviewer should document this in the Data Review Report.

2.8.3.2 Verify that the appropriate number of field duplicates per matrix sampled were collected and analyzed to support project quality objectives. If field duplicates were not collected at the required frequency to support project objectives, then the reviewer should:

- Record the absence of field precision data in the Data Review Report to discuss how the lack of field precision data might potentially increase the uncertainty surrounding site decisions.

2.8.3.3 Aqueous Field Duplicates

a. Calculate the RPD for all analytes detected at concentrations greater than or equal to 2x the SQL in the aqueous field duplicate pair.

   - If any analyte is detected at concentrations greater than or equal to 2x the SQL in both aqueous field duplicate samples and has an absolute RPD greater than 30%, then the reviewer should estimate (J) positive detects for the affected analyte in the duplicate samples.

   - If any analyte is detected at concentrations greater than or equal to the SQL but less than 2x the quantitation limit in both aqueous field duplicate samples and has an absolute RPD greater than 30%, then the reviewer should use professional judgment to accept or estimate (J) the positive detects for the analyte in the duplicate samples considering the increased variability near the SQL.

   - If any analyte has one positive detect that is greater than or equal to 2x the SQL and a duplicate positive detect that is greater than or equal to the SQL but less than twice the SQL, and the absolute RPD exceeds 30%, then the reviewer should use professional judgment to qualify detects for that analyte in the duplicate sample.

b. Do not calculate RPDs in the following situations; use the following guidance to evaluate the aqueous field duplicates:

- If any analyte has a non-detect (or value reported as less than the SQL) and the duplicate has a positive detect that is greater than or equal to 2x the SQL, then the reviewer should estimate (J) the positive detect and (UJ) the non-detect for that analyte.

- If any analyte has a non-detect or a reported value below the SQL and the duplicate has a detect that is greater than or equal to the SQL but less than 2x the SQL, then the reviewer should use professional judgment to qualify the positive detects and non-detects.

- If any analyte is a non-detect or is less than the SQL in both of the field duplicate samples, then no action is taken.

2.8.3.4 Non-Aqueous Field Duplicates

a. Calculate the RPD for all analytes detected at concentrations greater than or equal to the SQL in the non-aqueous field duplicate pair.

   - If any analyte is detected at concentrations greater than or equal to 2x the SQL in both aqueous field duplicate samples and has an absolute RPD greater than 50%, then the reviewer should estimate (J) positive detects for the affected analyte in both samples.

   - If any analyte is detected at concentrations greater than or equal to the SQL but less than 2x the quantitation limit in both non-aqueous field duplicate samples and has an absolute RPD greater than 50%, then the reviewer should used professional judgment to accept, or estimate (J) the positive detects for that analyte taking into consideration the increased variability of data near the SQL.

   - If any analyte has one positive detect that is greater than or equal to 2x the SQL and a duplicate positive detect that is greater than or equal to the SQL but less than twice the SQL, the absolute RPD exceeds 50%, then the reviewer should use professional judgment to qualify detects for that analysis in the duplicate sample.

b. Do not calculate RPDs in the following situations; rather, use the following guidance to evaluate the non-aqueous field duplicates:

   - If any analyte has a non-detect (or value reported as less than the SQL) and the duplicate positive detect that is greater or equal to 2x the SQL, then the reviewer should estimate (J) the positive detect and (UJ) the non-detect for that analyte.

   - If any analyte has a non-detect or a reported value below the SQL and the duplicate has a detect that is greater than or equal to the SQL but less than 2x the SQL, then the reviewer should use professional judgment to qualify the positive detects and non-detects for that analyte

- If any analyte is a non-detect or is less than the SQL in both of the field duplicate samples, then no action is taken.

2.8.3.5 For each duplicate pair, check and recalculate the analytical concentration for at least one positive detect and one SQL (for a diluted sample or soil sample) for each fraction and analytical method. If calculation and/or transcription errors are detected, then the reviewer should:

- Contact the laboratory to evaluate the data accuracy and possible need to re-quantitate and resubmit all corrected raw data and forms. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is accurate. Under these circumstances, the reviewer may determine that the sample data should be qualified or rejected. A discussion of the rationale for data qualification and the qualifiers used should be documented on the worksheets/checklists. Technical decisions resulting in rejection of data should also be documented in the Data Review Report.

2.8.3.6 Evaluate the appropriateness of qualifying the entire data set based on field duplicate results. If field duplicate data indicate poor field precision including sample heterogeneity and/or possible sampling error, then the reviewer should use:

- Professional judgment to qualify data for all samples of the same matrix or the entire data set. The reviewer should discuss on the worksheets/checklists and the Data Review Report the justification for the professional judgment applied.

2.8.3.7 Evaluate field duplicate precision data to assess overall precision and to verify the field sampler's ability to collect representative duplicate samples. Laboratory duplicate sample data should be evaluated to verify the laboratory's ability to generate precise data. Matrix spike data can also be evaluated to identify overall matrix issues. If field duplicate data indicate poor field precision and general sample heterogeneity and/or possible sampling error, then the reviewer should use:

- Professional judgment to qualify data for all analytes in all samples of the same matrix. This problem should be noted on the worksheets/checklists and in the Data Review Report, *Overall Evaluation of Data and Potential Usability Issues* section where the potential impact on the representativeness and usability of the data for project DQOs is documented.

Equation 2-1: Relative Percent Difference

Field duplicate and split sampling analysis precision is evaluated by calculating a Relative Percent Difference (RPD). The following equation from the *EPA Environmental Data Standards* (19) measure of duplicate precision is applied; the lower the RPD value, the greater the precision:

$$d_i = \frac{Y_i - X_i}{(Y_i + X_i)/2} x100$$

Relative Percent Difference (RPD or d_i), where X is the primary value and Y is the duplicate. Note: this equation retains the sign of the difference. Absolute values may be used based on the needs of the project.

Equation 2-2: Relative Standard Deviation

Replicate precision is evaluated by calculating the Relative Standard Deviation (RSD), also referred to as the coefficient of variation (CV), of the samples using the following equation (the smaller the RSD, the greater the precision):

$$\%RSD = \frac{S}{mean} \; x \; 100\%$$

Where,

$$S = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \overline{x})^2}{n-1}}$$

x_i = *each individual value used for calculating the mean*

$\overline{x}$ = *the mean of n values*

n = the total number of values

S=standard deviation

Table 2-5: Qualification of Organic Analytes in Field Duplicates
Situation 1: Positive Detects in Both Field Duplicates

RPD	**Aqueous ≤ 30%** **Non-aqueous ≤ 50%**	**Aqueous > 30%** **Non-aqueous > 50%**		
Sample Results	**Both Duplicates ≥ 2xSQL**	**Both Duplicates ≥ 2 x SQL**	**SQL ≤ Both Duplicate samples concs. < 2 x SQL**	**One sample conc. ≥ 2 x SQL** **SQL ≤ Other sample conc. < 2 x. SQL**
Detects	A	J	Professional Judgment	Professional Judgment
Non-detects	A	NA	NA	NA

Note: Qualification refers to the affected analyte in duplicate sample results only. Professional judgment may be used and rationale provided when applying duplicate actions to all samples of the same matrix within the data set.

Table 2-6: Qualification of Organic Analytes in Field Duplicates
Situation 2: Positive Detect in Only One Field Duplicate Sample[1]

Non-Aqueous Field Duplicate Sample Results		
Sample Results	**One Sample conc. = ND (or value reported as less than the SQL)** **SQL ≤ Other Sample Conc. < 2 x SQL**	**One Sample conc. = ND (or value reported as less than the SQL)** **Other Sample Conc. ≥2x SQL**
Detects	Professional Judgment	J
Non-detects	Professional Judgment	UJ

[1]RPDs should not be determined for duplicate pairs in this situation.

Note: No action is taken when both field duplicate results are positive detects <SQL or non-detects.

2.9 Inorganic – Field Duplicates, Field Replicates and Oversight Split Sampling Data Review Guidance

2.9.1 Objective

Field duplicates measure the cumulative effects of both field and laboratory precision and hence provide an indication of overall precision. Duplicate precision is evaluated by calculating a Relative Percent Difference (RPD) in accordance with the *Quality Assurance and Quality Control Environment Data Standard* (19); a lower value RPD demonstrates better precision. Typically, field duplicates may have greater variability than laboratory duplicates. It is also expected that non-aqueous matrices will have a greater variance than aqueous matrices due to the heterogeneity of most non-aqueous samples (e.g., soil and sediment samples).

Occasionally project needs require additional precision data. This may include the collection of three or more field replicate samples. Replicate precision is evaluated by calculating the Relative Standard Deviation (RSD), also referred to as the coefficient of variation (V); the smaller the RSD the greater the precision.

Oversight split sampling analysis may be performed to monitor performance of another organization or contractor. Split sampling analyses are evaluated by calculating a Relative Percent Difference (RPD) similar to duplicates. **Note:** This equation assumes that values generated by EPA and those values generated by equivalent methods used by the PRP (or other entities) are equally accurate. The RPD calculation is used to assess data comparability.

2.9.2 Criteria

2.9.2.1 The frequency of field duplicate analysis must support the site-specific quality objectives and be documented in the EPA-approved QAPP or SAP. The following regional criteria for field duplicates are provided as guidance. Site specific criteria may be established and applied as necessary.

Aqueous Inorganic Field Duplicates

a. For all analytes detected at concentrations greater than or equal to five times the sample quantitation limit (SQL) in both field duplicate samples of aqueous matrices, the absolute RPD should be less than or equal to 30 percent (RPD $\leq$ 30%).

b. For all analytes detected at concentrations less than five times the SQL in either field duplicate sample of aqueous matrices, the absolute difference between the sample concentrations should be less than or equal to twice the SQL.

Non-Aqueous Inorganic Field Duplicates

a. For all analytes detected at concentrations greater than or equal to five times the SQL in both field duplicate samples of non-aqueous matrices, the absolute RPD must be less than or equal to 50 percent (RPD $\leq$ 50%).

b. For all analytes detected at concentrations less than five times the SQL in either field duplicate sample of non-aqueous matrices, the absolute difference between the sample concentrations must be less than or equal to four times the SQL.

2.9.2.2 The frequency and evaluation criteria and actions of field replicate analysis and split sampling analysis must support the site-specific quality objectives and must be documented in the EPA-approved QAPP or SAP.

2.9.3 Evaluation and Actions

All potential impacts on the sample data resulting from field duplicate anomalies should be noted on data review worksheets/checklists. If technical decisions result in rejection of the data, then the reviewer should also document and justify the technical decisions made based on professional judgment in the Data Review Report.

Action applies to the affected analyte in all inorganic samples of the same matrix prepared and analyzed by the same method.

2.9.3.1 Identify the samples which are field duplicates from the Chain-of-Custody Record and/or the Traffic Report. If field duplicates are not listed on the Chain-of-Custody Record or the Traffic Report, then the reviewer should:

- Contact the sampler to ascertain if field duplicates were collected. If the forms were completed incorrectly, or if field duplicates were not collected, then the reviewer should document this in the Data Review Report.

2.9.3.2 Verify that the appropriate number of field duplicates per matrix sampled were collected and analyzed to support project quality objectives. If field duplicates were not collected at the required frequency to support project objectives, then the reviewer should:

- Record the absence of field precision data in the Data Review Report and discuss how the lack of field precision data might potentially increase uncertainty surrounding site decisions.

2.9.3.3 Aqueous Field Duplicates

a. Calculate the RPD for all analytes detected at concentrations greater than or equal to 5x the SQL in the aqueous field duplicate pair. If any analyte is detected at concentrations greater than or equal to 5x the SQL in both aqueous field duplicate samples and has an absolute RPD greater than 30%, then the reviewer should:

   - Estimate (J) positive detects and estimate (UJ) non-detects for the affected analyte in all samples of the same matrix prepared and analyzed by the same method.

b. Calculate the absolute difference for all analytes detected at concentrations less than

5x the SQL in either one or both of the aqueous field duplicate samples (including the case where one duplicate sample result is a non-detect and the other result is a positive detect). If any analyte is detected at concentrations less than 5x the SQL in either one or both of the aqueous field duplicate samples and the absolute difference is greater than 2x the SQL, then the reviewer should:

- Estimate (J) positive detects and estimate (UJ) non-detects for the affected analyte in all samples of the same matrix prepared and analyzed by the same method.

c. If any analyte is detected at concentrations less than the SQL in both of the field duplicate samples, or if any analyte is a non-detect in both of the field duplicate samples, then no action is taken.

2.9.3.4 Non-Aqueous Field Duplicates

a. Calculate the RPD for all analytes detected at concentrations greater than or equal to 5x the SQL in both non-aqueous field duplicates. If any analyte is detected at concentrations greater than or equal to 5x the SQL in both non-aqueous field duplicate samples and has an absolute RPD greater than 50%, then the reviewer should:

- Estimate (J) positive detects and estimate (UJ) non-detects for the affected analyte in all samples of the same matrix prepared and analyzed by the same method.

b. Calculate the absolute difference for all analytes detected at concentrations less than 5x the SQL in either one or both of the non-aqueous field duplicate samples (including the case where one duplicate sample result is a non-detect and the other result is a positive detect). If any analyte is detected at concentrations less than 5x the SQL in either one or both of the non-aqueous field duplicate samples and the absolute difference is greater than 4x the SQL, then the reviewer should:

- Estimate (J) positive detects and estimate (UJ) non-detects for the affected analyte in all samples of the same matrix prepared and analyzed by the same method.

c. If any analyte is detected at concentrations less than the SQL in both of the field duplicate samples, or if any analyte is a non-detect in both of the field duplicate samples, then no action is taken.

Note: When applying the criteria of 4x the SQL, the SQL is calculated using the sample weight, volume, and percent solids for the sample versus the duplicate sample.

2.9.3.5 Check and recalculate the analytical concentrations for at least one positive detect and one SQL (for a diluted sample or soil sample) for each analytical method in each field

duplicate sample. If calculation and/or transcription errors are detected, then the reviewer should:

- Contact the laboratory to evaluate the data accuracy and possible need to re-quantitate and resubmit all corrected raw data and forms. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is accurate. Under these circumstances, the reviewer may determine that the sample data should be qualified or rejected. A discussion of the rationale for data qualification and the qualifiers used should be documented on the worksheets/checklists and in the Data Review Report.

2.9.3.6 Evaluate the appropriateness of qualifying only the field duplicate sample results or only a subset of samples of the same matrix for the affected analyte. Generally, action based on field duplicate results is applied to the affected analyte across all inorganic samples of the same matrix prepared and analyzed by the same method. If there is information to indicate that the matrix heterogeneity and/or potential sampling error are limited to the field duplicate samples or to a specific subset of samples of the same matrix, then the reviewer should use:

- Professional judgment to apply the action only to the field duplicate samples or to a specific subset of samples of the same matrix. The reviewer should discuss the justification for not qualifying all samples of the same matrix and limiting the qualification to specific samples in the Data Review Report.

2.9.3.7 Evaluate field duplicate precision data to assess overall precision and to verify the field sampler's ability to collect representative duplicate samples. Laboratory duplicate sample data should be evaluated to verify the laboratory↘s ability to generate precise data. Matrix spike data can also be evaluated to identify overall matrix issues. If field duplicate data indicate poor field precision and general sample heterogeneity and/or possible sampling error, then the reviewer should use:

- Professional judgment to qualify data for all analytes in all samples of the same matrix. This problem should be noted in the Data Review Report, O*verall Evaluation of Data and Potential Usability Issues* section where the potential impact on the representativeness and usability of the data for project DQOs is documented.

See Equation 2-1: Relative Percent Difference and Equation 2-2: Relative Percent Standard Deviation for details on these equations.

Table 2-7: Qualification of Inorganic Analytes Based on Field Duplicates – Aqueous Matrices

Sample Results	Aqueous Field Duplicate Sample Results			
	Both Duplicates ≥ 5 x SQL		One or Both Duplicates < 5 x SQL[1]	
	RPD ≤ 30%	RPD > 30%	Abs. Diff. ≤ 2 x SQL	Abs. Diff. > 2 x SQL
Detects	A	J	A	J
Non-detects	A	UJ	A	UJ

[1] No action is taken when both field duplicate results are positive detects < SQL or are non-detects.

Note: Qualification refers to the affected analyte in all samples of the same matrix prepared and analyzed by the same method. Professional judgment may be used, with rationale provided, to apply duplicate actions only to the field duplicate sample results or to a subset of samples of the same matrix for the affected analyte.

Table 2-8: Qualification of Inorganic Analytes Based on Field Duplicates - Non-Aqueous Matrices

Sample Results	Non-Aqueous Field Duplicate Sample Results			
	Both Duplicates ≥ 5 x SQL		One or Both Duplicates < 5 x SQL[1]	
	RPD ≤ 50%	RPD > 50%	Abs. Diff. ≤ 4 x SQL	Abs. Diff. > 4 x SQL
Detects	A	J	A	J
Non-detects	A	UJ	A	UJ

[1] No action is taken when both field duplicate results are positive detects < SQL or are non-detects.

Note: Qualification refers to the affected analyte in all samples of the same matrix prepared and analyzed by the same method. Professional judgment may be used, with rationale provided, to apply duplicate actions only to the field duplicate sample results or to a subset of samples of the same matrix for the affected analyte.

2.10 Percent Solids in Non-Aqueous Samples Data Review Guidance

2.10.1 Objective

The objective is to ensure that percent (%) solids are appropriately considered when evaluating analytical results for non-aqueous samples.

2.10.2 Criteria

To be considered as representing soil/sediment matrices, samples should have percent solids greater than 30 percent.

Sampling and analytical methodologies must be determined during project scoping processes and must be based on the data objectives. Most analytical methods for soil-type matrices are applicable to both soils and sediments with no preparation and analysis differences. Since a definition for soil and sediment matrices is not provided in most analytical methodologies, for over 20 years EPA NE has used the definition by the Office of Water Regulations and Standards Industrial Technology Division, Method 1620, Section 14.16, Draft September 1989 (15). Soil samples are defined as: "soils, sediments, and sludge samples containing more than 30% solids".

High moisture sediments may or may not be successfully analyzed by routine analytical methods. Additional sampling and analytical preparation steps may need to be employed to ensure a representative amount of sample is prepared and analyzed. To enhance sampling procedures, standing water may be decanted from field samples, and/or the sample may be centrifuged or filtered to remove excess water. To achieve the dry weight quantitation limits, the laboratory must perform a percent solids determination prior to preparation and the initial volume of sample prepared must be increased accordingly. This presumes that the samplers have collected sufficient volume, above and beyond normal volume requirements, so that additional sample can be prepared.

2.10.3 Evaluation and Actions

2.10.3.1 Verify that all non-aqueous samples contain solids greater than 30%.

- If a non-aqueous sample contains 30% solids or less ($\leq$ 30% solids) but 10% solids or greater ($\geq$ 10% solids), then estimate (J, UJ) positive detects and non-detects.

- If a non-aqueous sample contains less than 10% solids (< 10% solids), then reject (R) detects or use professional judgment to estimate (J) detects when analytes are detected in high concentrations, and reject (R) non-detects.

2.10.3.2 If sampling and/or analytical preparation steps were employed to address high moisture soil/sediment/solid samples, such as removing the aqueous portion or increasing the sample size, then the reviewer should use professional judgment to determine whether the associated sample data should be qualified (UJ, J or R) or accepted.

The reviewer should determine whether or not project objectives were achieved, such as required detection limits. Dry weight quantitation limits and whether or not the sampling and analytical methods were appropriate for the sample matrix should be considered. The rationale for data qualification should be documented on data review worksheets/checklists and discussed in the *Overall Evaluation of Data and Potential Usability Issues* section of the Data Review Report.

Table 2-9: Qualification of Non-Aqueous Samples Based on Sample Percent Solids

CRITERIA	ACTION	
	Detected Analytes	**Non-Detected Analytes**
% Solids > 30%	No qualification	
10% ≤ % Solids ≤ 30%	J	UJ
% Solids < 10 %	R*	R

*Professional judgment may be used to estimate (J) data in samples with high percent moisture content.

2.11 Pesticides and Aroclor Sulfur Removal Clean-up Data Review Guidance

2.11.1 Objective

Pesticide/Aroclor sulfur cleanup procedures remove elemental sulfur from sample extracts prior to analysis. If not removed, sulfur may cause a rise in the chromatographic baseline preventing accurate analyte identification and quantitation.

2.11.2 Criteria

2.11.2.1 Sulfur removal procedures should be performed on all field sample extracts suspected of containing elemental sulfur that interfere with GC analysis.

2.11.2.2 Sulfur removal procedures must also be performed on associated QC sample extracts, and method blank extracts. When only a subset of samples requires sulfur removal, a separate sulfur blank is prepared.

2.11.2.3 The sulfur blank must meet all method blank QC criteria.

2.11.3 Evaluation and Actions

2.11.3.1 Review Pesticide and Aroclor results (Form Is) and/or data package narrative to determine if sulfur cleanup was performed on any sample extracts and associated QC samples and method blanks.

- If a manual review is performed, then the reviewer should note that sulfur cleanup was performed and that reducing conditions may exist at the sample site location.

2.11.3.2 Check the field sample GC chromatograms to determine whether or not there is a flat baseline. A rising baseline may indicate the presence of sulfur. Confirm that all pesticide/Aroclor peaks are adequately resolved and are symmetrical.

- If a method-required sulfur cleanup was not performed on sample extracts that contain sulfur or adequate sulfur removal was not achieved, which is demonstrated by a rising baseline or interference determining late eluters, then the reviewer should carefully assess the impact on the sample data. If only minor sulfur interference is observed, then the reviewer should use professional judgment to estimate (J) positive detects for analyte(s) that co-elute with sulfur and reject (R) non-detects.

- If the sulfur contamination obscures a limited, discrete portion of the chromatogram, then the reviewer should use professional judgment to reject (R) the positive detects and non-detects for analytes co-eluting with sulfur and accept the unaffected sample results.

– If the sulfur contamination is gross and the majority of the chromatogram is obscured, then the reviewer should use professional judgment to reject (R) the entire pesticide/PCB analysis for that sample. The reviewer should request sample reanalysis that includes sulfur removal.

2.11.3.3 Confirm from the raw data, laboratory bench sheets, or SDG Narrative, that a method-required cleanup technique was used to remove sulfur present in the samples.

– If a method-required sulfur cleanup technique was not used for sulfur removal, then the reviewer should request sample cleanup and reanalysis and document all technical decisions in the Data Review Report.

2.11.3.4 Verify from Form IV PEST and Form IV ARO that a sulfur cleanup blank was prepared and analyzed along with the samples, or that the associated method blank was also sulfur cleaned.

– If a sulfur cleanup blank was not prepared and/or analyzed with the samples, or the associated method blank was not also sulfur cleaned, then the reviewer should use professional judgment to qualify sample data.

2.11.3.5 Verify that the sulfur cleanup blank met all method QC acceptance criteria specified for the method blank contamination.

– If the sulfur cleanup blank does not meet QC criteria after sulfur cleanup, then the reviewer should refer to Section 2.5, and use professional judgment to qualify sample data.

2.11.3.6 Verify from the raw data that there are no target analytes greater than the quantitation limit present in the sulfur cleanup blank.

– If any target analytes are detected in the sulfur cleanup blank greater than or equal to the SQL, then the sulfur cleanup may be a source of contamination. The reviewer must use professional judgment in conjunction with guidance provided in Section 2.5 to qualify sample data.

2.11.3. 7 Compare the raw data to the reported results, if available, and verify that no calculation and /or transcription errors have occurred.

– If discrepancies between the raw and reported data are found, the reviewer should have the laboratory evaluate the discrepancy and recalculate and resubmit all corrected raw data and forms as applicable. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is more accurate. The reviewer may determine that the sample data should be estimated (J) or rejected (R). The rationale for data qualification and the qualifiers used should be documented on the worksheets/checklists and in the Data Review Report.

Table 2-10: Qualification of Pesticides/PCB Analytes Based on Sulfur Cleanup

Minor Sulfur Interference	Sample Result	Discrete Sulfur Interference	Gross Sulfur Interference
Estimate (J) positive detects that co-elute with sulfur.	Detects	Accept analytes not impacted by sulfur interference. Reject (R) positives detects that co-elute with sulfur.	Reject (R) all analytes and request re-analysis.
Reject (R) non-detects that co-elute with sulfur.	Non-detects	Accept analytes not impacted by sulfur interference. Reject (R) non-detects that co-elute with sulfur.	Reject (R) all analytes and request re-analysis.

2.12 Organic - Supplement Matrix Spike/Matrix Spike Duplicate Guidance

Matrix spike and matrix spike duplicate sample results should be evaluated in accordance with the most recent NFG Matrix Spike/Matrix Spike Duplicate criteria. EXES automated evaluation and qualification procedures apply to the parent sample only. Professional judgment must be used to determine whether or not the associated field samples should be qualified.

Chapter 3

Tiered Superfund Organic and Inorganic Data Review

3.1 Introduction

The ***Region 1 Tiered Organic and Inorganic Data Validation Guidelines*** July 1, 1993 guidance document has expired and is replaced by this guidance. With the introduction of automated data review most of the time-intensive verification and validation steps can now routinely be performed electronically for CLP data at no extra cost. Therefore, the region has adopted a new 2-Tiered approach for data review that incorporates automated review.

3.2 Selection of Data Review Tier

When planning data collection activities, the EPA project manager can select between two data review tiers based on the project objectives (Table 3-1). Data review tiers may always be modified to accommodate modified analyses and project-specific technical specifications such as non-routine project contaminants of concern, lower quantitation limits, and/or unusual matrices. **Note: Tier 1 Data Review is the minimum level of review that Superfund data must undergo prior to use by the Region.**

Tier 1 Data Review provides basic information about the completeness of the data package, PES score results, and qualifies sample results based on reported laboratory quality control results, including laboratory contamination. For CLP data, Tier 1 is performed electronically. **Note: Tier 1 does not include the qualification of sample results based on Regional QC criteria for PES accuracy data; field duplicate sample precision data; and equipment, trip or bottle blank contamination, % solids, organic MS/MSD or pesticide and Aroclor Sulfur clean-up.**

A ***Tier 1 Plus Data Review*** provides the basic Tier 1 review in addition to review and qualification of sample results based on Regional QC that are not part of the basic Tier 1 review. For CLP data, Tier 1 Plus Data Review is performed electronically with some additional manual review per the guidance provided in Chapter 2 of this Regional DR Supplement.

Tier 2 Data Review consists of a Tier 1 Plus review and includes additional levels of raw data review for enhanced accuracy checks. For CLP data, Tier 2 is performed electronically with additional manual review. **Note: Tier 2 is the preferred level of review for human health and ecological risk assessment and is typically required for Dioxin/Furan and PCB Congener analyses**.

Table 3-1: Data Review Tiers/Electronic CLP Data Validation Stages

<table>
<tr><th>Regional Data Review Tiers*</th><th>Use</th><th colspan="4">Data Review and Qualification Activities</th><th>Stages Electronic/Manual</th></tr>
<tr><td rowspan="3">Tier 1</td><td rowspan="3">Minimum Data Review Tier for Superfund Data used by the Agency.</td><td colspan="4">Review and qualification of sample results based only on completeness and compliance of sample receipt condition checks</td><td>Stage 1 Electronic</td></tr>
<tr><td></td><td colspan="3">AND sample-related QC results</td><td>Stage 2A Electronic</td></tr>
<tr><td></td><td></td><td colspan="2">AND instrument-related QC results</td><td>Stage 2B Electronic</td></tr>
<tr><td>Tier 1 Plus</td><td>Use when regional field precision, field contamination, PES checks on laboratory accuracy, and regional % solids criteria are required to meet DQOs; and higher Tier is neither warranted nor cost effective.</td><td colspan="2">Tier 1</td><td colspan="2">PLUS Regional QC sample results and activities (field duplicate samples, PESs, field contamination, Percent Solids, Organic MS/MSD and Pesticide and Aroclor Sulfur Clean-up) in accordance with DR Supplement Section 2.</td><td>Electronic & Manual for R-1 QC</td></tr>
<tr><td rowspan="2">Tier 2</td><td rowspan="2">Use to ensure data quality for risk assessments, dioxin analyses and when project DQOs specify.</td><td colspan="3" rowspan="2">Tier 1 Plus</td><td>AND recalculation checks</td><td>Stage 3** Electronic/Manual</td></tr>
<tr><td></td><td>AND review of instrument outputs</td><td>Stage 4 Manual</td></tr>
</table>

*Tiers may be modified to accommodate modified analyses including non-routine project contaminants of concern, matrices, etc.
** For Organic CLP data, Stage 3 recalculation checks are included in the minimum electronic review deliverables.

3.3 Tier 1 Data Review

A Tier 1 Data Review is required for all Superfund data that will be used by the Region. Tier 1 includes the review and qualification of sample results in accordance with the NFGs based on (refer to Tables 2-1, 2-2, and 2-3 for additional information):

- Delivery of required data package documents by the laboratory. A completeness check is conducted in accordance with Section 2.4 of this guidance and ensures evidentiary documentation is included in the data package;
- Sample-related QC results and QC acceptance criteria (e.g., method blanks, DMC recoveries, deuterated monitoring compounds (DMC) recoveries, laboratory control sample (LCS) recoveries, duplicate analyses, matrix spike and matrix spike duplicate recoveries, serial dilutions, post digestion spikes). **Note: Only laboratory contamination is assessed with a Tier 1 review. See Tier 1 Plus Data Review for the evaluation of field contamination.**
- Instrument-related QC results (e.g., initial and continuing calibrations, instrument performance checks).

Tier 1 Documentation:
Organic CLP data are electronically reviewed at the Stage 3 level and Inorganic CLP data are currently reviewed electronically at the Stage 2B level in accordance with *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use,* OSWER No. 92000.1-85, EPA 540-R-08-005, January 13, 2009, http://www.epa.gov/superfund/policy/pdfs/EPA-540-R-08-005.pdf. Refer to Tables 3-3 and 3-4. It is expected that data reviewers will utilize electronic data reports whenever available. In the case of non-CLP data, data reviewers will use organization-specific worksheets/checklists as applicable (Refer to Attachment 2-3).

The Data Review Report documents missing data/information; provides a brief description of significant data quality issues regarding the reported laboratory QC results; and, includes a Data Summary Table **(Note: Sample results are qualified based on the NFGs)**. Electronic data review reports and worksheets/checklist are attached to the Data Review Report. Refer to Section 2.3 for further guidance on formatting the Data Review Report.

3.3.1 Tier 1 Plus Data Review

Tier 1 Plus builds on the Tier 1 Data Review and includes manual review and qualification of sample results based on Regional QC results and guidance provided in the following Sections (refer to Tables 2-1, 2-2, and 2-3 for additional information):

- Field blanks (equipment, trip and bottle blanks) to evaluate field contamination (Refer to Sections 2.5 and 2.6).
- PESs results to evaluate laboratory accuracy (Refer to Section 2.7);
- Field duplicate samples to evaluate field precision (Refer to Sections 2.8 and 2.9);
- Percent Solids (Refer to Section 2.10)
- Pesticide and Aroclor Sulfur Removal (Refer to Section 2.11); and

- Organic MS/MSDs (Refer to Section 2.12)

Tier 1 Plus Documentation: Includes Tier 1 documentation plus qualification of results based on the additional QC reviewed. **(Note: Sample results are qualified based on the NFGs and the Regional DR Supplement).**

3.3.2 Tier 1 Modified Data Review

When non-routine analytes, quantitation limits, matrices, etc. are required for project activities, a modified data review should be requested. A Modified Tier 1 Data Review includes a basic Tier 1 (or Tier 1 Plus) review and an electronic and/or manual review of non-routine sample data as specified in the QAPP.

Tier 1 Modified Documentation: Tier 1 or Tier 1 Plus documentation in addition to a review of data quality issues regarding requested analytes, quantitation limits, matrices, etc. Data Summary Tables report sample results qualified based on requested review.

3.4 Tier 2 Data Review

Tier 2 Data Review builds on a Tier 1 Plus review and includes the review and qualification of sample results in accordance with NFGs based on (refer to Tables 2-1, 2-2, and 2-3 for additional information):

- recalculation checks (performed electronically for organic Stage 3 deliverables ; and
- instrument outputs (e.g., gas chromatograms, mass spectra)

Tier 2 Documentation: Includes Tier 1 Plus documentation. The results of a Tier 2 Data Review are documented on worksheets/checklists or parameter-specific electronic reports. Refer to Section 2.3 for further guidance on formatting the Data Review Report.

3.3 Required Superfund Labeling of Data Review Level

3.3.1 Documenting the Label and Tier for the Data Review Process

The data reviewer documents the Stage and Tier of validation for each laboratory analytical data package in the Data Review Report. Stage labels are applied in accordance with the *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use,* OSWER No. 92000.1-85, EPA 540-R-08-005, January 13, 2009, http://www.epa.gov/superfund/policy/pdfs/EPA-540-R-08-005.pdf. The label of the stage is documented in the Data Review Report subject area of the report. The labels of the various Stages are listed below:

Table 3-2: Stage Labels for Externally Validated Laboratory Analytical Data

Label	Corresponding Label Code
Stage_1_Validation_Electronic	S1VE
Stage_1_Validation_Manual	S1VM
Stage_1_Validation_Electronic_and_Manual	S1VEM
Stage_2A_Validation_Electronic	S2AVE
Stage_2A_Validation_Manual	S2AVM
Stage_2A_Validation_Electronic_and_Manual	S2AVEM
Stage_2B_Validation_Electronic	S2BVE
Stage_2B_Validation_Manual	S2BVM
Stage_2B_Validation_Electronic_and_ Manual	S2BVEM
Stage_3_Validation_Electronic	S3VE
Stage_3_Validation_Manual	S3VM
Stage_3_Validation_Electronic_and_Manual	S3VEM
Stage_4_Validation_Electronic	S4VE
Stage_4_Validation_Manual	S4VM
Stage_4_Validation_Electronic_and_ Manual	S4VEM
Not_Validated	NV

Table 3-3: Summary of Organic Data Review Tiers for Electronic and Manual Review

Data Review Tier	Review Activities	CLP Electronic Review (Stage 3 Deliverable)	Non-CLP Manual Review
Tier 1 Purpose: Minimum Data Review Tier for Superfund data used by the Agency.	Review tasks	Completeness check per DR Supplement (Section 2.4) & PES Score Report check. Electronic review of sample results per NFGs based on - laboratory QC sample results; - instrument-related QC results; and - recalculation checks.	Completeness check per DR Supplement (Section 2.4) & PES Score Report check. Manual review of sample results per NFGs based on - summarized laboratory QC sample results; and - instrument-related QC results.
	Data Qualification	Electronic application of data qualifiers per NFG based on summarized QC results and recalculations.	Manual application of data qualifiers per NFG criteria and actions based on summarized QC results.
	Documentation	Data Review Report Attachments: Data Summary Table Relevant Electronic data review reports (e.g. Report #3)	Data Review Report Attachments: Data Summary Table Worksheets/checklists
Tier 1 Plus Purpose: Used to review regional QC samples to assess field precision, field contamination, PES checks on laboratory accuracy, and when regional % solids criteria are required to meet DQOs; and when a higher Tier is neither warranted nor cost effective.	Review Tasks	Tier 1 Electronic review PLUS Manual review of regional QC in accordance with DR Supplement, Section 2: • Field contamination; • Field duplicate sample results; • PES results; • % Solids; • Organic MS/MSD; and • Pesticide & Aroclor Sulfur Clean-up.	Tier 1 Manual review PLUS Manual review of regional QC in accordance with DR Supplement, Section 2: • Field contamination; • Field duplicate sample results; • PES results; • % Solids; • Organic MS/MSD; and • Pesticide & Aroclor Sulfur Clean-up.
	Data Qualification	Electronic and Manual application of data qualifiers* per NFGs and regional DR Supplement.	Manual application of data qualifiers* per NFGs and regional DR Supplement.
	Documentation	Data Review Report & Attachments: Data Summary Table Relevant Electronic data review reports (e.g. Report #3) Manual worksheet/checklists per regional DR Supplement	Data Review Report & Attachments: Data Summary Table Manual worksheets/checklists per regional DR Supplement and/or QAPP.

Table 3-3: Summary of Organic Data Review Tiers for Electronic and Manual Review

Data Review Tier	Review Activities	CLP Electronic Review (Stage 3 Deliverable)	Non-CLP Manual Review
		and/or QAPP.	.
Modified Tier 1 Purpose: Used to review CLP RAS Modified Analyses (MA)/technical specifications (e.g., unique target analytes; lower quantitation limits; non-routine matrices, etc.)	Review Tasks	Electronic Tier 1 or Tier 1 Plus Review AND review of MA requirements as specified in QAPP. **Note:** Generally, Electronic data review can be performed on MAs; Manual review may be needed on a project-specific basis.	Tier 1 or Tier 1 Plus Data Review AND Manual review of technical specifications in accordance with the QAPP.
	Data Qualification	Electronic and Manual application of data qualifiers* per DR supplement Section 2.	Manual application of data qualifiers* per DR Supplement Section 2.
	Documentation	Data Review Report & Attachments: Data Summary Table Relevant Electronic data review reports (e.g. Report #3) Manual worksheets/checklists per regional DR Supplement and/or QAPP.	Data Review Report & Attachments: Data Summary Table Manual worksheets/checklists per regional DR Supplement and/or QAPP.
Tier 2 Purpose: Use to review ecological and health risk assessment data and when project DQOs specify. **Note:** Tier 2 review is routinely performed for dioxin/furan/PCB congener analyses.	Review Tasks	Tier 1 Plus Data Review AND Manual review of instrument outputs (e.g., chromatograms).	Tier 1 Plus Data Review AND Manual recalculation checks AND Manual review of instrument outputs.
	Data Qualification	Electronic and Manual application of data qualifiers.	Manual application of data qualifiers.
	Documentation	Data Review Report & Attachments: Data Summary Table Relevant Electronic data review reports (e.g. Report #3) Manual worksheets/checklists per regional DR Supplement and/or QAPP.	Data Review Report & Attachments: Data Summary Table Manual worksheets/checklists per regional DR Supplement and/or QAPP.

* Use of alternate data flags should be documented in the QAPP or equivalent document.

Table 3-4: Summary of Inorganic Data Review Tiers for Electronic and Manual Review

Data Review Tier	Review Activities	CLP Electronic Review (Stage 2b Deliverable)	Non-CLP Manual Review
Tier 1 Purpose: Minimum Data Review Tier for Superfund data used by the Agency.	Review tasks	Completeness check per DR Supplement (Section 2.4) & PES Score Report check. Electronic review of sample results per NFGs based on - laboratory QC sample results; and - instrument-related QC results. **Note:** No recalculation checks are performed at this stage except for Holding Times.	Completeness check per DR Supplement (Section 2.4) & PES Score Report check. Manual review of sample results per NFGs based on - summarized laboratory QC sample results; and - instrument-related QC results.
	Data Qualification	Electronic application of data qualifiers per NFG based on summarized QC results.	Manual application of data qualifiers per NFG criteria and actions based on summarized QC results.
	Documentation	Data Review Report Attachments: Data Summary Table Relevant Electronic data review reports (e.g. Report #3)	Data Review Report Attachments: Data Summary Table Worksheets/checklists
Tier 1 Plus Purpose: Used to review regional QC samples to assess field precision, field contamination, PES checks on laboratory accuracy, and when regional % solids criteria are required to meet DQOs; and when a higher Tier is neither	Review Tasks	Tier 1 Electronic review PLUS Manual review of regional QC in accordance with DR Supplement, Section 2: • Field contamination; • Field duplicate samples; • PES results; and • % Solids.	Tier 1 Manual review PLUS Manual review of regional QC in accordance with DR Supplement, Section 2: • Field contamination; • Field duplicate samples; • PES results; and • % Solids.
	Data Qualification	Electronic and Manual application of data qualifiers* per NFGs and regional DR Supplement.	Manual application of data qualifiers* per NFGs and regional DR Supplement.
	Documentation	Data Review Report & Attachments: Data Summary Table Relevant Electronic data review reports (e.g. Report #3)	Data Review Report & Attachments: Data Summary Table Manual worksheets/checklists per regional DR Supplement

Table 3-4: Summary of Inorganic Data Review Tiers for Electronic and Manual Review

Data Review Tier	Review Activities	CLP Electronic Review (Stage 2b Deliverable)	Non-CLP Manual Review
warranted nor cost effective.		Manual worksheet/checklists per regional DR Supplement and/or QAPP.	and/or QAPP.
Modified Tier 1 Purpose: Used to review CLP RAS Modified Analyses (MA)/technical specifications (e.g., unique target analytes; lower quantitation limits; non-routine matrices, etc.)	Review Tasks	Electronic Tier 1 or Tier 1 Plus Review AND review of MA requirements as specified in QAPP. **Note:** Generally, Electronic data review can be performed on MAs; Manual review may be needed on a project-specific basis.	Tier 1 or Tier 1 Plus Data Review AND Manual review of technical specifications in accordance with the QAPP.
	Data Qualification	Electronic and Manual application of data qualifiers* per DR supplement Section 2.	Manual application of data qualifiers* per DR Supplement Section 2.
	Documentation	Data Review Report & Attachments: Data Summary Table Relevant Electronic data review reports (e.g. Report #3) Manual worksheets/checklists per regional DR Supplement and/or QAPP.	Data Review Report & Attachments: Data Summary Table Manual worksheets/checklists per regional DR Supplement and/or QAPP.
Tier 2 Purpose: Use to review ecological and health risk assessment data; and when project DQOs specify.	Review Tasks	Tier 1 Plus Data Review AND Electronic and Manual recalculation checks AND Manual review of instrument outputs.	Tier 1 Plus Data Review AND Manual recalculation checks AND Manual review of instrument outputs.
	Data Qualification	Electronic and Manual application of data qualifiers.	Manual application of data qualifiers.
	Documentation	Data Review Report & Attachments: Data Summary Table Relevant Electronic data review reports (e.g. Report #3) Manual worksheets/checklists per regional DR Supplement and/or QAPP.	Data Review Report & Attachments: Data Summary Table Manual worksheets/checklists per regional DR Supplement and/or QAPP.

* Use of alternate data flags should be documented in the QAPP or equivalent document.

Chapter 4

Performance Evaluation Sample Program

4.1 Introduction

The *U.S. EPA NE Performance Evaluation Program Guidance* July 1996 has expired and is replaced by guidance in this Chapter. All documents that reference and/or utilize the EPA NE Performance Evaluation Sample (PES) Program must be revised to reflect these new procedures.

This guidance provides implementation details for the use of PESs for environmental data operations conducted within the region. The use of single and/or double blind PESs helps to ensure that environmental data collection activities result in the delivery of analytical data of known and documented quality, which are suitable for the intended use.

4.2 Purpose of the PES Program

EPA NE supports the routine use of PESs to:

- identify a community of technically capable laboratories during laboratory pre-award evaluation;
- evaluate the performance of analytical laboratories over a period of time; and,
- provide information on a laboratory's ability to accurately identify and quantitate analytes of interest during the period of sample preparation and analysis.

The EPA NE PES Program works in conjunction with the graded data review approach described in previous Chapters.

4.3 Use of PESs

The EPA NE PES program can be used for programs described below.

4.3.1 Superfund Program

The EPA NE PES Program applies to all Superfund fixed laboratory, field laboratory (full protocol analytical methods performed in a mobile or transportable field laboratory), and field screening analyses, regardless of the mechanism used to obtain analytical services, the funding source for the project, or the project lead (EPA or non-EPA entity) for the site work.

4.3.1.1 EPA Fund-lead, Potentially Responsible Parties (PRPs) and Federal Facility Oversight Projects

For EPA Fund-lead, PRP and Federal Facility Oversight Superfund projects, the EPA NE PES Program applies to all analytical services obtained through the Contract Laboratory Program (CLP) and non-CLP vehicles. Non-CLP vehicles include fixed laboratories, field laboratory and field screening analytical services provided directly by EPA or by EPA lead contractors and/or subcontractors. EPA-provided PESs, which meet project DQOs, should be utilized when available as described in Section 4.4 of this guidance document. If appropriate PESs for the project DQOs are not available through EPA, then PESs should be obtained from commercial vendors.

4.3.1.2 Fund-lead Projects Performed by States or other Federal Agencies

For Fund-lead projects performed by States (under Cooperative Agreements) or other Federal Agencies (under Interagency Agreements) that utilize the CLP to obtain analytical services, EPA-provided PESs should be utilized. When non-CLP vehicles are utilized to provide fixed laboratory, field laboratory, or field screening analytical services for these Superfund projects, EPA-provided PESs, which meet project DQOs should be utilized when available as described in this guidance. If appropriate PESs for the project DQOs are not available through EPA, then PESs should be obtained from commercial vendors.

4.3.1.3 Non Fund-lead Projects

For Non Fund-lead Superfund projects performed by Potentially Responsible Parties (PRPs) or other Federal Agencies, the EPA NE PES Program applies to all fixed laboratory, field laboratory, and field screening analytical services utilized for these projects. Appropriate PESs for the project DQOs must be utilized whenever environmental samples are collected. If appropriate PESs for the project DQOs are not available through EPA, then PESs should be obtained from commercial vendors.

4.3.1.4 EPA NE PES Program Requirements for Superfund Projects

The following EPA NE PES Program requirements apply to all Superfund projects:

- One single or double blind PES should be used for each sample matrix, analysis parameter, and concentration level for each Sample Delivery Group (SDG) that is sent to a laboratory. An SDG is generally defined as a group of 20 or fewer field samples within a project, received over a period of up to 7 calendar days. The PES should not be counted as field samples in the 20 sample SDG total;

- PESs are required for analytical testing when they are available from EPA or commercial vendors in the appropriate matrix and at the proper concentration level. Additionally, PESs should contain as many target analytes as possible, but they must contain at least one of the target analytes, preferably a site contaminant of concern; and,

- For soil/sediment/solid sampling events, it is not necessary to include an aqueous PES when the only aqueous samples are equipment and/or trip blanks **and** when a PES exists (from either EPA or a commercial vendor) for the soil/sediment/solid samples. However, an aqueous PES should be included with soil/sediment/solid samples when a soil/sediment/solid PES (from either EPA or a commercial vendor) does not exist for the analytical parameter.

Note: The frequency and/or type of PESs should support the project DQOs. Since each project is unique, the selection of PESs should be intentional.

The EPA NE Performance Evaluation (PE) Chemist can be contacted (as per Section 4.6.1.1) when choosing an appropriate PES.

4.3.2 Non-Superfund Programs

The EPA NE QA Unit recommends that Non-Superfund programs utilize PESs whenever environmental samples are collected. Specific PESs are not available through EPA for non-Superfund activities; therefore, they must be obtained from commercial vendors (refer to Section 4.8). This recommendation applies to environmental sampling performed by EPA (OEME, OEP, etc.) and non-EPA entities (facilities, manufacturers, generators, States, other Federal Agencies, etc.) which support non-Superfund federal regulations such as RCRA, UST, CWA, NPDES, CAA, TSCA, FIFRA, etc.

The following PES Program recommendations should apply to all Non-Superfund projects:

- One single or double blind PES should be used for each sample matrix, analysis parameter, and concentration level for each Sample Delivery Group (SDG) that is sent to a laboratory. An SDG is generally defined as a group of 20 or fewer field samples within a project, received over a period of up to 7 calendar days. The PESs should not be counted as field samples in the 20 sample SDG total;

- PESs are required for all analytical testing when they are available from commercial vendors in the appropriate matrix and at the proper concentration level. Additionally, PESs should contain as many target analytes as possible, but they must contain at least one of the target analytes, preferably a contaminant of concern at the site; and,

- For soil/sediment/solid sampling events, it is not necessary to include an aqueous PES when the only aqueous samples are equipment and/or trip blanks **and** when a PES exists from a commercial vendor for the soil/sediment/solid samples. However, an aqueous PES should be included with soil/sediment/solid samples when a soil/sediment/solid PES does not exist for that analysis parameter.

  Note: The frequency and/or type of PESs should support the project DQOs. Since each project is unique, the selection of PESs should be intentional.

The EPA NE Performance Evaluation Chemist may be contacted to obtain advice when choosing an appropriate PES. (Refer to Attachment 2-1)

4.4 Application of PESs

Table 4-1 provides a list of EPA-provided PESs that are currently available through the EPA NE QA Unit for Fund-lead, PRP and Federal Facility Oversight Superfund site activities. Analytical applications are included for each PES material on the list. Use of the PESs is **NOT** limited to the example application. For instance, #95-001 or #98-002, Low/Medium Volatiles in Water, could be used for analysis by the CLP SOM0X.X Statement of Work, SW-846 Method 8260, or 40 CFR Method 624, etc. Note that several catalog numbers may exist for a particular method description and matrix.

The catalog numbers indicate several different concentrations and analyte mixes. When requesting PESs, the FSC or EPA Field Sampling Personnel must clearly identify the necessary analytes and concentration range(s). The EPA NE Performance Evaulation Chemist is responsible for arranging shipment of the PESs to the contractors or subcontractors.

Note: If an aqueous mercury PES is needed, order PES #06-003 as the aqueous #90-004 PES contains metals but does **not** contain mercury.

In addition to the list of PESs available in Table 4-1, an extensive array of PESs can be special ordered by contacting the EPA NE Data Review Chemist. These PESs are prepared specifically by EPA's PES contractor and would contain site-specific analytes and/or concentrations designed to meet the sampler's needs. These site-specific PESs can be single-blind or double-blind full-volume PESs. Special-order PESs can usually be filled in the same time frame as those listed in Table 4-1.

PESs and Standard Reference Materials (SRMs) that are available from commercial vendors are provided in Tables 4-2 and 4-3 for use in Fund-lead Superfund projects, for Non Fund-lead Superfund projects, as well as for Non-Superfund projects. Tables 4-2 and 4-3 list the parameters and matrices for which various vendors can supply PESs and SRMs, respectively. SRMs can be utilized as PESs. Table 4-4 provides vendor telephone and fax numbers. Individual vendors should be contacted directly to obtain current catalog information. Current catalog information must be reviewed to ensure that PESs will meet project DQOs for specific compounds/parameters, matrices and concentration levels. The lists provided in Tables 4-2 and 4-3 are not inclusive of all potential PES/SRM vendors and does not constitute an endorsement by EPA of any particular vendor or any specific PES. It is provided solely for reference in identifying potential commercial PES sources.

4.5 Planning for PES Use

The use of PESs, as an analytical Quality Control measure, should be evaluated during the project planning phase. The utilization of PESs in accordance with this guidance should be referenced in the Quality Assurance Project Plan (QAPP) and/or Sampling and Analysis Plan (SAP) along with the frequency, analytical parameters, matrices, and concentration levels for each PES. The origin of the PES (EPA-provided or commercial vendor) should be documented in the QAPP and/or SAP.

Additionally, preparation and analysis of PESs must be included in laboratory Technical Specifications as QC requirements for fixed and/or field laboratories.

PESs are not included in the sample count for a CLP SDG. For example, 20 field samples and two PESs would be one SDG assuming the samples are received within seven days and the shipment is complete even though 22 (total) samples were submitted for analysis.

4.6 Roles and Responsibilities

4.6.1 Superfund Program

The process is summarized with a flow chart, see Figure 4-1. The process roles/responsibilities, time frames for planning, obtaining, analyzing, scoring, and evaluating results for EPA-provided and commercial PESs used in Superfund projects is captured in Figure 4-1.

4.6.1.1 EPA NE Performance Evaluation Chemist

The Performance Evaluation (PE) Chemist of the EPA NE Quality Assurance Unit (Refer to Attachment 2-1 for contact information) is responsible for the following activities:

- Providing a current list of EPA PESs upon request;
- Supplying EPA PESs to EPA FSC and EPA Field Sampling Personnel;
- Scoring EPA PES analytical results;
- Providing EPA PES Score Reports to EPA FSC and EPA Field Sampling Personnel; and,
- Tracking EPA PESs.

4.6.1.2 EPA NE Data Review Chemist

The EPA NE Data Review (DR) Chemist of the EPA NE Quality Assurance Unit (Refer to Attachment 2-1 for contact information) is responsible for the following activities:

- Providing advice to identify commercial PES vendors, choosing an appropriate PESs, handling Special-Request/Site-Specific PE orders and evaluating resultant data quality;

- Providing PES trend reports based on EPA PES score results by lab or sample type;

- Notifying EPA FSC when EPA PES score results indicate laboratory performance problems; and,

- Communicating between the PES provider and user.

4.6.1.3 EPA Field Sampling Contractors and EPA Field Sampling Personnel

EPA FSC and EPA Field Sampling Personnel are responsible for the following activities (when CLP and/or non-CLP mechanisms are used to obtain analytical services for EPA Fund-lead, PRP and Federal Facility Oversight projects):

- Determining PES needs during the project planning phase (scoping meetings, QAPP and/or SAP development);

- Identifying PES sources (EPA and commercial);

- Procuring commercial PESs if necessary;

- Requesting EPA PESs from the EPA NE PE Chemist according to the procedures outlined in Section 4.7;

- Ensuring that every laboratory analyzing project samples receives and analyzes appropriate PESs according to the frequency requirements described in this guidance or as established by the project objectives/procedures;

- Obtaining PES score results from EPA and/or commercial PES vendors;

- Evaluating PES score results in accordance with Section 2.7 of this guidance and documenting the evaluation on the data review worksheets/checklists and the Data Review Report as appropriate; and,

- Notifying the EPA NE DR Chemist if the EPA PES performance necessitated the need for reduced payment or rejection of any CLP data and immediately contacting the EPA NE RSCC to place a hold on the invoice.

4.6.1.4 States and Other Federal Agencies

4.6.1.4.1 Fund-lead CLP Projects

For Fund-lead projects performed by States or other Federal Agencies that utilize the CLP or methods similar to CLP, to obtain analytical services, the States and other Federal Agencies are responsible for performing the activities described in Section 4.6.1.3 of this guidance.

4.6.1.4.2 Fund-lead Non-CLP Projects

When non-CLP methods or methods dissimilar to CLP are used, and, therefore, commercial PESs must be used, then States or other Federal Agencies are responsible for the following activities:

- Determining PES needs during the project planning phase (scoping meetings, DQO development, QAPP and/or SAP development);
- Identifying commercial PES sources;
- Procuring commercial PES;
- Ensuring that every laboratory analyzing project samples, receives and analyzes appropriate commercial PESs according to the frequency requirements described in Section 4.3.2 of this guidance document;
- Obtaining score results for commercial PES; and,
- Evaluating commercial PES score results in accordance with Section 2.7 of this guidance and documenting the evaluation on the data review worksheets/checklist and the Data Review Report as appropriate.

4.6.1.5 Non Fund-lead Projects

For Non Fund-lead Superfund projects performed by PRPs or other Federal Agencies, the PRP or other Federal Agency is responsible for the following activities:

- Determining PES needs during the project planning phase (scoping meetings, DQO development, QAPP and/or SAP development);
- Identifying commercial PES sources;
- Procuring commercial PESs;
- Ensuring that every laboratory analyzing project samples receives and analyzes appropriate commercial PESs according to the frequency requirements described in this guidance document;
- Obtaining score results for commercial PESs; and,
- Evaluating commercial PES score results in accordance with Section 2.7 of this guidance and including a discussion of the PES score results on the data review worksheets/checklists and the Data Review Report as appropriate.

4.6.2 Non-Superfund Programs

EPA Site Managers and EPA Project Officers are responsible for ensuring that the EPA NE PES Program requirements contained in this guidance document are applied to environmental sampling performed by EPA (OEME, OEP, etc.) and non-EPA entities (facilities, manufacturers, generators, States, other Federal Agencies, etc.) in support of Non-Superfund federal regulations.

The EPA or non-EPA entity performing sampling is responsible for:

- Determining PES needs during the project planning phase (scoping meetings, DQO development, QAPP and/or SAP development);
- Identifying commercial PES sources;
- Procuring commercial PESs;
- Ensuring that every laboratory analyzing project samples receives and analyzes appropriate commercial PESs according to the frequency requirements described in this guidance;
- Obtaining score results for commercial PESs; and,
- Evaluating commercial PES score results in accordance with Section 2.7 of this guidance and including a discussion of the PES score results on the data review worksheets/checklists and the Data Review Report as appropriate.

The EPA NE DR Chemist may be contacted to obtain advice on identifying available commercial vendors of PESs, choosing a proper PES, or evaluating resultant analytical data quality.

4.7 Detailed Procedures for the PES Program

4.7.1 Superfund Program

Specific procedures for obtaining and utilizing EPA-provided PESs for the EPA NE PES Program are provided below. These procedures must be followed by EPA FSC and EPA Field Sampling Personnel (whenever CLP and/or non-CLP mechanism are used to obtain analytical services for EPA Fund-lead, PRP, and Federal Facility Oversight projects) and by States or other Federal Agencies that utilize the CLP or methods similar to CLP to obtain analytical services for Superfund projects.

1. The EPA FSC (START, RACS, etc.), State, Federal Agency (ACOE, etc.) or EPA Field Sampling Personnel send (via email) the EPA NE PE Sample Request Form (See Attachment 4-1) to the EPA NE PE Chemist (Refer to Attachment 2-1 for contact information) one week prior to sampling. If e-mail is not accessible, the request form may be submitted via telefax at 617-918-8397at least one week prior to sampling.

2. The EPA NE PE Chemist will confirm receipt of the PES request by email or telephone.

Note: In an emergency, PES can be requested within 24 to 48 hours of ordering, but this service cannot be guaranteed.

3. The EPA NE PES Request Form must specify the catalog numbers for requested PES, number of PESs ordered, method description, applicable matrix, exact reference title or number for the analytical method which will be used to prepare and analyze the PES and field samples.

4. Identify specific analytes and concentration ranges in the "Required Analyte & Concentration" field on the request form. If a specific analyte or special concentration, as requested by the FSC or EPA Field Sampling Personnel in the "Required Analyte & Concentration" field, cannot be provided by an existing EPA PES, then the EPA NE PE Chemist will notify the requester by telephone. The FSC or EPA Field Sampling Personnel will then determine, based on project DQOs, whether an EPA PES that does not contain the specific analyte or special concentration will be sufficient to meet project DQOs or whether a commercial PES will be utilized. Copies of blank and completed EPA NE PES Request Forms are provided in Attachment 4-1.

5. EPA PES and preparation instructions are provided directly to the requestor and upon receipt the information should be verified against the order submitted by the FSC or EPA Field Sampling Personnel. The PE Chemist should be contacted if PESs do not arrive or the shipment was not as requested. The FSC or EPA Field Sampling Personnel must ensure that PESs are handled and stored properly until they are sent to a laboratory for analysis.

6. Sample numbers may be assigned to the EPA PESs during sampling by the FSC or EPA Field Sampling Personnel. The EPA PES vial numbers must be documented on the Traffic Report/Chain of Custody Forms and to cross-reference sample numbers and EPA PES vial numbers, as appropriate.

7. The FSC or the EPA Field Sampling Personnel submit the EPA PESs, the preparation instructions and field samples to the laboratories performing the analyses.

8. The laboratories analyze the EPA PESs and field samples according to the specified methods. For CLP, the laboratories provide the resultant data packages to the RSCC. For non-CLP, the laboratories provide the resultant data packages to the FSC.

9. When the RSCC submits the CLP data packages to the FSC or EPA Field Sampling Personnel, or when the FSC or EPA Field Sampling Personnel receive a non-CLP data package from the laboratory, then the FSC or EPA Field Sampling Personnel immediately (within 3 business days) emails or telefaxes the EPA PES data (Form Is) to the EPA-NE PE Chemist. The corresponding EPA PES vial number (ID#) and CERCLIS site ID must be written on the Form Is by the FSC or EPA Field Sampling Personnel. The complete analytical method reference (full method name, number, revision date, etc.) must also be written on the Form Is if it is not in the Form I header information.

10. The EPA PE Chemist scores the EPA PES data and emails the results back to the EPA Field Sampling Personnel, usually within 2 business days.

11. The EPA PES score results are evaluated by the FSC or EPA Field Sampling Personnel, and the EPA PES score results are incorporated into the data review process in accordance with Section 2.7 of this guidance. A discussion of the PES score results must be provided with the data review worksheets/checklists and Data Review Report as appropriate.

12. If poor PES results indicate reduced payment or rejection of any CLP data, the FSC or EPA Field Sampling Personnel must contact the EPA NE DR Chemist who initiates the reduced payment/data rejection process. When resampling may be necessary, the FSC or EPA Field Sampling Personnel must contact the EPA Site Manager by telephone or email to alert them of the situation, as soon as practical.

Similar procedures should be employed for obtaining and utilizing commercial PESs for Fund-lead projects performed by States or other Federal Agencies that utilize non-CLP methods to obtain analytical services and for Non Fund-lead Superfund projects performed by PRPs or other Federal Agencies.

4.7.2 Non-Superfund Programs

EPA Site Managers and EPA Project Managers should establish procedures for implementing the use of PESs for Non-Superfund data collection activities. Procedures should be similar to the activities described for the Superfund program. Documented procedures establish project QA documentation and project-specific procedures. SOPs or guidance documents could be generated to standardize the procedures critical to producing environmental data that are consistent, comparable, credible and defensible.

4.8 Commercial Vendors of PESs and Standard Reference Materials (SRMs)

Tables 4-2 and 4-3 provide a list of commercially available PESs and SRMs, respectively. For easy access to information, the PESs/SRMs are classified by major analytical parameters and matrix with the associated vendor's name. Table 4-4 provides a list of PES/SRM vendors with their full name, telephone number and WEB address.

Figure 4-1: Superfund PES Program Process

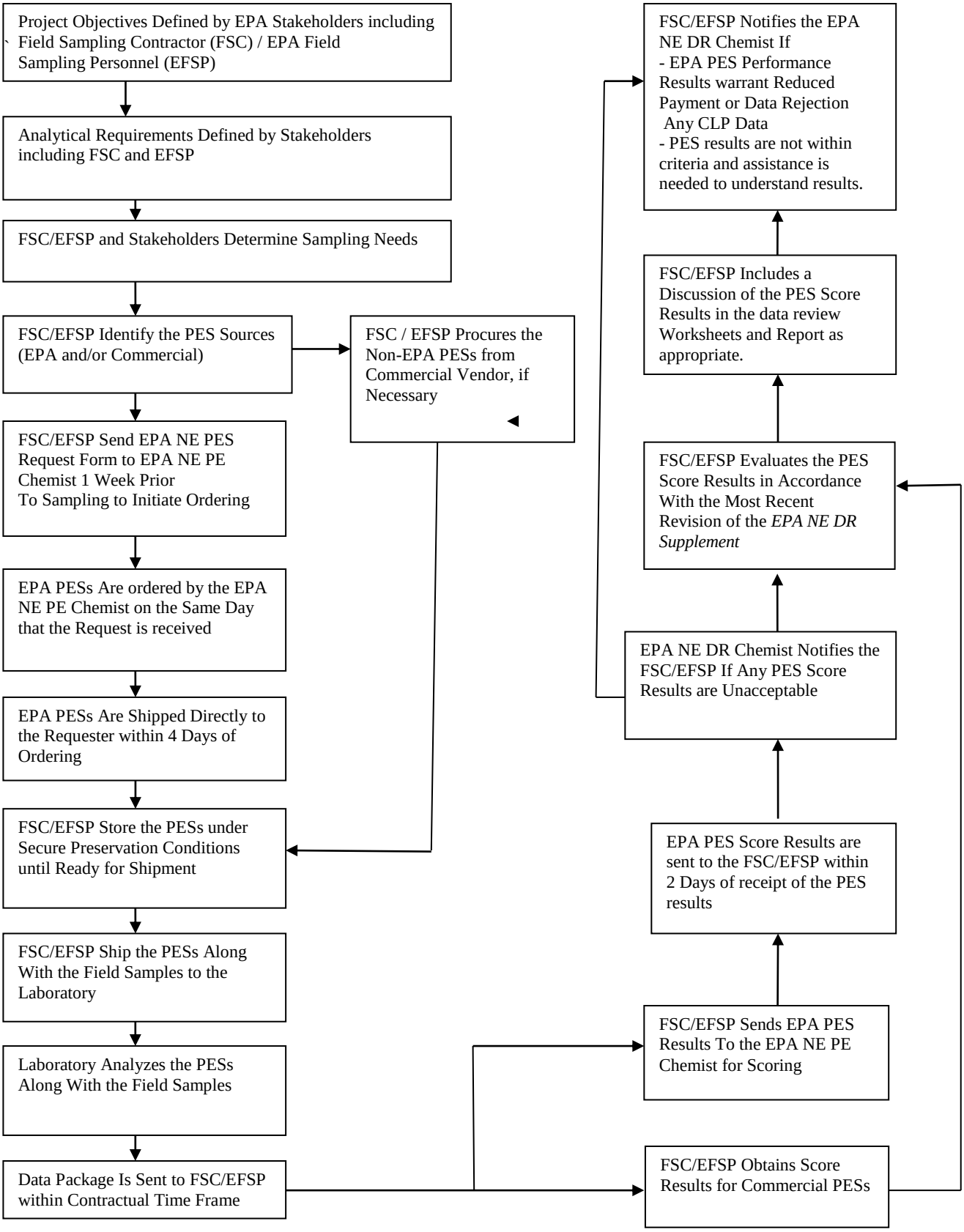

Table 4-1: EPA NE PERFORMANCE EVALUATION SAMPLES [(1)] (1/2013 Update)

PARAMETER	CATALOG NUMBER	METHOD DESCRIPTION & MATRIX	APPLICATION
METALS	90-005	Low/Medium Metals in Soil (with Mercury)	ISM01 & Rev
	94-020	ICC Industry Category Metals in Soil - Chemical and Allied Products (Various Levels Available)	ISM01 & Rev.
	94-021	ICC Industry Category Metals in Soil - Primary Metals Industries (Various Levels Available)	ISM01 & Rev.
	94-022	ICC Industry Category Metals in Soil - Mining (Various Levels Available)	ISM01 & Rev.
	94-023	ICC Industry Category Metals in Soil - Recyclers (Various Levels Available)	ISM01 & Rev.
	94-024	ICC Industry Category Metals in Soil- Other Waste Facilities (Various Levels Available)	ISM01 & Rev.
	95-009	ICC Industry Category Metals in Soil - Municipal Landfill (Various Levels Available)	ISM01 & Rev.
	95-017-S	Low/Medium Metals in Soil (With and Without Mercury)	ISM01 & Rev.
	95-017-W	Low/Medium Metals in Water (No Mercury)	ISM01 & Rev.
	99-004	Low/Medium Metals in Water (No Mercury)	ISM01 & Rev.
	99-005	Low/Medium Metals in Soil (With and Without Mercury)	ISM01 & Rev.
	03-009	Metals in Water by ICP-MS (in acid for spiking)	ISM01 & Rev.
	06-003	Mercury in Water	ISM01 & Rev.
	08-005	Low/Medium Metals in Water (Some ppm levels)	ISM01 & Rev.
CYANIDE	99-008	Low /Medium Concentration Cyanide in Soil (various ppm levels)	ISM01 & Rev.
	06-004	Low /Medium Concentration Cyanide in Water (various ppb levels)	ISM01 & Rev.
	12-012	Low /Medium Concentration Cyanide in Soil	ISM01 & Rev.
LEAD WIPES	12-017	Wipe Sample Containing Lead	ISM01 & Rev.

(1) The information in this table is from "*Final U.S. Environmental Protection Agency 2013 Superfund PES Catalog"* which is available to contractors from the Superfund National Program Office, Quality Assurance Technical Support Program.

PARAMETER	CATALOG NUMBER	METHOD DESCRIPTION & MATRIX	APPLICATION
VOLATILES	91-001	Volatiles in Water – Trace Concentration	SOM01, Method 524.2
	95-001	Low/Medium Volatiles in Water	SOM01& Rev.
	95-008	Volatiles in Water – Trace Concentration	SOM01, Method 524.2
	98-002	Low/Medium Volatiles in Water	SOM01& Rev.
	01-001	Volatiles in Water - Trace Concentration	SOM01, Method 524.2
	01-004	Low/Medium Volatiles in Water (with Dioxane)	SOM01& Rev
	03-006	Low/Medium Volatiles in Soil	SOM01& Rev.
	05-003	Volatiles in Water - Trace Concentration	SOM01, Method 524.2
	05-004	Volatiles in Water - Low/Medium Concentration	SOM01& Rev
	05-008	Low/Medium Volatiles in Soil	SOM01& Rev
	07-001	Volatiles in Water - Trace Concen. -SIM (EDB & DBCP)	SOM01& Rev
	09-001	Medium-Level Volatiles in Soil	SOM01& Rev
	Requests to OEME	Volatiles in Air	TO-14, EMSL-RTP
SEMIVOLATILES	91-002	Semivolatiles in Water- ppb range	SOM01& Rev
	95-002	Semivolatiles in Water -ppb range	SOM01& Rev
	95-008	Semivolatiles in Water - ppb range	SOM01& Rev
	98-002	Semivolatiles in Water - ppb range	SOM01& Rev
	01-001	Semivolatiles in Water - ppb range	SOM01& Rev
	01-016	Semivolatiles in Soil - ppm range	SOM01& Rev
	05-005	Semivolatiles in Water - ppb range	SOM01& Rev
	05-009	Semivolatiles in Soil - ppm range	SOM01& Rev
PESTICIDES	91-003	Pesticides in Water - Low Concentration (<1ppb)	SOM01& Rev
	95-003	Low/Medium Pesticides in Water	SOM01& Rev
	95-008	Pesticides in Water - Low Concentration (<1ppb)	SOM01& Rev
	98-002	Low/Medium Pesticides in Water	SOM01& Rev
	01-001	Pesticides in Water - Low Concentration (One Aroclor)	SOM01& Rev
	03-003	Toxaphene in Water	SOM01& Rev
	03-004	Toxaphene in Soil	SOM01& Rev
	03-008	Pesticides in Soil (10 ppb and below)	SOM01& Rev
	05-002	Pesticides in Soil - High Concentration	SOM01& Rev
	05-006	Low/Medium Pesticides in Water	SOM01& Rev

PESTICIDES	06-007	Pesticides in Soil (ppb range)	SOM01& Rev
	10-001	Low/Medium Pesticides in Soil	SOM01& Rev
PCBs	04-001	Chlorinated Biphenyl Congeners in Soil - WHO List	CBC01 & Rev
	04-005	Aroclor 1254 in Soil	SOM01& Rev
	05-007	Aroclors in Water (ppb range)	SOM01& Rev
	06-001	Aroclor 1248 in Soil	SOM01& Rev
	06-002	Aroclor 1260 in Soil	SOM01& Rev
	06-005	Aroclor 1221 in Soil	SOM01& Rev
	06-006	Aroclor 1242 in Soil	SOM01& Rev
	08-004	Single Aroclor in Water - (Choice of seven)	SOM01& Rev
1,4-Dioxane	03-007	1,4-Dioxane in Water for Volatile Analysis	Method 8261A
	03-010	1,4-Dioxane in Water for Semivolatile Analysis	Modified 8270
PAHs for SIM	08-001	PAHs in Water for SIM GC/MS Analysis	SOM01& Rev
	08-002	PAHs in Soil for SIM GC/MS Analysis	SOM01& Rev
DIOXINS/FURANS [(2)]	90-009	CDD/CDF in Soil (10 to 100 ppb range)	DLM02.2, Method 1613B
	92-016	CDD/CDF in Soil with PCB Interferences (10 to 80 ppb range)	DLM02.2, Method 1613B
	95-011	CDD/CDF in Soil (ppt levels for High Resolution MS)	DLM02.2, Method 1613B
	95-012	CDD/CDF in Soil with Interferences (ppt range CDD/CDF with ppb level interferences for High Resolution MS) (Use with 95-013 as the blank)	DLM02.2, Method 1613B
	95-013	Interference Fortified Blank Soil (ppb interferences for H R MS) (Use along with 95-012 as the spiked samples)	DLM02.2, Method 1613B
	95-015	CDD/CDF in Incinerator Fly Ash (Various Levels Available)	DLM02.2, Method 1613B
	95-016	CDD/CDF in Region III Soil (ppb levels)	DLM02.2, Method 1613B
	01-003	CDD/CDF in Water (ppq levels) (Spike into 1.0 liter of lab water)	DLM02.2, Method 1613B
	01-003	CDD/CDF in Soil (ppt levels for HRMS analysis)	DLM02.2, Method 1613B
	01-017	CDD/CDF in Soil (ppt levels for HRMS analysis)	DLM02.2, Method 1613B
	01-018	CDD/CDF in Water (ppq levels, some with special interfering congeners for HRMS analysis)	DLM02.2, Method 1613B
	09-002	Soil Blank (no known interferences) (Use with the spiked samples)	DLM02.2, Method 1613B

[(2)] Dioxin/Furan Analyses require one Blank (or Interference Fortified Blank), and one Spike (or Interference Fortified Spike) at the appropriate concentration for the method. Note that blank and spike samples should be chosen so that the blank and spike pair either contains interferences or does

not contain interferences, i.e., a spike containing interferences should not be paired with a blank that does not contain interferences and vice versa.

Table 4-2: EPA NE VENDOR LIST OF PERFORMANCE EVALUATION SAMPLES

PARAMETER	MATRIX	NAME OF VENDOR[1]
DEMAND (BOD, COD, TOC)	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	Inorganic Ventures Inc., ULTRA Scientific
NUTRIENTS	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	Inorganic Ventures Inc., ULTRA Scientific
HARDNESS	Drinking Water	Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	Inorganic Ventures Inc., ULTRA Scientific
SOLIDS (TSS, TDS)	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	Inorganic Ventures Inc., ULTRA Scientific
OIL & GREASE	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	Inorganic Ventures Inc., ULTRA Scientific
MINERALS	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	Inorganic Ventures Inc,ULTRA Scientific
ANIONS	Water	ERA
CATIONS	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
pH	Drinking Water	ERA, Inorganic Ventures Inc.
	Water	ERA, Inorganic Ventures Inc.
	Wastewater	Inorganic Ventures Inc.
TRACE METALS	Drinking Water	ERA
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	Inorganic Ventures Inc., ULTRA Scientific
TRACE METALS	Transformer Oil	ULTRA Scientific
METALS	Drinking Water	Inorganic Ventures Inc., ULTRA Scientific

PARAMETER	MATRIX	NAME OF VENDOR[1]
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Soil	ERA
	Sewage Sludge	ERA
INORGANICS BLANK	Sand	ERA
	Soil	ERA
TOTAL PHENOLICS	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	Inorganic Ventures Inc., ULTRA Scientific
CYANIDE	Drinking Water	ERA, ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	Inorganic Ventures Inc., ULTRA Scientific
	Soil	ERA
	Transformer Oil	ULTRA Scientific
RESIDUAL CHLORINE	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	Inorganic Ventures Inc., ULTRA Scientific
TURBIDITY	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
ALUMINUM -High Level	Water	ERA
ASBESTOS	Water	ERA
FLUORIDE	Water	ERA
TOTAL ORGANIC HALIDES	Water	ERA
HEXAVALENT CHROMIUM	Water	ERA
URANIUM	Water	ERA
TRIHALOMETHANES	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
EDB/DBCP	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific

PARAMETER	MATRIX	NAME OF VENDOR[1]
VOLATILES	Drinking Water	ERA, ChemService, Ultra Scientific
	Water	ERA, ChemService, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	ULTRA Scientific
	Soil	ERA
	Transformer Oil	ULTRA Scientific
VOLATILES BLANK	Sand	ERA
	Soil	ERA
ACID EXTRACTABLES	Drinking Water	Inorganic Ventures Inc.
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
BASE/NEUTRAL EXTRACTABLES	Water	ERA, ULTRA Scientific
	Wastewater	ULTRA Scientific
SEMIVOLATILES	Drinking Water	ERA, Inorganic Ventures Inc., ChemService, ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ChemService, ULTRA Scientific
	Soil	ERA
	Transformer Oil	ULTRA Scientific
SEMIVOLATILES BLANK	Soil	ERA
PESTICIDES	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	ULTRA Scientific
CHLORDANE	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc.
	Wastewater	ULTRA Scientific
HERBICIDES	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific

PARAMETER	MATRIX	NAMEOF VENDOR[1]
CARBAMATE PESTICIDES	Drinking Water	ERA, ChemService, Inorganic Ventures Inc., ULTRA Scientific
	Water	ChemService, Inorganic Ventures Inc., ULTRA Scientific
TOXAPHENE	Drinking Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	ULTRA Scientific
PCBs	Drinking Water	ERA, Inorganic Ventures Inc.
	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Wastewater	ULTRA Scientific
	Oil	ERA, ULTRA Scientific
	Soil	ERA, Cambridge Isotope Laboratories
	Fish	Cambridge Isotope Laboratories
PCB SCREENING (For Method 508A)	Drinking Water	ULTRA Scientific
	Wastewater	ULTRA Scientific
PCB AS DECACHLOROBIPHENYL	Drinking Water	ERA
PAH	Water	ERA
DIOXINS	Water	Cambridge Isotope Laboratories
	Soil	Cambridge Isotope Laboratories
	Fish	Cambridge Isotope Laboratories
BTEX	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Soil	ERA, Inorganic Ventures Inc.
GASOLINE	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
	Soil	ERA
DIESEL FUEL	Water	ERA, Inorganic Ventures Inc., ULTRA Scientific
DIESEL FUEL	Soil	ERA
TOTAL PETROLEUM HYDROCARBON	Water	ERA, ULTRA Scientific
	Soil	ERA
CUSTOM MIXTURES	Air	Matheson Gas Products, Scott Specialty Gases

[1]Refer to Table 4-4 to obtain vendor's full name, telephone and Web address.

Table 4-3a: STANDARD REFERENCE MATERIAL VENDORS LIST
Inorganic

STANDARD REFERENCE MATERIAL DESCRIPTION		NAME OF VENDOR[1]
Parameter	**Matrix**	
LEAD	Fuel	NIST
	Soil	NIST
	Paint Sludge	RTC
	Paint Waste	RTC
	Dust	RTC
MERCURY	Water	NIST
	Sediment	NIST
VANADIUM	Crude Oil	NIST
VANADIUM & NICKEL	Fuel Oil	NIST
TRACE ELEMENTS	Water	NIST
	Coal Fired Industrial Plant Ash	Inorganic Ventures Inc.
	Industrial Incinerator Ash	Inorganic Ventures Inc.
	Municipal Incinerator Ash	Inorganic Ventures Inc.
	Dry Soil	Inorganic Ventures Inc.
	Diatomaceous Earth Cake	Inorganic Ventures Inc.
	Sewage Sludge Amended Soil	Inorganic Ventures Inc.
	Paint Sludge	Inorganic Ventures Inc.
	Plating Sludge	Inorganic Ventures Inc.
	Contaminated Water Filter Media	Inorganic Ventures Inc.
	Paint Chips	Inorganic Ventures Inc.
	Dust	Inorganic Ventures Inc.
METALS	Ashes	RTC
	Soils	RTC
	Sludges	RTC
	Urban Particulates & Water Filtration Wastes	RTC
TCLP METALS	Municipal Incinerator Ash	Inorganic Ventures Inc., RTC
	Superfund Site Soil	Inorganic Ventures Inc., RTC

STANDARD REFERENCE MATERIAL DESCRIPTION		NAME OF VENDOR[1]
Parameter	**Matrix**	
GENERAL	Estuarine Sediment	NIST
	Urban Particulate Matter	NIST
	Used Pellet Autocatalyst	NIST
	Used Monolith Autocatalyst	NIST
	Simulated Rainwater	NIST
	Buffalo River Sediment	NIST
	San Joaquin Soil	NIST
	Montana Soil	NIST
	Sediments Lake	RTC
	Sediments , Marine	RTC
	Sediments, Stream	RTC
	Soils	RTC
	Soil, Loam	RTC
	Soil, Sandy	RTC
	Sewage Sludge	RTC
	Fish Tissue	RTC
	Tuna Homogenate	RTC
	Cod Muscle	RTC
	Dogfish Liver	RTC
	Fish Tissue, Lyophilized	RTC
	Plankton	RTC

Table 4-3b: STANDARD REFERENCE MATERIAL VENDORS LIST
Organic

STANDARD REFERENCE MATERIAL DESCRIPTION		NAME OF VENDOR[1]
Parameter	**Matrix**	
PHENOLS IN METHANOL	---	NIST
AROMATIC HYDROCARBONS/HEXANE, TOLUENE	---	NIST
HALOCARBONS FOR H_2O	---	NIST
PAHs	Separator Sludge	Inorganic Ventures Inc., RTC
	Contaminated Soil	Inorganic Ventures Inc., RTC
	Contaminated Soil/Sediment	Inorganic Ventures Inc., RTC
	Coal Tar	NIST
PRIORITY POLLUTANTS PAHs	---	NIST
NITRATED PAH IN METHANOL	---	NIST
NITROPYRENES IN CH_2Cl_2	---	NIST
CHLORINATED PESTICIDES/HEXANE	---	NIST
CHLORINATED PESTICIDES/ISOOCTANE	---	NIST
PESTICIDE, LINDANE	---	NIST
PESTICIDE, 4,4'-DDE	---	NIST
PESTICIDE, 4,4'-DDT	---	NIST
PCBs/ISOOCTANE	---	NIST
PCBs	Oil	NIST
	Transformer Oil	Inorganic Ventures Inc., RTC
	Soil	Inorganic Ventures Inc., RTC
	Soil/Sediment	Inorganic Ventures Inc.
PCBs	Human Serum	NIST
	River Sediment	NIST

STANDARD REFERENCE MATERIAL DESCRIPTION		NAME OF VENDOR[1]
Parameter	**Matrix**	
CHLORINATED BIPHENYLS	---	NIST
ISOTOPE LABEL POLLUTANTS	---	NIST
DIOXIN	---	NIST
GENERAL	Urban Dust	NIST
	Diesel Particulate Matter	NIST
	Mussel	NIST
	Oyster Tissue	NIST
	Shale Oil	NIST
	Petroleum Crude Oil	NIST
	Copepoda, Dried/PCBs & Pest	RTC
	Fish Tissue, Lyophilized/PCBs & Pest	RTC
	Sediment "Hot Spot"/PCBs & Pest	RTC
	Tuna Homogenate	RTC
	Marine Sediment	NIST
	Cod Liver Oil	NIST

Table 4-3c: STANDARD REFERENCE MATERIAL VENDORS LIST
Analyzed Gases

STANDARD REFERENCE MATERIAL DESCRIPTION	NAME OF VENDOR[1]
SO_2 Permeation Tube	NIST
NO_2 Permeation Device	NIST
Methane/Air	NIST
Methane + Propane/Air	NIST
SO_2/N_2	NIST
Propane/Air	NIST
CO_2/Air	NIST
CO_2/N_2	NIST
NO/N_2	NIST
CO_2, O_2/N_2	NIST
Organic Compounds/Nitrogen	NIST
Volatile Toxic Organics	NIST
Benzene/Nitrogen	NIST
Benzene, Toluene, Chlorobenzene, & Bromobenzene/Nitrogen	NIST
Carbon Tetrachloride, Chloroform, Tetrachloroethylene & Vinyl Chloride/N_2	NIST
CO_2/N_2O/Air	NIST
CO/Air	NIST
CO_2/N_2	NIST
NO/N_2	NIST
C_3H_8/N_2	NIST
Oxides of Nitrogen/Air	NIST
O_2/N_2	NIST
CO/N_2	NIST
IM Gases, 3 Components	NIST

[1]Refer to Table 4-4 for vendor's full name, Website, telephone and telefax numbers.

Table 4-4: LIST OF PES/SRM VENDORS

NAME OF VENDOR	PES or SRM	TELEPHONE NUMBER
1. Cambridge Isotope Laboratories http://www.isotope.com/cil/products/market_detail.cfm?market=environmental	PES	800-322-1174 978-749-8000
2. Chem Service, Inc. http://www.chemservice.com/store.html#	PES	800-452-9994 610-692-3026
3. Environmental Resource Associates (ERA) (Combined with Analytical Products Group) http://www.eraqc.com/pages/public/products/download.aspx	PES	800-554-2511 702-898-3395
4. Inorganic Ventures, Inc http://inorganicventures.com/catalog/.	PES & SRM	800-669-6799 540-585-3012
5.Matheson Gas Products http://www.mathesongas.com/catalog/category.aspx?category_id=7&mode=specialty	PES	800-416-2505
6. National Institute of Standards and Technology (NIST) http://www.nist.gov/srm/using_catalog.cfm	SRM	301-975-2200
7. Resource Technology Corporation (RTC) http://www.rt-corp.com/products/	SRM	800-576-5690 307-742-5452
8. Scott Specialty Gases http://www.epaperflip.com/aglaia/viewer.aspx?docid=2252907b7653470c88ece00eeda616db&page=0	PES	877-715-8651
9. ULTRA Scientific http://www.ultrasci.com/catalogstart.aspx	PES	800-338-1754 401-294-9400

Chapter 5
Acronyms and Glossary of Terms

For general terms and acronyms, refer to EPA's Terminology Services Website:
http://iaspub.epa.gov/sor_internet/registry/termreg/searchandretrieve/termsandacronyms/search.do

For QA-related terms EPA NE adopts the acronyms and definitions provided in the following documents:

a. **Introduction to the Contract Laboratory Program (Appendix A – List of Acronyms Appendix B – Glossary)**
http://epa.gov/superfund/programs/clp/download/clpintro.pdf

b. **CLP National Functional Guidelines for Superfund Organic Methods Data Review (Appendix A – Glossary)**
http://epa.gov/superfund/programs/clp/download/somnfg.pdf

c. **CLP National Functional Guidelines for Inorganic Superfund Data Review (Appendix A – Glossary)**
http://epa.gov/superfund/programs/clp/download/ism/ism1nfg.pdf

d. **USEPA Analytical Services Branch (ASB) National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review**
http://www.epa.gov/superfund/programs/clp/download/dlm/dlm2nfg.pdf

e. **Uniform Federal Policy for Quality Assurance Project Plans – Evaluating, Assessing, and Documenting Environmental Data Collection and Use Programs Part 1: UFP-QAPP Manual (Glossary of Quality Assurance and Related Terms)**
http://www.epa.gov/fedfac/pdf/ufp_qapp_v1_0305.pdf

In addition, the following terms are defined by EPA NE.

Action High/Action Low – Analytes in PESs are scored as "action high" or "action low" if the concentration of the analyte is above or below, respectively, the acceptance limit for that particular analyte. The action high and action low acceptance limits are set by the Quality Assurance Technical Support (QATS) team based on statistical analysis of multiple analytical results. The PES scores are used to qualify the field sample results based on the procedures described in Section 2.7.3.5 of this document.

Complete SDG File Inventory Sheet (DC-2 Form) - The "DC-2 Form" lists all the deliverable components in the Complete SDG File. Each laboratory record is listed by page number. The form can be found in the CLP Statements of Work.

Data Qualifier Flags – A code applied to sample results by a data reviewer to indicate a verifiable or potential data deficiency or bias with the data being reviewed. Acceptable qualifiers for use in EPA NE are listed in Section 1.3.2.

Data Review Report –Is a one page report produced by the data reviewer to document for EPA NE the results of the data review. The report follows the specific format outlined in Section 2.3.2.

Data Summary Tables - Are spreadsheets attached to the Data Review Report which list the analytical results and their qualifiers (flags) for the field samples.

Data Usability - The process of determining and ensuring that the quality of the data produced meets the intended use of the data (b). A data usability assessment may be reported in conjunction with the Data Review Report and included as part the final project report; alternatively, a separate Data Usability Assessment Report may be issued. However reported, all limitations and restrictions on the use of the data are documented.

Electronic Data Exchange and Evaluation System (EXES) - The web-based Electronic Data Exchange and Evaluation System (EXES) is used by CLP customers and laboratories to perform automated data assessment and contract compliance screening. EXES provides CLP customers with electronic data assessment reports and spreadsheets customized to their data review needs. EXES provides contract compliance screening to CLP laboratories. Laboratories use EXES to upload their Electronic Data Deliverable (EDD) and receive an emailed report outlining any compliance issues found in the EDD. This allows CLP laboratories to inspect the contractual completeness and compliance of their EDD prior to delivery to EPA, resulting in a more compliant deliverable for CLP customers. EXES is one of the online tools provided by EPA's Analytical Services Branch and found at: http://www.epa.gov/superfund/programs/clp/asbtools.htm

EPA Field Sampling Personnel (EFSP) - EPA NE staff members who perform field sampling operations.

False Negative - The situation where a laboratory fails to detect and identify an analyte which is present in the PES or in an environmental sample. This is a serious problem which could lead to failure to implement necessary remedial actions.

False Positive - The situation where a laboratory reports the presence of a target or non-target analyte which was not present in a PES or in the environmental sample. This is a serious problem which could lead to unnecessary site actions.

Field Sampling Contractor (FSC) - Environmental firms which are under contract to EPA to perform field sampling operations at Superfund sites in the Region.

PES Scoring Evaluation Report (PES Score Report) - Is the report generated by the SPSWEB program from QATS. The report shows the results of the comparison between the PES's analytical results and the statistically defined acceptance windows. Each analyte in the PES is scored as either Acceptable or Warning High/Low or Action High/Low. The data reviewer qualifies/flags the field sample results based on the information in the PES score report. The score report is used in Section 2.7.3.5 of the Date Review Supplement.

Potentially Responsible Party (PRP) - A PRP is an individual or company (such as owners, operators, transporters, or generators of hazardous waste) that is potentially responsible for, or contributing to, the contamination problems at a Superfund site. Whenever possible, EPA NE requires PRPs, through administrative and legal actions, to clean up hazardous waste sites they have contaminated.

Sample Log-In Sheet (CLP DC-1 Form) - The DC-1 Form is completed by the analytical laboratory upon sample receipt and documents critical information concerning the samples including log-in date and sample condition.

Staged Electronic Data Deliverable (SEDD) - The Staged Electronic Data Deliverable (SEDD) is a uniform format for electronic delivery of analytical data for environmental programs. The data deliverable generated by SEDD is an industry-standard Extensible Markup Language (XML) file. For more details see: http://www.epa.gov/fem/sedd.htm.

Standard Reference Materials (SRM) - The reference materials distributed and certified by an appropriate national institute for standardization, including the National Institute of Standards and Technology (NIST) found at http://www.nist.gov/srm/. The National Research Council Canada also supplies certified reference materials at https://commerce-irc.nrc-cnrc.gc.ca/nrcb2c/b2c/start/(xcm=NRC-R3PITREX)/.do.

Tiered Approach – EPA NE adopts a tiered approach for reviewing data which allows EPA NE Project Managers to apply data review procedures commensurate with project objectives.

Warning High/Warning Low - PES results for a particular analyte will be scored as Warning High or Warning Low if the result is outside the range set by plus and minus two sigma units away from the mean but within the range set by three sigma units. The warning high and warning low limits are set by the Quality Assurance Technical Support (QATS) team based on statistical analysis of multiple analytical results. The PES scores are used to qualify the field samples based on the procedures described in Section 2.7.3.5 of this document.

Chapter 6
References

1. *EPA New England Data Review Program Guidance*, http://www.epa.gov/region1/oeme/index.html
2. Quality Standard for Environmental Data Collection, Production, and Use by EPA Organizations, CIO Standard 2106-S-01,(website to be added)
3. *Quality Systems for Environmental Data and Technology Programs - Requirements with Guidance for Use*, American National Standard, (ANSI/ASQ E4 -2004), February 2004
4. *USEPA Guidance on Data Verification and Data Validation* (EPA QA/G-8), December 2002, EPA/240/R-02/004, http://www.epa.gov/quality/qs-docs/g8-final.pdf
5. *EPA NE England Quality Management Plan*, July 28, 2011 http://www.epa.gov/region1/lab/qa/qmp/index.html
6. *EPA NE Quality Assurance Project Plan Program Guidance*, 2010 http://www.epa.gov/region1/lab/qa/pdfs/QAPPProgram.pdf
7. *EPA NE Assessment Program*, 2002
8. *USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*, OSWER Directive 9200.1-85, http://www.epa.gov/superfund/policy/pdfs/EPA-540-R-08-005.pdf
9. *USEPA Science Policy Council Peer Review Handbook* - http://www.epa.gov/peerreview/pdfs/prhandbk.pdf
10. *USEPA Science Policy Council Summary of General Assessment Factors for Evaluating the Quality of Scientific and Technical Information*, 2003 http://www.epa.gov/spc/pdfs/assess2.pdf
11. *USEPA Guidance on the Development, Evaluation, and Application of Environmental Models* http://www.epa.gov/crem/library/cred_guidance_0309.pdf
12. *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review* http://www.epa.gov/superfund/programs/clp/download/somnfg.pdf
13. *USEPA CLP National Functional Guidelines for Inorganic Superfund Data Review* http://www.epa.gov/superfund/programs/clp/download/ism1nfg.pdf
14. *USEPA Analytical Services Branch (ASB) National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review* http://www.epa.gov/superfund/programs/clp/download/dlm/dlm2nfg.pdf
15. *Quality Assurance Handbook for Air Pollution Measurement Systems*, EPA-454/R-98-004 http://itep68.itep.nau.edu/itep_downloads/DAI%20resources/EPA%20QA%20Guidance%20Docs/QA_Handbook_Redbook.pdf
16. EPA Records Management Schedules http://www.epa.gov/records/policy/schedule/schedules.htm
17. *Data Usability in Risk Assessment* Publication 9285.7-09A PB92-963356 April 1992
18. Office of Water Regulations and Standards Industrial Technology Division (Method 1620 Section 14.16, DRAFT September 1989) http://nepis.epa.gov/Exe/ZyNET.exe/20002GLA.txt?ZyActionD=ZyDocument&Client=EPA&Index=1986%20Thru%201990&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C86THRU90%5CTXT%5C00000003%5C20002GLA.txt&U

ser=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=10&ZyEntry=33

19. FINAL QUALITY ASSURANCE and QUALITY CONTROL DATA STANDARD, Standard No.: EX000012.2, February 4, 2010, http://iaspub.epa.gov/sor_internet/registry/datastds/findadatastandard/epaapproved/qaqc2/

Attachment 2-1: EPA New England QA Data Review Personnel and Contact Information

Title	Name	Phone Number	e-mail Address
EPA New England Data Review Chemist	Vicki Maynard	617.918.8614	Maynard.Vicki@epa.gov
	Backup: Steve Stodola	617.918.8634	Stodola.Steve@epa.gov
EPA New England Performance Evaluation Chemist	Leo Corben	617.918.8630	Corben.Leo@epa.gov
	Backup: Steve Stodola	617.918.8634	Stodola.Steve@epa.gov
Regional Sample Receipt Coordinator	Christine Clark	617.918.8615	Clark.Christine@epa.gov
	Backup: Steve DiMattei	617.918.8369	DiMattei.Steve@epa.gov

Attachment 2-2 – Example Data Review Reports

[redacted]
US EPA Approval Signature

12-13-12
Date

[redacted]
Remedial Project Manager
EPA New England
5 Post Office Square, Suite 100
Boston, MA 02109

December 13, 2012

Re: TO No. 85, Task No. 1, TDF No. 2783
Case No. 42887, SDG No. A3NR9
[redacted]
Precision Plating Site, Vernon, CT
Stage_3_Validation_Electronic_and_Manual (S3VEM)

Semivolatiles/Semivolatiles by SIM/Aroclors:

4/Equipment Blank/ A3NR9, A3NS0, A3NZ4, A3NZ5

Dear Ms. [redacted]:

A stage 3 electronic and manual validation was performed on the organic analytical data for four aqueous equipment blanks collected by [redacted] for U.S. EPA at the Precision Plating Site in Vernon, CT. The samples were analyzed according to USEPA SOW SOM01.2, April 11, 2007. The samples were validated using first the criteria in the USEPA SOW SOM01.2; and the Quality Assurance Project Plan (QAPP) for Remedial Investigation/Feasibility Study, Precision Plating Superfund Site, Vernon, CT, March 2012; then the USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review, June 2008; defaulting next to Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996 procedures; and finally to EPA Region I's Environmental Services Assistance Team Organic Data Validation SOP ESAT-01-0082 (03/30/07).

The data were evaluated based on the following parameters:

*	•	Data Completeness
*	•	Preservation and Technical Holding Times
*	•	GC/MS Instrument Performance Check
	•	Initial Calibrations
	•	Continuing Calibration Verifications
	•	Blanks
*	•	Deuterated Monitoring Compounds and Surrogate Compounds
*	•	Internal Standards
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Laboratory Control Sample Results
N/A	•	Field Duplicates
N/A	•	PE Samples/Accuracy Check

* • Target Compound Identification
* • Compound Quantitation and Reported Quantitation Limits
* • Tentatively Identified Compounds
* • System Performance

* - All criteria were met for this parameter.
Stage 3 Electronic Data Review Reports were available for this SDG.

Overall Evaluation of Data and Potential Usability Issues

The following is a summary of the site investigation/assessment objectives:

- Complete a remedial investigation/feasibility study (RI/FS) that results in a well-supported Record of Decision (ROD) for the Site.
- Refine the understanding of Site hydrogeology and the sources, nature, vertical extent, and fate of contaminants released at the Site to soil, groundwater, residential well water, surface water and sediment (air and vapor intrusion are not media of interest).
- Identify critical remaining data gaps and data needs, if any, to complete the RI.
- Use the data from the RI to help quantify human health and ecological risk assessments.
- Use the data from the RI to support an FS to identify an appropriate remedy for the Site to mitigate residual risk.

Data validation indicated only minor data quality problems.

Semivolatiles (Full Scan): Results were qualified due to method blank contamination.

Semivolatiles (SIM): Results were qualified due to initial calibration and continuing calibration %RSD and %D noncompliance for pentachlorophenol.

Aroclors: No qualifiers were required.

See the attached worksheets for details. The results reported on the Data Summary Tables are usable for the site objectives.

Ms. [redacted]
Page 3

December 13, 2012

Sincerely,

[redacted]

Data Validator

[redacted]

Program Manager

Attachments: Data Summary Tables
EXES NFG Report #06 - Analytical Sample Listing
EXES NFG Report #09 - Tentatively Identified Compounds
Data Validation Worksheets
Support Documentation
Communications
Field Notes
CSF Audit

Lab: XXXXX SDG: A3NR9 Case: 42887 SOW: SOM01.2 Analysis: Aroclor

Sample	A3NR9		A3NS0		A3NZ4		A3NZ5	
Location	EB-SB-01		EB-SB-02		EB-HA-01		EB-HA-02	
Type	Field_Blank		Field_Blank		Field_Blank		Field_Blank	
Matrix/Level	Water/Low		Water/Low		Water/Low		Water/Low	
Dilution Factor	1.0		1.0		1.0		1.0	
% Moisture	N/A		N/A		N/A		N/A	
Units	ug/L		ug/L		ug/L		ug/L	
Compounds	Final Result	Final Flag	Final Result	Final Flag	Final Result	Final Flag	Final Result	Final Flag
Aroclor-1016	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1221	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1232	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1242	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1248	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1254	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1260	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1262	1.0	U	1.0	U	1.0	U	1.0	U
Aroclor-1268	1.0	U	1.0	U	1.0	U	1.0	U

Lab: XXXXX **SDG**: A3NR9 **Case**: 42887 **SOW**: SOM01.2 **Analysis**: BNA/BNA-SIM

Sample No.:	**A3NR9**		**A3NS0**		**A3NZ4**		**A3NZ5**	
Sample Location:	**EB-SB-01**		**EB-SB-02**		**EB-HA-01**		**EB-HA-02**	
Sample Type:	**Field_Sample**		**Field_Sample**		**Field_Sample**		**Field_Sample**	
Matrix/Level:	**Water/Low**		**Water/Low**		**Water/Low**		**Water/Low**	
Dilution Factor:	**Full Scan = 1 SIM = 1**		**Full Scan = 1 SIM = 1**		**Full Scan = 1 SIM = 1**		**Full Scan = 1 SIM = 1**	
% Moisture:	**N/A**		**N/A**		**N/A**		**N/A**	
Units:	**ug/L**		**ug/L**		**ug/L**		**ug/L**	
Compound	**Final Result**	**Final Flag**	**Final Result**	**Final Flag**	**Final Result**	**Final Flag**	**Final Result**	**Final Flag**
Benzaldehyde	5.0	U	5.0	U	5.0	U	5.0	U
Phenol	5.0	U	5.0	U	5.0	U	5.0	U
Bis (2-Chloroethyl) ether	5.0	U	5.0	U	5.0	U	5.0	U
2-Chlorophenol	5.0	U	5.0	U	5.0	U	5.0	U
2-Methylphenol	5.0	U	5.0	U	5.0	U	5.0	U
2,2-Oxybis (1-Chloropropane)	5.0	U	5.0	U	5.0	U	5.0	U
Acetophenone	5.0	U	5.0	U	5.0	U	5.0	U
4-Methylphenol	5.0	U	5.0	U	5.0	U	5.0	U
N-Nitroso-di-n-propylamine	5.0	U	5.0	U	5.0	U	5.0	U
Hexachloroethane	5.0	U	5.0	U	5.0	U	5.0	U
Nitrobenzene	5.0	U	5.0	U	5.0	U	5.0	U
Isophorone	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitrophenol	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dimethylphenol	5.0	U	5.0	U	5.0	U	5.0	U
Bis (2-Chloroethoxy) methane	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U
Naphthalene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
4-Chloroaniline	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobutadiene	5.0	U	5.0	U	5.0	U	5.0	U

Caprolactam	5.0	U	5.0	U	5.0	U	5.0	U
4-Chloro-3-methylphenol	4.4	J	4.2	J	3.6	J	4.9	J
2-Methylnaphthalene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Hexachlorocyclopentadiene	5.0	U	5.0	U	5.0	U	5.0	U
2,4,6-Trichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U
2,4,5-Trichlorophenol	5.0	U	5.0	U	5.0	U	5.0	U
1,1'-Biphenyl	5.0	U	5.0	U	5.0	U	5.0	U
2-Chloronaphthalene	5.0	U	5.0	U	5.0	U	5.0	U
2-Nitroaniline	10	U	10	U	10	U	10	U
Dimethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U
2,6-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U
Acenaphthylene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
3-Nitroaniline	10	U	10	U	10	U	10	U
Acenaphthene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
2,4-Dinitrophenol	10	U	10	U	10	U	10	U
4-Nitrophenol	10	U	10	U	10	U	10	U
Dibenzofuran	5.0	U	5.0	U	5.0	U	5.0	U
2,4-Dinitrotoluene	5.0	U	5.0	U	5.0	U	5.0	U
Diethylphthalate	5.0	U	5.0	U	5.0	U	5.0	U
Fluorene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
4-Chlorophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U
4-Nitroaniline	10	U	10	U	10	U	10	U
4,6-Dinitro-2-methylphenol	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine	5.0	U	5.0	U	5.0	U	5.0	U
1,2,4,5-Tetrachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U
4-Bromophenyl-phenylether	5.0	U	5.0	U	5.0	U	5.0	U
Hexachlorobenzene	5.0	U	5.0	U	5.0	U	5.0	U
Atrazine	5.0	U	5.0	U	5.0	U	5.0	U
Pentachlorophenol	0.20	U S	0.20	U S	0.20	UJ[2] S	0.20	UJ[2] S
Phenanthrene	0.10	U S	0.10	U S	0.10	U S	0.10	U S

Anthracene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Carbazole	5.0	U	5.0	U	5.0	U	5.0	U
Di-n-butylphthalate	5.0	U[1]	1.7	J	5.0	U[1]	5.0	U[1]
Fluoranthene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Pyrene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Butylbenzylphthalate	5.0	U	5.0	U	5.0	U	5.0	U
3,3-Dichlorobenzidine	5.0	U	5.0	U	5.0	U	5.0	U
Benzo (a) anthracene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Chrysene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Bis (2-Ethylhexyl) phthalate	5.0	U[1]	1.8	J	5.0	U	1.1	J
Di-n-octylphthalate	5.0	U	5.0	U	5.0	U	5.0	U
Benzo (b) fluoranthene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Benzo (k) fluoranthene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Benzo (a) pyrene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Indeno (1,2,3-cd) pyrene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Dibenzo (a,h) anthracene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
Benzo (g,h,i) perylene	0.10	U S	0.10	U S	0.10	U S	0.10	U S
2,3,4,6-Tetrachlorophenol	5.0	U	5.0	U	5.0	U	5.0	U

S3VEM DATA VALIDATION QUALIFIER
COMMENTS:

J - Sample concentrations reported by the laboratory below the lowest standard are flagged (J) on the Data Summary Table as estimated values with no superscripts.

S - Result reported from undiluted SIM analyses

[1] Method blank contamination; the positive sample results that are less than the adjusted CRQL are reported as non-detects (U) at the adjusted CRQL.

[2] Initial and continuing calibration %RSD and %D outside criteria for pentachlorophenol; the non-detected sample results are estimated (UJ).

Attachments 2-3a – Example Inorganic Data Review Worksheets

S: QUALITY ASSURANCE/Data Review Program Guidance & Supplement/Data Review Supplement/Inorganic DR Worksheets
Q: Share/ QUALITY ASSURANCE/Data Review Program Guidance & Supplement/Data Review Supplement/Inorganic DR Worksheets

Attachments 2-3b – Example Organic Data Review Worksheets

S: QUALITY ASSURANCE/Data Review Program Guidance & Supplement/Data Review Supplement/Organic DR Worksheets
Q: Share/ QUALITY ASSURANCE/Data Review Program Guidance & Supplement/Data Review Supplement/Organic DR Worksheets

Attachment 4-1: EPA NE SUPERFFUND PERFORMANCE EVALUATION SAMPLE (PES) REQUEST FORM

SUPERFUND PERFORMANCE EVALUATION SAMPLE REQUEST FORM

Complete this form and send it to:
QATS Laboratory
2700 Chandler Avenue, Bldg. C
Las Vegas, NV 89120
PHONE: (702) 895-8722
FAX: (702) 795-8210

QATS SHIPS ALL MATERIALS WITHIN 72 HOURS OF RECEIPT OF REQUEST

FOR QATS USE ONLY		
Packaged By/Shipped By**:**		
Ship Date:		
Airbill # **:**		
COC #:		
Order #:		

Date of Request: / / SDG Number:

Date Materials Needed: / / For Use With SOW:

Site-specific Superfund Acct. #: Superfund Site Name: CERCLIS #:

Ship materials, request and chain of custody with sample numbers to:

Name:					
Company:					
Address:					
City:		State:		Zip Code:	
Telephone No.:		Fax No.:		E-Mail:	

Send copies of this request and chain of custody with sample numbers to:

Name:	Leo Corben (Grantee)				
Company:	US EPA				
Address:	11 Technology Drive				
City:	N.Chelmsford	State:	MA	Zip Code:	01863-2431
Telephone No.:	617-918-8630	Fax No.:	617-918-8397	E-Mail:	corben.leo@epa.gov

Sample Catalog Number	Required Analyte & Concentration (If Known)	Sigma Number (Optional)	Number Requested	FOR QATS USE ONLY	
				Sample #	Remarks

I acknowledge that, by law, PESs from the Superfund PES Repository cannot be used to support other U.S. EPA programs and/or other federal/state/local agencies for non-Superfund activities. As an Authorized PES Requestor, I certify that the above Performance Evaluation Samples are to be used in support of Superfund activities only.

Print Name

Authorized Signature