APPENDIX J

DATA USABILITY SUMMARY REPORTS

DATA USABILITY SUMMARY REPORT

REVERE SMELTING AND REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase I Remedial Design/ Remedial Action

Prepared by:

Quality Assurance Associates (*QAA, L.L.C.*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

September 22, 2012

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 4

3.0 DATA VALIDATION RESULTS 5

3.1 PRECISION 5
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 5
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 5
3.1.3 Field Duplicate (FD) Precision 5
3.2 ACCURACY 6
3.2.1 Laboratory Control Spike (LCS) Accuracy 6
3.2.2 Matrix Spike (MS) Accuracy 6
3.2.3 Serial Dilution (SD) %Difference 6
3.2.4 Surrogate (SU) Recovery 7
3.3 REPRESENTATIVENESS 7
3.3.1 Chain-of-Custody and Analysis Requests 7
3.3.2 Sample Preservation and Holding Time 8
3.3.3 Laboratory and Method Selection 8
3.3.4 Blanks (Laboratory and Field) 9
3.3.5 Analytical Procedures 10
3.4 COMPLETENESS 10
3.4.1 Laboratory Deliverables Completeness 10
3.4.2 EDD Correctness 11
3.4.3 Analytical Completeness 12
3.5 COMPARABILITY 12

LIST OF TABLES

Table 1 – Samples Collected and Tests Performed
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – QC Deficiencies and Data Qualification Actions
Table 4 – Qualified Results for Field Samples
Table 5 – Field Duplicate Results

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting and Refining Site Operable Unit 1 in Middletown, New York. The independent data review was completed in accord with the *Phase I Remedial Design/ Remedial Action Workplan* (Revision 1, December 2011), hereinafter called the Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 262 investigative soil samples plus the associated field QC samples, which were collected by ENTACT in March through May 2012 with the intended use of verifying that remediation goals have been achieved in excavated grids and confirming that backfill materials are suitable for use on-site. A complete listing of the samples collected and tests performed is shown in Table 1. QAA performed a full validation of the data and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) as specified in section 5.9 of the Workplan. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Data Review* (October 2004) and *National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The Workplan stipulates that the precision control limits will be dictated by the analytical method and the limits are 10-30 RPD, depending upon the test. The validator assessed precision using the laboratory and field duplicates. The laboratory prepared laboratory control spike duplicates (LCSD) using reagent water or sand for the HERB and VOC tests plus two or more unspiked matrix duplicates (MD) or matrix spike duplicates (MSD) using a sample from the site for every test. All LCS/LCSD RPDs are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. The RPDs for the matrix duplicates are within the limits, which indicates good precision for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the duplicate. Of the 6,047 total results, only 65 results (all of which are detects for metals) are qualified as estimated (J) based on laboratory duplicate precision. Additionally, the sampler collected 15 field duplicates with the 262 samples and the RPDs are within the limits, which indicates good precision for the sampling and analytical technique on the given matrix, or the validator qualified the results for the original and duplicate sample. Only four of the 235 pairs of results are qualified as estimated (J or UJ) based on field duplicate precision. For each qualified pair, the higher result (i.e., from either the original or duplicate sample) should be used for project decisions. This gives a conservative approach relative to protection of the environment. (For field duplicate pairs that pass the precision criteria, the value should be selected based on accepted convention for the site and/or agency requirements, e.g., select the value reported for the original sample, the average of the two values, etc.)
2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field

samples and calculation of the percent recovery of the known value. The Workplan stipulates that the accuracy control limits will be dictated by the analytical method. For most tests, the analytical method stipulates that the laboratory calculate in-house performance criteria. In order to better assess data usability, limits of 50-200% were employed where the laboratory limit for a spiked analyte falls outside these values. The validator assessed accuracy using the laboratory spikes and matrix spikes. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with each analytical batch and reported the recovery for every target compound except the multi-component pesticide technical Chlordane and five of the seven multi-component PCB Aroclors. The laboratory also prepared a laboratory control spike duplicate (LCSD) with each HERB analytical batch and several of the VOC analytical batches. All LCS/LCSD recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. Additionally, the laboratory prepared several matrix spikes (MS) and matrix spike duplicates (MSD) plus serial dilutions (SD) for the metals analyses using a sample from the site, including two or more for every test. The MS/MSD recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the MS/MSD. Likewise, the SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy of the metals results, or the validator qualified the results for similar samples in the same analytical batch as the SD. Eight non-detect results for Pentachlorophenol are qualified as rejected (R) due to extremely low matrix spike recovery (less than 10%). Of the remaining 6,039 results, only 99 results (most of which are for volatile organic compounds) are qualified as estimated based on matrix spike recovery. The qualification includes the expected direction of bias where known (i.e., J+ for high MS/MSD recovery and J- for low MS/MSD recovery). Additionally, the laboratory utilized one or more surrogate spikes for each organic analysis. The surrogate recoveries are within the laboratory limits for all samples but one SVOC sample (BF-3230c-001-0'-4.5') and one Pesticide sample (BF-2985c-001-0'-8'). Both samples are all non-detect and the validator qualified the results as estimated (UJ).

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, investigative samples were collected as required in the approved sampling and analysis plan with the exception of deviations that were approved by NYSDEC (e.g., sidewalls that will be excavated in Phase 2 were not sampled, the north and west sidewalls of grid 16 were considered one sidewall due to slope, grid 43 was deferred to Phase 2, etc.). All other planned samples were collected in addition to a number of unplanned samples (e.g., additional confirmation samples were collected due to unanticipated excavations, additional floor samples were collected based on the grid floor square footage, etc.). Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory and field blanks, and analytical instrument setup (i.e., tuning, calibration, interference correction, etc.) For all samples, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. Also, the laboratory prepared and analyzed a method blank with each analytical batch and the sampler collected four trip blanks with the VOC samples. The laboratory and field blanks show no contamination, which indicates the samples were not affected by laboratory or field procedures, or the validator qualified the samples associated with the blank that have a concentration similar to that in the blank. The qualified results are for TCLP Lead (8 of the 140 results qualified

due to laboratory leachate blank contamination), Acetone (48 of the 92 results qualified due to laboratory blank contamination, which includes all but eight of the 56 detects), and Methylene Chloride (82 of the 92 results qualified due to laboratory and/or trip blank contamination, which includes all but six of the 88 detects). Per the NFG, the validator qualified detects above the reporting limit with a J+ flag while detects below the reporting limit (i.e., laboratory J-values) were qualified with a U flag. Results with a U flag should be considered not detected at the reporting limit, and thus the validator replaced the concentration reported by the laboratory with the reporting limit. Additionally, proper analytical procedures were used and calibration results met the method requirements or the validator qualified the affected samples. All of the 1,4-Dioxane results, which are all non-detects, are qualified as estimated (UJ) due to low instrument response. Additionally, 42 results are qualified due to calibration drift.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed with a specific matrix and/or analysis. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. All analyses of investigative samples produced valid analytical measurements, with the exception of eight non-detect results for Pentachlorophenol. With 6,047 total results, this gives a completeness of 99.9%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples selected for validation were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics for all laboratory job numbers except 460-38653-1. The analytical results for organics are reported in mg/kg with dry-weight correction for this job number.

DATA USABILITY

The results for Pentachlorophenol in eight backfill samples are qualified as rejected (R) and thus are not suitable for use. The absence or presence of this analyte cannot be confirmed in the qualified samples due to extremely low matrix spike recovery (less than 10%). All other results for the investigative samples are acceptable for use with the qualifications shown in Table 4. Results that are qualified with a UJ should be considered not present above the reporting limit; however the reporting limit is an estimated value. Results that are qualified with a J- (biased low) can be used for determining the presence of the analyte and as an indication that the concentration of the analyte exceeds a given criterion. However, the concentration reported for detects may be low. Results that are qualified with a J+ (biased high) can be used for determining the presence of the analyte and as an indication that the concentration of the analyte is less than a given criterion. However, the concentration reported for detects may be high. Similarly, results that are qualified with a J (estimated) may be either low or high. For results qualified with a U (blank contamination), the analyte should be considered not detected at the reporting limit.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables, which include hardcopy data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Data Package Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Instrument Tuning and Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD),
- Field Duplicates (FD),
- Surrogates (SU), and
- Internal Standards (IS).

Additionally, the validator examined the raw data for 10% of the sample batches (randomly selected by the validator across the various analysis dates and tests) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of all laboratory narrative comments and how each affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are typically the laboratory-derived recovery control limits based on historical performance (but not less than 50% lower limit or greater than 200% upper limit)
- Laboratory Precision – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which range from 10-30 RPD
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 30% for inorganics, 20% for purgeable organics (VOC), and 10% for extractable organics were used. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD) and matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

The laboratory analyzed an LCSD for every analytical batch (maximum 20 samples) and reported RPDs for all target compounds for each HERB batch and the VOC batches without an MS/MSD prepared using a sample from the site. All RPDs are at or below the control limit.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every inorganics analytical batch (maximum 20 samples) and an MSD for every organics analytical batch (maximum 20 samples) and reported RPDs for MD and MSD prepared using a sample from the site. A total of 29 different soil samples from the site were used to prepare an MD or MSD for one or more tests. With a total of 262 investigative soil samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Additionally, the validator noted that two or more MD or MSD are reported for each type of analytical test and sample media (i.e., backfill, excavation confirmation, or documentation).

Some MD and MSD RPDs are above the control limit and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that, for cases where either result for the duplicate pair is non-detect, the check does not apply as the laboratory reported the RPD as NC (not calculable) in the hardcopy report and as 0 in the EDD. Additionally, the validator considered samples of the same media (i.e., backfill, excavation confirmation, or documentation) to be of similar matrix (e.g., if deficiencies were noted for a MD or MSD prepared using a backfill sample, all backfill samples in the same analytical batch were qualified).

3.1.3 FIELD DUPLICATE (FD) PRECISION

The samplers collected 15 FD with the 262 investigative samples, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Results for the field duplicates are summarized in Table 5.

Four pairs of results are outside the field precision criteria and the validator qualified the data as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the remaining 235 pairs of FD results meet the criteria, which indicates good overall precision, and thus the validator only qualified the original and duplicate sample for the four FD deficiencies.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD), matrix spikes (MS/MSD), serial dilutions (SD), and surrogate (SU) spikes. LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique on the given sample matrix. Surrogates are added to each sample before preparation and analysis and provide an indication of accuracy for each individual sample analysis.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS and/or LCSD for every analytical batch (maximum 20 samples) as required and reported recoveries for all target compounds except the multi-component pesticide technical Chlordane and five of the seven multi-component PCB Aroclors. All recoveries are within the control limits.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS for every inorganics analytical batch (maximum 20 samples) and an MS/MSD for every organics analytical batch (maximum 20 samples) and reported recoveries for MS and MSD prepared using a sample from the site. A total of 29 different soil samples from the site were used to prepare a matrix spike for one or more tests. With a total of 262 investigative soil samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Additionally, the validator noted that two or more matrix spikes are reported for each type of analytical test and sample media (i.e., backfill, excavation confirmation, or documentation).

Some MS and MSD recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that if an analyte was detected in the unspiked parent sample at a concentration well above (greater than four times) the concentration of spike added to the sample, thereby rendering the recoveries inconclusive, the check was waived and the validator did not qualify the data. For cases where the MS or MSD recovery is outside the control limits but greater than the data rejection limit (30% for inorganics, 20% for purgeable organics (VOC), and 10% for extractable organics) and the average MS/MSD recovery is in control, the validator did not qualify the data. The validator also did not qualify the data for cases where the MS or MSD recovery is outside the control limits (i.e., the laboratory-derived recovery control limits based on historical performance or 50-200%, whichever is more stringent) but within 70-130% since this is considered within the inherent method error and suitable for the intended use. Additionally, the validator considered samples of the same media (i.e., backfill, excavation confirmation, or documentation) to be of similar matrix (e.g., if deficiencies were noted for a MS/MSD prepared using a backfill sample, all backfill samples in the same analytical batch were qualified).

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all target compounds detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.2.4 SURROGATE (SU) RECOVERY

The laboratory spiked each organic sample with one or more surrogates before preparation and analysis.

A few surrogate recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

All samples were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records, which confirms that sample integrity was maintained. The validator noted the following regarding the custody records and sample log-in at the laboratory:

- All samples were received within two days of collection as recommended in DER-10 except those in laboratory job numbers 460-39364-1 and 460-39365-1, which were received three days after collection in good condition.
- Custody seals were only used on the sample shipping containers for a few of the laboratory job numbers; however for all laboratory job numbers the laboratory sample custodian noted that the coolers and samples did not appear to have been compromised or tampered with.
- The samplers did not enter any of the trip blanks (laboratory sample IDs 460-38653-43, 460-38653-44, 460-38780-39, and 460-38859-28) on the custody records. All trip blanks were logged in for VOC analysis upon receipt at the laboratory per ENTACT.
- The sampler did not enter the time relinquished on the custody record for laboratory job numbers 460-38859-1 and 460-39614-1. The date relinquished and release signature are present.
- The laboratory sample custodian did not enter the date/time relinquished on the second page of the custody record for laboratory job number 460-39845-1. The release signature is present and the date/time is entered on the first page.
- Samples IDs for the following required correction/clarification as follows:

Lab ID	Field ID	Date/Time Sampled	Action
460-38859-16	BF-2996g-001-0'-5'	04/05/12 13:35:00	The laboratory logged in an incorrect sample ID (BF-2996c-001-0'-5'). A revised report and EDD was submitted with the correct ID.
460-38947-1	ECS-SSA11-SER1-0"-6"	04/10/12 13:25:00	The laboratory logged in an incorrect sample ID (ECS-SSA11-SER1-0"-6'). A revised report and EDD was submitted with the correct ID.
460-38947-2	ECS-SSA13-SSR1-0"-6"	04/10/12 13:30:00	The laboratory logged in an incorrect sample ID (ECS-SSA13-SSR1-0"-6'). A revised report and EDD was submitted with the correct ID.

Lab ID	Field ID	Date/Time Sampled	Action
460-39135-5	ECS-27-F	04/16/12 13:50:00	The sample label reads DS-27-SW. The laboratory logged in the sample using the ID on the custody record, which was confirmed correct by the ENTACT field crew.
460-39136-7	DS-16-SN	04/16/12 15:25:00	The sample label reads DS-20-SW while the jar top reads DS-16-SN. The laboratory logged in the sample using the ID on the custody record, which was confirmed correct by the ENTACT field crew.
460-39249-1	BF-2981c-001x-0-5'	04/18/12 08:55:00	The laboratory logged in an incorrect sample ID (BF-2981c-001v-0-5'). A revised report was submitted with the correct ID. The EDD was created after the correction.
460-39614-12	ECS-BF-DEC-001R-F5-0-1'	04/27/12 13:50:00	The sampler entered an incorrect sample ID (ECS-BF-DEC-001R-F5-0-1") on the custody record. A revised report and EDD was submitted with the correct ID.
460-39845-1	ECS-SSA23-SS-0-6"	05/03/12 13:35:00	The laboratory logged in an incorrect sample ID (ECS-SSA23-SS-0-6-"). A revised report and EDD was submitted with the correct ID.
460-39845-2	ECS-SSA23-SE1-0-6"	05/03/12 13:40:00	The laboratory logged in an incorrect sample ID (ECS-SSA23-SE1-0-6-"). A revised report and EDD was submitted with the correct ID.

All field samples were analyzed for the tests requested on the chain-of-custody except as follows:

- Total Arsenic and Lead was cancelled per ENTACT's instructions on 4/16/12 for all samples in laboratory job number 460-39092-1.
- For sample BF-2994g-002-0'-6.5', only VOCs were requested. The laboratory inadvertently also reported all the other DER-10 analytes excluding Mercury and Trivalent Chromium (i.e., Total DER-10 Metals, Cr VI, PEST, PCB, HERB, SVOC, and CN).
- For samples ECS-1-F, ECS-2-F, and ECS-2-Fx, the laboratory reported Total Arsenic and Lead as requested by ENTACT after the samples were received.
- For sample ECS-BF-DEC-001R-F2-0-1', the laboratory reported Total TAL Metals including Mercury instead of Total Arsenic and Lead as requested by ENTACT after the samples were received.
- For the backfill composite samples and the associated QC samples in laboratory job number 460-38780-1, the laboratory inadvertently reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of the DER-10 analytes as requested.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

All samples were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 5.7.2 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. (For VOCs, the validator noted that the VOC soil samples were collected in 4-oz jars using a bulk technique and analyzed using a low-level deionized water extraction (on day 1 to day 5) with heated purge-n-trap per the Workplan rather than using closed system purge-n-trap or methanol extraction as indicated by the preparation method (SW-846 5035) referenced by the laboratory.)

For the backfill samples, the target analyte list includes all DER-10 analytes and the nominal reporting limits (i.e., without dry-weight correction or sample dilution and based on the standard sample weight and final volume) are at or below the levels of concern (i.e., the Allowable Constituent Levels (ACLs) for imported fill or soil from Appendix 5 of the DER-10), except as follows:

- DER-10 Appendix 5 lists m-Cresol(s), o-Cresol(s), and p-Cresol(s). The laboratory reported m & p-Cresols and o-Cresol as it is not possible to separate m-Cresol and p-Cresol using method 8270C.
- DER-10 Appendix 5 lists Chlordane (alpha). The laboratory reported technical Chlordane, which is a commercial mixture that contains alpha-Chlordane and gamma-Chlordane along with other related compounds.
- The nominal reporting limit for Pentachlorophenol of 1 mg/kg is slightly above the ACL of 0.8 mg/kg. Note however that the laboratory reported any confirmed detects above the method detection limit (MDL) but below the reporting limit (i.e., J-values) and the laboratory's MDL for Pentachlorophenol is well below the ACL at 0.099 mg/kg.

For the excavation confirmation and documentation samples, the target analyte list includes total Arsenic, total Lead, and/or TCLP Lead as requested and all Contract Laboratory Program (CLP) metals for the TAL metals. The nominal reporting limits are below the levels of concern (i.e., the remedial goals) for total Arsenic, total Lead, and TCLP Lead. There are no established levels of concern for TAL metals.The nominal reporting limits comply with the requirements in the ASP for TAL metals with the exception of Iron, which has a nominal reporting limit of 30 mg/kg for the soil samples that is above the ASP reporting limit of 20 mg/kg.

(Note: The laboratory dilutes all total metals samples 2-4x before analysis as standard practice. All Revere samples were diluted 4x and thus nominal reporting limits were determined at this dilution rate. The laboratory also dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank (and leachate blank for TCLP) for every analytical batch (maximum 20 samples) and a calibration blank for every 10 metals analyses as required per the analytical methodology. Additionally, a trip blank was included with each shipment of VOC samples except that for laboratory job number 460-39249-1. This is a variance as the Workplan calls for one trip blank for every cooler of VOC samples submitted to the laboratory for analysis. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used.

Several detects are reported in the laboratory and trip blanks, primarily at concentrations between the MDL and RL (i.e., laboratory J-values) and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator calculated a blank equivalent concentration taking into account the sample weight, moisture content, and dilution factor for each sample when determining if the contamination in the blank is near that in the sample, and thus if data quality is affected for that sample. When comparing aqueous blank concentrations (e.g., for trip blanks) to solid samples, the validator assumed that all contamination found in the aqueous blank aliquot analyzed is potentially present in the solid sample aliquot analyzed.

3.3.5 ANALYTICAL PROCEDURES

The analytical procedures (instrument tuning and initial calibration, continuing calibration verification, and internal standards), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method with some exceptions primarily for the VOC analyte 1,4-Dioxane. The validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

Additionally, no issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes 91 analytical batches and the validator re-calculated sample results and QC check parameters for nine batches and made the following observations from the review of the raw data:

- Total As and Pb batch 107756 – The laboratory reports the RPD for matrix duplicates (MD) as NC (not calculable) if either result is less than the reporting limit and the serial dilution (SD) %difference as NC (not calculable) if the undiluted result is less than 50x MDL since the checks are waived below these levels.
- TCLP Pb batch 112164 – No additional observations.
- Hg batch 109333 – No additional observations.
- PEST batch 110152 – The laboratory used dual column confirmation for all GC analyses (including PEST, PCB, and HERB). For field and QC analyses, the laboratory reports the result from the column with the higher concentration, provided that the RPD between the two columns is less than 40%. If the RPD is greater than 40%, the column with the lower concentration is reported with a note in the narrative and the result is reported with a P flag. There is just one case where the RPD exceeded 40% for this data set (for the surrogate Decachlorobiphenyl in sample BF-2981c-001-0'-5').
- PCB batch 112607 – The laboratory quantitates the Aroclors using eight characteristic peaks, which is beyond the minimum three required by the method and the five recommended by the method. Qualitative identification may be made with fewer peaks if there is a good pattern match, which is consistent with the analytical method.
- HERB batch 108882 – No additional observations.
- VOC batch 110443 – The laboratory prepares all bulk soil samples for both a deionized (DI) water and a methanol extraction and uses the DI water extract where possible for lower reporting limits. All samples for this data set, which were collected as bulk soils in 4-oz jars, were analyzed as low level DI extracts. Additionally, the laboratory determined that the peaks at 12.5 and 14.0 on the VOC chromatograms are column bleed and therefore are not reported as TICs.
- SVOC batch 108130 – No additional observations.
- CN batch 110661 – No additional observations.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The Level 4 data packages and EDD contain all necessary information or the laboratory submitted a revision upon request as follows:

Laboratory Job No.	Action
460-38437-1	A revised package was submitted with the correct dilution factor for the PDS of total metals sample 23 and with consistent units for the TCLP field samples and QC samples to obtain correct reporting of the PDS and SD of TCLP sample 15.
460-38653-1	A revised package and EDD were submitted with missing recovery data for 8270 LCS 460108130/2A.
460-38859-1	A revised package and EDD were submitted with correct Sample IDs per Section 3.3.1 and with missing method blank and LCS data for 8081 batch 108736.
460-38947-1	A revised package and EDD were submitted with correct Sample IDs per Section 3.3.1.
460-39091-1	A revised package was submitted with missing raw data.
460-39092-1	A revised package was submitted with missing raw data.
460-39249-1	A revised package was submitted with correct Sample IDs per Section 3.3.1 and with missing raw data. A revised package and EDD was submitted with extraneous 7196 results removed.
460-39363-1	A revised package was submitted with missing raw data.
460-39614-1	A revised package and EDD were submitted with correct Sample IDs per Section 3.3.1.
460-39845-1	A revised package was submitted with the correct dilution factor for the PDS of total metals sample 9. A revised package and EDD were submitted with correct Sample IDs per Section 3.3.1.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Lab ID	Field ID	Date/Time Sampled	Action
460-39614-13	ECS-BF-DEC-001R-SS2-0-6"	04/27/2012 13:55:00	The validator changed the sample ID in sys_sample_code, sample_name, and sys_loc_code from ECS-BF-DEC-001R-SS2-0-6' to ECS-BF-DEC-001R-SS2-0-6" to match that on the custody record and in the data package.
460-39614-14	ECS-BF-DEC-001R-F6-0-1'	04/27/2012 14:00:00	The validator changed the sample ID in sys_sample_code, sample_name, and sys_loc_code from ECS-BF-DEC-001R-F6-0-1" to ECS-BF-DEC-001R-F6-0-1' to match that on the custody record and in the data package.
460-39614-16	ECS-BF-DEC-001R-SW2-0-6"	04/27/2012 14:25:00	The validator changed the sample ID in sys_sample_code, sample_name, and sys_loc_code from ECS-BF-DEC-001R-SW2-0-6 to ECS-BF-DEC-001R-SW2-0-6" to match that on the custody record and in the data package.
460-38653-43	Trip Blank1	04/03/2012 00:00:00	The validator changed the sample_matrix_code from SO to WQ and the sample_type_code from N to TB to match that on the custody record and in the data package.
460-38653-44	Trip Blank2	04/03/2012 00:00:00	
460-39364-2	DS-13-SW	04/18/2012 16:14:00	The validator changed the sample_type_code from MS to N to match that on the custody record and in the data package.

Lab ID	Field ID	Date/Time Sampled	Action
460-38653-9	BF-2972c-002-0'-8'	04/03/2012 09:40:00	The validator changed the composite_yn from N to Y and/or the composite_desc from blank to Comp to match that on the custody record and in the data package.
460-38653-27	BF-2973c-001-0'-4'	04/03/2012 13:05:00	
460-38653-30	BF-2974c-001-0'-3.5'	04/03/2012 13:29:00	
460-38653-12	BF-2975c-001-0'-4'	04/03/2012 10:25:00	
460-38653-24	BF-2976c-001-0'-7.5'	04/03/2012 12:45:00	
460-38653-33	BF-2977c-001-0'-3.5'	04/03/2012 13:45:00	
460-38653-15	BF-2978c-001-0'-6'	04/03/2012 10:43:00	
460-38653-21	BF-2979c-001-0'-8.5'	04/03/2012 11:18:00	
460-39249-6	BF-2981c-001x-0-5'	04/18/2012 08:55:00	
460-38653-18	BF-2982c-001-0'-5'	04/03/2012 11:03:00	
460-38653-36	BF-2983c-001-0'-9'	04/03/2012 14:12:00	
460-39249-9	BF-2985c-001-0'-8'	04/18/2012 09:25:00	
460-38653-39	BF-2986c-001-0'-13.5'	04/03/2012 14:41:00	
460-39249-24	BF-2989c-001-1'-4'	04/18/2012 13:20:00	
460-38653-42	BF-2990c-001-0'-7.5'	04/03/2012 15:00:00	
460-39249-27	BF-2993c-001-1'-6'	04/18/2012 13:40:00	
460-38780-26	BF-2995c-001-0'-4.5'	04/04/2012 14:30:00	
460-39249-30	BF-2997c-001-1'-6'	04/18/2012 13:58:00	
460-39249-12	BF-3000c-001-0'-8'	04/18/2012 09:47:00	
460-39249-21	BF-3224c-001-1'-4'	04/18/2012 13:03:00	
460-38780-32	BF-3225c-001-0'-3'	04/04/2012 15:17:00	
460-39249-15	BF-3228c-001-1'-7'	04/18/2012 12:35:00	
460-39249-18	BF-3232c-001-1'-5'	04/18/2012 12:52:00	
460-38859-6	BF-3234c-001-0'-5'	04/05/2012 10:34:00	
460-38859-27	BF-3236c-001-0'-6'	04/05/2012 14:37:00	
460-38859-25	BF-3236g-001-0'-6'	04/05/2012 14:35:00	The validator changed the composite_yn from Y to N and the composite_desc from Comp to blank to match that on the custody record and in the data package.

3.4.3 ANALYTICAL COMPLETENESS

The validator rejected eight non-detect results for Pentachlorophenol due to extremely low matrix spike recovery (less than 10%). With 6,047 total results, this gives a completeness of 99.9%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which a target analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which a target analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size and include dry-weight correction for all soil samples as required per Section 5.7.1 of the Workplan. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results for the investigative samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics for all laboratory job numbers except 460-38653-1. The analytical results for organics are reported in mg/kg with dry-weight correction for this job number. (For the 7196A analyses, Trivalent Chromium is shown as not dry-weight corrected by TestAmerica-Edison and as dry-weight corrected by TestAmerica-Pittsburgh, which performed the 7196A analyses for laboratory job number 460-39249-1. Trivalent Chromium is calculated from the results for Hexavalent Chromium and total Chromium, which are dry-weight corrected, and thus the Trivalent Chromium is not directly dry-weight corrected but is on a dry-weight basis.)

The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated.

TABLE 1

REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1

Phase I Remedial Design/ Remedial Action

SAMPLES COLLECTED AND TESTS PERFORMED

Lab ID	Field ID	Sample Date	Sample Type	Sample Media	Sample Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-38437-1	ECS-SSA1-F	3/28/12	INV	ECS	Soil	X	X										
460-38437-2	ECS-SSA1-SW	3/28/12	INV	ECS	Soil	X	X										
460-38437-3	ECS-SSA1-SN	3/28/12	INV	ECS	Soil	X	X										
460-38437-4	ECS-SSA1-SE	3/28/12	INV	ECS	Soil	X	X										
460-38437-5	ECS-SSA1-SS	3/28/12	INV	ECS	Soil	X	X										
460-38437-6	ECS-SSA2-F	3/28/12	INV	ECS	Soil	X	X										
460-38437-7	ECS-SSA2-SN	3/28/12	INV	ECS	Soil	X	X										
460-38437-8	ECS-SSA2-SE	3/28/12	INV	ECS	Soil	X	X										
460-38437-9	ECS-SSA2-SS	3/28/12	INV	ECS	Soil	X	X										
460-38437-10	ECS-SSA2-SW	3/28/12	INV	ECS	Soil	X	X										
460-38437-11	ECS-SSA32-SN	3/28/12	INV	ECS	Soil	X	X										
460-38437-12	ECS-SSA32-SW	3/28/12	INV	ECS	Soil	X	X										
460-38437-13	ECS-SSA32-SE	3/28/12	INV	ECS	Soil	X	X										
460-38437-13LR	ECS-SSA32-SE_LR	3/28/12	MD	ECS	Soil		X										
460-38437-13MS	ECS-SSA32-SE_MS	3/28/12	MS	ECS	Soil		X										
460-38437-14	ECS-SSA32-SS	3/28/12	INV	ECS	Soil	X	X										
460-38437-15	ECS-SSA32-F	3/28/12	INV	ECS	Soil	X	X										
460-38437-15LR	ECS-SSA32-F_LR	3/28/12	MD	ECS	Soil	X	X										
460-38437-15MS	ECS-SSA32-F_MS	3/28/12	MS	ECS	Soil	X	X										
460-38437-16	ECS-SSA13-F	3/28/12	INV	ECS	Soil	X	X										
460-38437-17	ECS-SSA13-F-FD	3/28/12	FD	ECS	Soil	X	X										
460-38437-18	ECS-SSA13-SN	3/28/12	INV	ECS	Soil	X	X										
460-38437-19	ECS-SSA13-SE	3/28/12	INV	ECS	Soil	X	X										
460-38437-20	ECS-SSA13-SS	3/28/12	INV	ECS	Soil	X	X										
460-38437-21	ECS-SSA13-SW	3/28/12	INV	ECS	Soil	X	X										
460-38437-22	ECS-SSA11-F	3/28/12	INV	ECS	Soil	X	X										
460-38437-23	ECS-SSA11-SN	3/28/12	INV	ECS	Soil	X	X										
460-38437-23LR	ECS-SSA11-SN_LR	3/28/12	MD	ECS	Soil		X										
460-38437-23MS	ECS-SSA11-SN_MS	3/28/12	MS	ECS	Soil		X										
460-38437-24	ECS-SSA11-SE	3/28/12	INV	ECS	Soil	X	X										
460-38437-25	ECS-SSA11-SS	3/28/12	INV	ECS	Soil	X	X										
460-38437-26	ECS-SSA11-SW	3/28/12	INV	ECS	Soil	X	X										

Lab ID	Field ID	Sample Date	Sample Type	Sample Media	Sample Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-38653-1	BF-2972g-001-0'-8'	4/3/12	INV	BF	soil										X		
460-38653-2	BF-2972g-002-0'-8'	4/3/12	INV	BF	soil										X		
460-38653-3	BF-2972g-003-0'-8'	4/3/12	INV	BF	soil										X		
460-38653-4	BF-2972g-004-0'-8'	4/3/12	INV	BF	soil										X		
460-38653-5	BF-2972g-005-0'-8'	4/3/12	INV	BF	soil										X		
460-38653-6	BF-2972g-006-0'-8'	4/3/12	INV	BF	soil										X		
460-38653-7	BF-2972g-007-0'-8'	4/3/12	INV	BF	soil										X		
460-38653-8MS	BF-2972c-001-0'-8'_MS	4/3/12	MS	BF	soil							X	X				
460-38653-8SD	BF-2972c-001-0'-8'_SD	4/3/12	MSD	BF	soil							X	X				
460-38653-9	BF-2972c-002-0'-8'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-8	BF-2972c-001-0'-8'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-10	BF-2975g-001-0'-4'	4/3/12	INV	BF	soil										X		
460-38653-11	BF-2975g-002-0'-4'	4/3/12	INV	BF	soil										X		
460-38653-12	BF-2975c-001-0'-4'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-13	BF-2978g-001-0'-6'	4/3/12	INV	BF	soil										X		
460-38653-14	BF-2978g-002-0'-6'	4/3/12	INV	BF	soil										X		
460-38653-15	BF-2978c-001-0'-6'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-15MS	BF-2978c-001-0'-6'_MS	4/3/12	MS	BF	soil												X
460-38653-15SD	BF-2978c-001-0'-6'_SD	4/3/12	MSD	BF	soil												X
460-38653-16	BF-2982g-001-0'-5'	4/3/12	INV	BF	soil										X		
460-38653-17	BF-2982g-002-0'-5'	4/3/12	INV	BF	soil										X		
460-38653-18	BF-2982c-001-0'-5'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-19	BF-2979g-001-0'-8.5'	4/3/12	INV	BF	soil										X		
460-38653-20	BF-2979g-002-0'-8.5'	4/3/12	INV	BF	soil										X		
460-38653-21	BF-2979c-001-0'-8.5'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-22	BF-2976g-001-0'-7.5'	4/3/12	INV	BF	soil										X		
460-38653-23	BF-2976g-002-0'-7.5'	4/3/12	INV	BF	soil										X		
460-38653-24	BF-2976c-001-0'-7.5'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-25	BF-2973g-001-0'-4'	4/3/12	INV	BF	soil										X		
460-38653-26	BF-2973g-002-0'-4'	4/3/12	INV	BF	soil										X		
460-38653-27	BF-2973c-001-0'-4'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-27LR	BF-2973c-001-0'-4'_LR	4/3/12	MD	BF	soil					X							
460-38653-27MS	BF-2973c-001-0'-4'_MS	4/3/12	MS	BF	soil					X							
460-38653-28	BF-2974g-001-0'-3.5'	4/3/12	INV	BF	soil										X		
460-38653-29	BF-2974g-002-0'-3.5'	4/3/12	INV	BF	soil										X		
460-38653-30	BF-2974c-001-0'-3.5'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-31	BF-2977g-001-0'-3.5'	4/3/12	INV	BF	soil										X		
460-38653-32	BF-2977g-002-0'-3.5'	4/3/12	INV	BF	soil										X		
460-38653-33	BF-2977c-001-0'-3.5'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-34	BF-2983g-001-0'-9'	4/3/12	INV	BF	soil										X		

Lab ID	Field ID	Sample Date	Sample Type	Sample Media	Sample Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-38653-35	BF-2983g-002-0'-9'	4/3/12	INV	BF	soil										X		
460-38653-36	BF-2983c-001-0'-9'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-36MS	BF-2983c-001-0'-9'_MS	4/3/12	MS	BF	soil									X			X
460-38653-36SD	BF-2983c-001-0'-9'_SD	4/3/12	MSD	BF	soil									X			X
460-38653-37	BF-2986g-001-0'-13.5'	4/3/12	INV	BF	soil										X		
460-38653-38	BF-2986g-002-0'-13.5'	4/3/12	INV	BF	soil										X		
460-38653-39	BF-2986c-001-0'-13.5'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-40	BF-2990g-001-0'-7.5'	4/3/12	INV	BF	soil										X		
460-38653-41	BF-2990g-002-0'-7.5'	4/3/12	INV	BF	soil										X		
460-38653-42	BF-2990c-001-0'-7.5'	4/3/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38653-42LR	BF-2990c-001-0'-7.5'_LR	4/3/12	MD	BF	soil				X								
460-38653-42MS	BF-2990c-001-0'-7.5'_MS	4/3/12	MS	BF	soil				X								
460-38653-43	Trip Blank1	4/3/12	TB	TB	water										X		
460-38653-44	Trip Blank2	4/3/12	TB	TB	water										X		
460-38780-1	BF-2994g-001-0'-6.5'	4/4/12	INV	BF	soil										X		
460-38780-2	BF-2994g-002-0'-6.5'	4/4/12	INV	BF	soil					X	X	X	X	X	X	X	X
460-38780-2MS	BF-2994g-002-0'-6.5'_MS	4/4/12	MS	BF	soil												X
460-38780-2SD	BF-2994g-002-0'-6.5'_SD	4/4/12	MSD	BF	soil												X
460-38780-3	BF-2994c-001-0'-6.5'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-4	BF-2991g-001-0'-6'	4/4/12	INV	BF	soil										X		
460-38780-5	BF-2991g-002-0'-6'	4/4/12	INV	BF	soil										X		
460-38780-6	BF-2991c-001-0'-6'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-7	BF-2987g-001-0'-8.5'	4/4/12	INV	BF	soil										X		
460-38780-8	BF-2987g-002-0'-8.5'	4/4/12	INV	BF	soil										X		
460-38780-9	BF-2987c-001-0'-8.5'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-10	BF-2987g-001x-0'-8.5'	4/4/12	FD	BF	soil										X		
460-38780-11	BF-2987c-001x-0'-8.5'	4/4/12	FD	BF	soil				X	X	X	X	X	X		X	X
460-38780-12	BF-2984g-001-0'-10'	4/4/12	INV	BF	soil										X		
460-38780-13	BF-2984g-002-0'-10'	4/4/12	INV	BF	soil										X		
460-38780-14	BF-2984c-001-0'-10'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-15	BF-2980g-001-0'-7.5'	4/4/12	INV	BF	soil										X		
460-38780-16	BF-2980g-002-0'-7.5'	4/4/12	INV	BF	soil										X		
460-38780-17	BF-2980c-001-0'-7.5'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-18	BF-2988g-001-0'-7.5'	4/4/12	INV	BF	soil										X		
460-38780-19	BF-2988g-002-0'-7.5'	4/4/12	INV	BF	soil										X		
460-38780-20	BF-2988c-001-0'-7.5'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-21	BF-2992g-001-0'-7'	4/4/12	INV	BF	soil										X		
460-38780-22	BF-2992g-002-0'-7'	4/4/12	INV	BF	soil										X		
460-38780-23	BF-2992c-001-0'-7'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-24	BF-2995g-001-0'-4.5'	4/4/12	INV	BF	soil										X		

Lab ID	Field ID	Sample Date	Sample Type	Sample Media	Sample Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-38780-24MS	BF-2995g-001-0'-4.5'_MS	4/4/12	MS	BF	soil										X		
460-38780-24SD	BF-2995g-001-0'-4.5'_SD	4/4/12	MSD	BF	soil										X		
460-38780-25	BF-2995g-002-0'-4.5'	4/4/12	INV	BF	soil										X		
460-38780-25MS	BF-2995g-002-0'-4.5'_MS	4/4/12	MS	BF	soil										X		
460-38780-25SD	BF-2995g-002-0'-4.5'_SD	4/4/12	MSD	BF	soil										X		
460-38780-26	BF-2995c-001-0'-4.5'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-26LR	BF-2995c-001-0'-4.5'_LR	4/4/12	MD	BF	soil				X	X	X						
460-38780-26MS	BF-2995c-001-0'-4.5'_MS	4/4/12	MS	BF	soil				X	X	X	X	X	X		X	X
460-38780-26SD	BF-2995c-001-0'-4.5'_SD	4/4/12	MSD	BF	soil							X	X	X		X	X
460-38780-27	BF-2998g-001-0'-3.5'	4/4/12	INV	BF	soil										X		
460-38780-28	BF-2998g-002-0'-3.5'	4/4/12	INV	BF	soil										X		
460-38780-29	BF-2998c-001-0'-3.5'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-30	BF-3225g-001-0'-3'	4/4/12	INV	BF	soil										X		
460-38780-31	BF-3225g-002-0'-3'	4/4/12	INV	BF	soil										X		
460-38780-32	BF-3225c-001-0'-3'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-32MS	BF-3225c-001-0'-3'_MS	4/4/12	MS	BF	soil									X			
460-38780-32SD	BF-3225c-001-0'-3'_SD	4/4/12	MSD	BF	soil									X			
460-38780-33	BF-3226g-001-0'-3'	4/4/12	INV	BF	soil										X		
460-38780-34	BF-3226g-002-0'-3'	4/4/12	INV	BF	soil										X		
460-38780-35	BF-3226c-001-0'-3'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-36	BF-3229g-001-0'-5'	4/4/12	INV	BF	soil										X		
460-38780-37	BF-3229g-002-0'-5'	4/4/12	INV	BF	soil										X		
460-38780-38	BF-3229c-001-0'-5'	4/4/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38780-39	Trip Blank	4/4/12	TB	TB	water										X		
460-38859-1	BF-3233g-001-0'-6'	4/5/12	INV	BF	soil										X		
460-38859-2	BF-3233g-002-0'-6'	4/5/12	INV	BF	soil										X		
460-38859-3	BF-3233c-001-0'-6'	4/5/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38859-3MS	BF-3233c-001-0'-6'_MS	4/5/12	MS	BF	soil											X	X
460-38859-3SD	BF-3233c-001-0'-6'_SD	4/5/12	MSD	BF	soil											X	X
460-38859-4	BF-3234g-001-0'-5'	4/5/12	INV	BF	soil										X		
460-38859-5	BF-3234g-002-0'-5'	4/5/12	INV	BF	soil										X		
460-38859-6	BF-3234c-001-0'-5'	4/5/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38859-6LR	BF-3234c-001-0'-5'_LR	4/5/12	MD	BF	soil				X		X						
460-38859-6MS	BF-3234c-001-0'-5'_MS	4/5/12	MS	BF	soil				X		X						
460-38859-7	BF-3230g-001-0'-4.5'	4/5/12	INV	BF	soil										X		
460-38859-8	BF-3230g-002-0'-4.5'	4/5/12	INV	BF	soil										X		
460-38859-9	BF-3230c-001-0'-4.5'	4/5/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38859-10	BF-3227g-001-0'-6'	4/5/12	INV	BF	soil										X		
460-38859-11	BF-3227g-002-0'-6'	4/5/12	INV	BF	soil										X		
460-38859-12	BF-3227c-001-0'-6'	4/5/12	INV	BF	soil				X	X	X	X	X	X		X	X

Lab ID	Field ID	Sample Date	Sample Type	Sample Media	Sample Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-38859-13	BF-2999g-001-0'-5'	4/5/12	INV	BF	soil										X		
460-38859-14	BF-2999g-002-0'-5'	4/5/12	INV	BF	soil										X		
460-38859-15	BF-2999c-001-0'-5'	4/5/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38859-16	BF-2996g-001-0'-5'	4/5/12	INV	BF	soil										X		
460-38859-17	BF-2996g-002-0'-5'	4/5/12	INV	BF	soil										X		
460-38859-18	BF-2996c-001-0'-5'	4/5/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38859-19	BF-3235g-001-0'-6'	4/5/12	INV	BF	soil										X		
460-38859-20	BF-3235g-002-0'-6'	4/5/12	INV	BF	soil										X		
460-38859-21	BF-3235c-001-0'-6'	4/5/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38859-22	BF-3231g-001-0'-8'	4/5/12	INV	BF	soil										X		
460-38859-23	BF-3231g-002-0'-8'	4/5/12	INV	BF	soil										X		
460-38859-24	BF-3231c-001-0'-8'	4/5/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38859-25	BF-3236g-001-0'-6'	4/5/12	INV	BF	soil										X		
460-38859-26	BF-3236g-002-0'-6'	4/5/12	INV	BF	soil										X		
460-38859-27	BF-3236c-001-0'-6'	4/5/12	INV	BF	soil				X	X	X	X	X	X		X	X
460-38859-28	TB	4/5/12	TB	TB	water										X		
460-38947-1	ECS-SSA11-SER1-0"-6"	4/10/12	INV	ECS	soil	X		X	X								
460-38947-2	ECS-SSA13-SSR1-0"-6"	4/10/12	INV	ECS	soil	X	X										
460-39091-1	ECS-SSA7-F-1'	4/13/12	INV	ECS	soil	X	X										
460-39091-2	ECS-SSA2-FR1-1.5'	4/13/12	INV	ECS	soil	X	X										
460-39092-1	ECS-36-F	4/13/12	INV	ECS	soil	X											
460-39092-2	ECS-40-F	4/13/12	INV	ECS	soil	X											
460-39092-3	ECS-39-F	4/13/12	INV	ECS	soil	X											
460-39092-4	ECS-42-F	4/13/12	INV	ECS	soil	X											
460-39092-5	ECS-38-F	4/13/12	INV	ECS	soil	X											
460-39092-6	ECS-33-F	4/13/12	INV	ECS	soil	X											
460-39092-7	ECS-33-FX	4/13/12	FD	ECS	soil	X											
460-39092-8	ECS-34-F	4/13/12	INV	ECS	soil	X											
460-39092-9	ECS-35-F	4/13/12	INV	ECS	soil	X											
460-39092-10	ECS-31-F	4/13/12	INV	ECS	soil	X											
460-39092-11	ECS-30-F	4/13/12	INV	ECS	soil	X											
460-39092-11LR	ECS-30-F_LR	4/13/12	MD	ECS	soil	X											
460-39092-11MS	ECS-30-F_MS	4/13/12	MS	ECS	soil	X											
460-39092-12	ECS-29-F	4/13/12	INV	ECS	soil	X											
460-39092-13	ECS-28-F	4/13/12	INV	ECS	soil	X											
460-39092-14	ECS-24-F	4/13/12	INV	ECS	soil	X											
460-39092-15	ECS-25-F	4/13/12	INV	ECS	soil	X		X	X								
460-39092-16	ECS-26-F	4/13/12	INV	ECS	soil	X											
460-39092-17	ECS-22-F	4/13/12	INV	ECS	soil	X											
460-39092-18	ECS-21-F	4/13/12	INV	ECS	soil	X											

Lab ID	Field ID	Sample Date	Sample Type	Sample Media	Sample Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-39092-19	ECS-20-F	4/13/12	INV	ECS	soil	X											
460-39092-19LR	ECS-20-F_LR	4/13/12	MD	ECS	soil	X											
460-39092-19MS	ECS-20-F_MS	4/13/12	MS	ECS	soil	X											
460-39135-1	ECS-32-F	4/16/12	INV	ECS	soil	X											
460-39135-2	ECS-32-FX	4/16/12	FD	ECS	soil	X											
460-39135-3	ECS-37-F	4/16/12	INV	ECS	soil	X		X	X								
460-39135-4	ECS-41-F	4/16/12	INV	ECS	soil	X											
460-39135-5	ECS-27-F	4/16/12	INV	ECS	soil	X											
460-39135-6	ECS-18-F	4/16/12	INV	ECS	soil	X											
460-39135-6LR	ECS-18-F_LR	4/16/12	MD	ECS	soil	X											
460-39135-6MS	ECS-18-F_MS	4/16/12	MS	ECS	soil	X											
460-39136-1	DS-41-SW	4/16/12	INV	DS	soil	X											
460-39136-2	DS-37-SW	4/16/12	INV	DS	soil	X											
460-39136-3	DS-32-SW	4/16/12	INV	DS	soil	X											
460-39136-4	DS-28-SW	4/16/12	INV	DS	soil	X											
460-39136-5	DS-24-SW	4/16/12	INV	DS	soil	X											
460-39136-6	DS-20-SW	4/16/12	INV	DS	soil	X											
460-39136-7	DS-16-SN	4/16/12	INV	DS	soil	X											
460-39249-1	BF-2981g-001-0'-5'	4/18/12	INV	BF	soil										X		
460-39249-2	BF-2981g-001x-0'-5'	4/18/12	FD	BF	soil										X		
460-39249-3	BF-2981g-002-0'5'	4/18/12	INV	BF	soil										X		
460-39249-4	BF-2981g-002x-0'-5'	4/18/12	FD	BF	soil										X		
460-39249-5	BF-2981c-001-0'-5'	4/18/12	INV	BF	soil				X	X	X*	X	X	X		X	X
460-39249-6	BF-2981c-001x-0-5'	4/18/12	FD	BF	soil				X	X	X*	X	X	X		X	X
460-39249-7	BF-2985g-001-0'-8'	4/18/12	INV	BF	soil										X		
460-39249-8	BF-2985g-002-0'-8'	4/18/12	INV	BF	soil										X		
460-39249-9	BF-2985c-001-0'-8'	4/18/12	INV	BF	soil				X	X	X*	X	X	X		X	X
460-39249-10	BF-3000g-001-0'-8'	4/18/12	INV	BF	soil										X		
460-39249-10MS	BF-3000g-001-0'-8'_MS	4/18/12	MS	BF	soil										X		
460-39249-10SD	BF-3000g-001-0'-8'_SD	4/18/12	MSD	BF	soil										X		
460-39249-11	BF-3000g-002-0'-8'	4/18/12	INV	BF	soil										X		
460-39249-11MS	BF-3000g-002-0'-8'_MS	4/18/12	MS	BF	soil										X		
460-39249-11SD	BF-3000g-002-0'-8'_SD	4/18/12	MSD	BF	soil										X		
460-39249-12	BF-3000c-001-0'-8'	4/18/12	INV	BF	soil				X	X	X*	X	X	X		X	X
460-39249-12LR	BF-3000c-001-0'-8'_LR	4/18/12	MD	BF	soil				X	X	X*						
460-39249-12MS	BF-3000c-001-0'-8'_MS	4/18/12	MS	BF	soil				X	X	X*	X	X	X		X	X
460-39249-12SD	BF-3000c-001-0'-8'_SD	4/18/12	MSD	BF	soil							X	X	X		X	X
460-39249-13	BF-3228g-001-1'-7'	4/18/12	INV	BF	soil										X		
460-39249-14	BF-3228g-002-1'-7'	4/18/12	INV	BF	soil										X		
460-39249-15	BF-3228c-001-1'-7'	4/18/12	INV	BF	soil				X	X	X*	X	X	X		X	X

Lab ID	Field ID	Sample Date	Sample Type	Sample Media	Sample Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-39249-16	BF-3232g-001-1'-5'	4/18/12	INV	BF	soil										X		
460-39249-17	BF-3232g-002-1'-5'	4/18/12	INV	BF	soil										X		
460-39249-18	BF-3232c-001-1'-5'	4/18/12	INV	BF	soil				X	X	X*	X	X	X		X	X
460-39249-19	BF-3224g-001-1'-4'	4/18/12	INV	BF	soil										X		
460-39249-20	BF-3224g-002-1'-4'	4/18/12	INV	BF	soil										X		
460-39249-21	BF-3224c-001-1'-4'	4/18/12	INV	BF	soil				X	X	X*	X	X	X		X	X
460-39249-22	BF-2989g-001-1'-4'	4/18/12	INV	BF	soil										X		
460-39249-23	BF-2989g-002-1'-4'	4/18/12	INV	BF	soil										X		
460-39249-24	BF-2989c-001-1'-4'	4/18/12	INV	BF	soil				X	X	X*	X	X	X		X	X
460-39249-25	BF-2993g-001-1'-6'	4/18/12	INV	BF	soil										X		
460-39249-26	BF-2993g-002-1'-6'	4/18/12	INV	BF	soil										X		
460-39249-27	BF-2993c-001-1'-6'	4/18/12	INV	BF	soil				X	X	X*	X	X	X		X	X
460-39249-28	BF-2997g-001-1'-6'	4/18/12	INV	BF	soil										X		
460-39249-29	BF-2997g-002-1'-6'	4/18/12	INV	BF	soil										X		
460-39249-30	BF-2997c-001-1'-6'	4/18/12	INV	BF	soil				X	X	X*	X	X	X		X	X
460-39254-1	ECS-15-F	4/17/12	INV	ECS	soil	X											
460-39254-2	ECS-23-F	4/17/12	INV	ECS	soil	X											
460-39254-3	ECS-19-F	4/17/12	INV	ECS	soil	X											
460-39254-4	ECS-17-F	4/17/12	INV	ECS	soil	X											
460-39254-5	ECS-14-F	4/17/12	INV	ECS	soil	X											
460-39256-1	BF-DEC-001-0'-1'	4/18/12	INV	ECS	soil	X	X										
460-39256-2	BF-DEC-002-0'-1'	4/18/12	INV	ECS	soil	X	X										
460-39258-1	DS-15-SW	4/17/12	INV	DS	soil	X											
460-39258-2	DS-14-SW	4/17/12	INV	DS	soil	X											
460-39363-1	ECS-11-F	4/20/12	INV	ECS	soil	X											
460-39363-2	ECS-11-Fx	4/20/12	FD	ECS	soil	X											
460-39363-3	DS-11-SW	4/20/12	INV	DS	soil	X											
460-39363-4	ECS-1-F	4/20/12	INV	ECS	soil	X	X										
460-39363-4LR	ECS-1-F_LR	4/20/12	MD	ECS	soil	X	X										
460-39363-4MS	ECS-1-F_MS	4/20/12	MS	ECS	soil	X	X										
460-39363-5	ECS-2-F	4/20/12	INV	ECS	soil	X	X										
460-39363-6	ECS-2-Fx	4/20/12	FD	ECS	soil	X	X										
460-39364-1	ECS-13-F	4/18/12	INV	ECS	soil	X											
460-39364-1LR	ECS-13-F_LR	4/18/12	MD	ECS	soil	X											
460-39364-1MS	ECS-13-F_MS	4/18/12	MS	ECS	soil	X											
460-39364-2	DS-13-SW	4/18/12	INV	DS	soil	X											
460-39364-3	DS-12-SW	4/18/12	INV	DS	soil	X											
460-39364-4	DS-12-SWx	4/18/12	FD	DS	soil	X											
460-39364-5	ECS-12-F	4/18/12	INV	ECS	soil	X											
460-39365-1	ECS-13-F	4/18/12	INV	ECS	soil		X										

Lab ID	Field ID	Sample Date	Sample Type	Sample Media	Sample Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-39614-1	ECS-BF-DEC-001R-F1-0-1'	4/27/12	INV	ECS	soil	X	X										
460-39614-2	ECS-BF-DEC-001R-F1-X-0-1'	4/27/12	FD	ECS	soil	X	X										
460-39614-3	ECS-BF-DEC-001R-SW1-0-6"	4/27/12	INV	ECS	soil	X	X										
460-39614-4	ECS-BF-DEC-001R-SN1-0-6"	4/27/12	INV	ECS	soil	X	X										
460-39614-4LR	ECS-BF-DEC-001R-SN1-0-6" _LR	4/27/12	MD	ECS	soil	X											
460-39614-4MS	ECS-BF-DEC-001R-SN1-0-6" _MS	4/27/12	MS	ECS	soil	X											
460-39614-5	ECS-BF-DEC-001R-F2-0-1'	4/27/12	INV	ECS	soil	X		X	X								
`460-39614-5LR	ECS-BF-DEC-001R-F2-0-1' _LR	4/27/12	MD	ECS	soil			X									
460-39614-5MS	ECS-BF-DEC-001R-F2-0-1' _MS	4/27/12	MS	ECS	soil			X									
460-39614-6	ECS-BF-DEC-001R-SN2-0-6"	4/27/12	INV	ECS	soil	X	X										
460-39614-7	ECS-BF-DEC-001R-F3-0-1'	4/27/12	INV	ECS	soil	X	X										
460-39614-8	ECS-BF-DEC-001R-SN3-0-6"	4/27/12	INV	ECS	soil	X	X										
460-39614-9	ECS-BF-DEC-001R-F4-0-1'	4/27/12	INV	ECS	soil	X	X										
460-39614-10	ECS-BF-DEC-001R-SS3-0-6"	4/27/12	INV	ECS	soil	X	X										
460-39614-11	ECS-BF-DEC-001R-SE1-0-6"	4/27/12	INV	ECS	soil	X	X										
460-39614-12	ECS-BF-DEC-001R-F5-0-1'	4/27/12	INV	ECS	soil	X	X										
460-39614-13	ECS-BF-DEC-001R-SS2-0-6"	4/27/12	INV	ECS	soil	X	X										
460-39614-14	ECS-BF-DEC-001R-F6-0-1'	4/27/12	INV	ECS	soil	X	X										
460-39614-15	ECS-BF-DEC-001R-SS1-0-6"	4/27/12	INV	ECS	soil	X	X										
460-39614-15LR	ECS-BF-DEC-001R-SS1-0-6" _LR	4/27/12	MD	ECS	soil	X	X										
460-39614-15MS	ECS-BF-DEC-001R-SS1-0-6" _MS	4/27/12	MS	ECS	soil	X	X										
460-39614-16	ECS-BF-DEC-001R-SW2-0-6"	4/27/12	INV	ECS	soil	X	X										
460-39614-17	ECS-BF-2983-F	4/27/12	INV	ECS	soil	X	X										
460-39614-18	ECS-BF-2983-SS	4/27/12	INV	ECS	soil	X	X										
460-39614-19	ECS-BF-2983-SN	4/27/12	INV	ECS	soil	X	X										
460-39614-20	ECS-BF-2983-SW	4/27/12	INV	ECS	soil	X	X										
460-39614-21	ECS-BF-2983-SE	4/27/12	INV	ECS	soil	X	X										
460-39614-22	ECS-SSA2-F-R2-2'	4/25/12	INV	ECS	soil	X	X										
460-39775-1	ECS-10-F	5/1/12	INV	ECS	soil	X											
460-39775-2	DS-10-SW	5/1/12	INV	DS	soil	X											
460-39775-3	DS-9-SW	5/1/12	INV	DS	soil	X											
460-39775-4	ECS-9-F	5/1/12	INV	ECS	soil	X											
460-39775-5	ECS-8-F	5/1/12	INV	ECS	soil	X											
460-39775-6	DS-8-SW	5/1/12	INV	DS	soil	X											
460-39775-7	ECS-7-F	5/1/12	INV	ECS	soil	X											

Lab ID	Field ID	Sample Date	Sample Type	Sample Media	Sample Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-39775-8	DS-7-SW	5/1/12	INV	DS	soil	X											
460-39775-9	ECS-6-F	5/1/12	INV	ECS	soil	X											
460-39775-10	ECS-6-F-X	5/1/12	FD	ECS	soil	X											
460-39775-11	DS-6-SW	5/1/12	INV	DS	soil	X											
460-39775-12	ECS-6-SE	5/1/12	INV	ECS	soil	X											
460-39775-12LR	ECS-6-SE_LR	5/1/12	MD	ECS	soil	X											
460-39775-12MS	ECS-6-SE_MS	5/1/12	MS	ECS	soil	X											
460-39775-13	ECS-5-F	5/1/12	INV	ECS	soil	X											
460-39775-14	ECS-5-SE	5/1/12	INV	ECS	soil	X											
460-39775-15	DS-5-SW	5/1/12	INV	DS	soil	X											
460-39775-16	ECS-4-F	5/1/12	INV	ECS	soil	X											
460-39775-17	ECS-4-FX	5/1/12	FD	ECS	soil	X											
460-39775-18	ECS-4-SE	5/1/12	INV	ECS	soil	X											
460-39775-19	ECS-3-F	5/1/12	INV	ECS	soil	X											
460-39775-19LR	ECS-3-F_LR	5/1/12	MD	ECS	soil	X											
460-39775-19MS	ECS-3-F_MS	5/1/12	MS	ECS	soil	X											
460-39775-20	ECS-3-SE	5/1/12	INV	ECS	soil	X											
460-39775-21	ECS-2-SE	5/1/12	INV	ECS	soil	X	X										
460-39775-22	ECS-1-SE	5/1/12	INV	ECS	soil	X	X										
460-39775-23	ECS-1-SN	5/1/12	INV	ECS	soil	X		X	X								
460-39845-1	ECS-SSA23-SS-0-6"	5/3/12	INV	ECS	soil	X	X										
460-39845-2	ECS-SSA23-SE1-0-6"	5/3/12	INV	ECS	soil	X		X	X								
460-39845-3	ECS-SSA23-F1-1'	5/3/12	INV	ECS	soil	X	X										
460-39845-4	ECS-SSA23-F1x-1'	5/3/12	FD	ECS	soil	X	X										
460-39845-5	ECS-SSA23-F2-1'	5/3/12	INV	ECS	soil	X	X										
460-39845-6	ECS-SSA23-SE2-0-6"	5/3/12	INV	ECS	soil	X	X										
460-39845-7	ECS-SSA20-SE-0-6"	5/3/12	INV	ECS	soil	X	X										
460-39845-8	ECS-SSA-20-F-1'	5/3/12	INV	ECS	soil	X	X										
460-39845-9	ECS-SSA 19-F-1'	5/3/12	INV	ECS	soil	X	X										
460-39845-9LR	ECS-SSA 19-F-1'_LR	5/3/12	MD	ECS	soil	X	X										
460-39845-9MS	ECS-SSA 19-F-1'_MS	5/3/12	MS	ECS	soil	X	X										
460-39845-10	ECS-SSA 19-SE-0-6"	5/3/12	INV	ECS	soil	X	X										
460-39845-11	ECS-SSA-19-Sn-0-6"	5/3/12	INV	ECS	soil	X	X										
460-40362-1	ECS-SSA19-SE-R1-0-6"	5/16/12	INV	ECS	soil	X	X										
460-40362-2	ECS-SSA23-SE2-R1-0-6"	5/16/12	INV	ECS	soil	X	X										
460-40362-2LR	ECS-SSA23-SE2-R1-0-6" _LR	5/16/12	MD	ECS	soil		X										
460-40362-2MS	ECS-SSA23-SE2-R1-0-6" _MS	5/16/12	MS	ECS	soil		X										

* Cr III/ VI samples subcontracted to TestAmerica-Pittburgh for laboratory job number 460-39249-1

BF - Backfill Sample
DS - Documentation Sample
ECS - Excavation Confirmation Sample
FD - Field Duplicate Sample
INV - Investigative Sample
MD – Matrix Duplicate Sample (unspiked)
MS - Matrix Spike Sample
MSD - Matrix Spike Duplicate Sample
TB - Trip Blank

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Pb: 1311/ 3010A/ 6010B for Lead in leachates of soil samples
- Total As and Pb: 3020B/ 6010B for Arsenic and Lead in soil samples
- Total TAL Metals: 3020B/ 6010B for 22 ICP-AES Target Analyte List (TAL) Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc) in soil samples
- Hg: 7471A for total Mercury in soil samples
- Total DER10 Metals: 3020B/ 6010B for 12 ICP-AES NYSDEC DER-10 Appendix 5 Metals (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, Selenium, Silver, and Zinc in soil samples
- Cr III/VI: 3060A/7196A for Hexavalent Chromium and Trivalent Chromium in soil samples
- PEST: 3541/ 3620B/ 8081A for 15 NYSDEC DER-10 Appendix 5 pesticides in soil samples
- PCB: 3541/ 3665A/ 8081A for 7 Aroclors in soil samples
- HERB: 8151A for Silvex (2,4,5-TP) in soil samples
- VOC: 8260B for 30 NYSDEC DER-10 Appendix 5 volatile organic compounds (VOCs) in bulk soil samples and 5030B/ 8260B for 30 VOCs in aqueous trip blanks
- SVOC: 3541/ 8270C for 20 NYSDEC DER-10 Appendix 5 semivolatile organic compounds (SVOCs) plus Dibenzofuran and Hexachlorobenzene in soil samples
- CN: 9012A for Cyanide in soil samples

TABLE 2
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase I Remedial Design/ Remedial Action

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Blank contamination. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase I Remedial Design/ Remedial Action

QC DEFICIENCIES AND DATA QUALIFICATION ACTIONS

Lab ID	Sample Code	Type	Method			Date and Time			GC	D	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col	F		Qual	LCL	UCL	CL		
MATRIX DUPLICATE (MD) PRECISION																	
460-38437-23LR	ECS-SSA11-SN_03/28/12LR	MD		3020B	6010B		03/30/12 21:37:07	04/01/12 08:09:21	NA	4	LEAD	*			20	Poor lab duplicate precision (25 RPD)	J/UJ to detects/NDs for ECS samples digested in the same batch
460-38653-27LR	BF-2973c-001-0'-4'_04/03/12LR	MD		3020B	6010B		04/04/12 17:00:00	04/05/12 22:36:58	NA	4	LEAD	*			20	Poor lab duplicate precision (22 RPD)	J/UJ to detects/NDs for BF samples digested in the same batch
460-38780-26LR	BF-2995c-001-0'-4.5'_04/04/12LR	MD		3020B	6010B		04/13/12 07:34:43	04/14/12 00:04:06	NA	4	ARSENIC	*			20	Poor lab duplicate precision (44 RPD)	J/UJ to detects/NDs for BF samples digested in the same batch
460-38780-26LR	BF-2995c-001-0'-4.5'_04/04/12LR	MD		3020B	6010B		04/13/12 07:34:43	04/14/12 00:04:06	NA	4	LEAD	*			20	Poor lab duplicate precision (35 RPD)	J/UJ to detects/NDs for BF samples digested in the same batch
460-38780-26LR	BF-2995c-001-0'-4.5'_04/04/12LR	MD		3020B	6010B		04/13/12 07:34:43	04/14/12 00:04:06	NA	4	MANGANESE	*			20	Poor lab duplicate precision (57 RPD)	J/UJ to detects/NDs for BF samples digested in the same batch
460-39363-4LR	ECS-1-F _04/20/12LR	MD		3020B	6010B		04/27/12 18:58:01	04/28/12 17:47:19	NA	4	LEAD	*			20	Poor lab duplicate precision (50 RPD)	J/UJ to detects/NDs for ECS samples digested in the same batch
460-39614-5LR	ECS-BF-DEC-001R-F2-0-1' _04/27/12LR	MD		3020B	6010B		05/02/12 18:30:00	05/03/12 11:27:21	NA	4	MANGANESE	*			20	Poor lab duplicate precision (29 RPD)	J/UJ to detects/NDs for ECS samples digested in the same batch
460-39845-9LR	ECS-SSA 19-F-1' _05/03/12LR	MD		3020B	6010B		05/04/12 17:39:52	05/05/12 22:02:10	NA	4	LEAD	*			20	Poor lab duplicate precision (71 RPD)	J/UJ to detects/NDs for ECS samples digested in the same batch
MATRIX SPIKE DUPLICATE (MSD) PRECISION																	
460-38780-24SD	BF-2995g-001-0'-4.5'_04/04/12SD	MSD		5035	8260B		04/06/12 23:39:24	04/12/12 23:07:00	NA	1	1,4-DIOXANE (P-DIOXANE)	*	69	131	30	Poor MS/MSD precision (36.4 RPD)	J to detects for BF samples analyzed in the same batch (none)
460-38780-26SD	BF-2995c-001-0'-4.5'_04/04/12SD	MSD		3541	8270C		04/09/12 10:50:00	04/12/12 22:09:00	NA	1	PENTACHLORO-PHENOL	J*	19	113	30	Poor MS/MSD precision (37 RPD)	J to detects for BF samples analyzed in the same batch (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	D F	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
FIELD DUPLICATE (FD) PRECISION																	
460-39135-2	ECS-32-FX_04/16/12	FD	1311	3010A	6010B	04/19/12 16:00:00	04/24/12 09:10:35	04/24/12 13:37:45	NA	5	LEAD					Poor field duplicate precision (49 RPD), use higher result from field duplicate	J/UJ to detects/NDs for original and duplicate sample
460-39092-7	ECS-33-FX_04/13/12	FD	1311	3010A	6010B	04/18/12 17:00:00	04/19/12 10:37:58	04/20/12 01:08:26	NA	5	LEAD					Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate	J/UJ to detects/NDs for original and duplicate sample
460-39775-17	ECS-4-FX_05/01/12	FD	1311	3010A	6010B	05/08/12 16:00:00	05/09/12 08:59:04	05/09/12 14:19:21	NA	5	LEAD					Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate	J/UJ to detects/NDs for original and duplicate sample
460-39775-10	ECS-6-F-X_05/01/12	FD	1311	3010A	6010B	05/08/12 16:00:00	05/09/12 08:59:04	05/09/12 13:50:18	NA	5	LEAD					Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate	J/UJ to detects/NDs for original and duplicate sample
MATRIX SPIKE (MS) RECOVERY																	
460-38437-15MS	ECS-SSA32-F_03/28/12MS	MS		3020B	6010B		03/30/12 18:36:59	04/01/12 18:53:26	NA	4	LEAD	N	75	125		Low matrix spike recovery (45%)	J-/UJ to detects/NDs for ECS samples digested in the same batch
460-38437-13MS	ECS-SSA32-SE_03/28/12MS	MS		3020B	6010B		03/30/12 18:25:06	03/31/12 21:46:26	NA	4	LEAD	4	75	125		High matrix spike recovery (199%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-38653-27MS	BF-2973c-001-0'-4'_04/03/12MS	MS		3020B	6010B		04/04/12 17:00:00	04/05/12 23:02:07	NA	4	SILVER	N	75	125		Low matrix spike recovery (67%)	J-/UJ to detects/NDs for BF samples digested in the same batch
460-38780-26MS	BF-2995c-001-0'-4.5'_04/04/12MS	MS		3020B	6010B		04/13/12 07:34:43	04/14/12 00:29:20	NA	4	MANGANESE	4	75	125		Low matrix spike recovery (-6%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-39249-12MS	BF-3000c-001-0'-8'_04/18/12MS	MS		3020B	6010B		04/27/12 07:28:42	04/27/12 13:23:47	NA	4	MANGANESE	4	75	125		High matrix spike recovery (138%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-39363-4MS	ECS-1-F_04/20/12MS	MS		3020B	6010B		04/27/12 18:58:01	04/28/12 17:57:59	NA	4	LEAD	N	75	125		Low matrix spike recovery (70%)	None (recovery within 70-130% data qualification limits)
460-39614-5MS	ECS-BF-DEC-001R-F2-0-1'_04/27/12MS	MS		3020B	6010B		05/02/12 18:30:00	05/03/12 11:38:11	NA	4	ALUMINUM	4	75	125		High matrix spike recovery (501%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-39614-5MS	ECS-BF-DEC-001R-F2-0-1'_04/27/12MS	MS		3020B	6010B		05/02/12 18:30:00	05/03/12 11:38:11	NA	4	ANTIMONY	N	75	125		Low matrix spike recovery (67%)	J-/UJ to detects/NDs for ECS samples digested in the same batch
460-39614-5MS	ECS-BF-DEC-001R-F2-0-1'_04/27/12MS	MS		3020B	6010B		05/02/12 18:30:00	05/03/12 11:38:11	NA	4	IRON	4	75	125		Low matrix spike recovery (-592%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-39249-12MS	BF-3000c-001-0'-8'_04/18/12MS	MS		3541	8082		04/23/12 02:55:53	04/23/12 10:37:00	1C	1	PCB-1260 (AROCLOR 1260)	*	63	143		Low average MS/MSD recovery (59.5%)	J-/UJ to detects/NDs for BF samples extracted in the same batch
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	1,2,4-TRIMETHYLBENZENE	*	81	121		Low average MS/MSD recovery (80%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	1,2-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (74.5%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	*	82	122		Low average MS/MSD recovery (80.5%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	1,3-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (75%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	1,4-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (75.5%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	1,4-DIOXANE (P-DIOXANE)	*	69	131		Low matrix spike recovery (56%)	None (average MS/MSD recovery passes at 69%)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	CHLOROBENZENE	*	80	120		Low average MS/MSD recovery (79%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	CIS-1,2-DICHLOROETHYLENE	*	80	120		Low average MS/MSD recovery (79%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	ETHYLBENZENE	*	81	121		Low average MS/MSD recovery (82%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	n-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (75%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	n-PROPYLBENZENE	*	81	121		Low average MS/MSD recovery (79%)	None (recovery within 70-130% data qualification limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	SEC-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (77%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	t-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (80.5%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	TETRACHLORO-ETHYLENE(PCE)	*	80	120		Low average MS/MSD recovery (82.5%)	None (recovery within 70-130% data qualification limits)
460-38780-24MS	BF-2995g-001-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:37:26	04/12/12 22:43:00	NA	1	XYLENES, TOTAL	*	82	122		Low average MS/MSD recovery (80.5%)	None (recovery within 70-130% data qualification limits)
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	1,2,4-TRIMETHYLBENZENE	*	81	121		Low average MS/MSD recovery (69.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	1,2-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (62%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	*	82	122		Low average MS/MSD recovery (69.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	1,3-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (65%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	1,4-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (62.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	CHLOROBENZENE	*	80	120		Low average MS/MSD recovery (73.5%)	None (recovery within 70-130% data qualification limits)
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	ETHYLBENZENE	*	81	121		Low average MS/MSD recovery (74.5%)	None (recovery within 70-130% data qualification limits)
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	n-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (59%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	n-PROPYLBENZENE	*	81	121		Low average MS/MSD recovery (68%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	SEC-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (64%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	t-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (69.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	TETRACHLORO-ETHYLENE(PCE)	*	80	120		Low average MS/MSD recovery (76.5%)	None (recovery within 70-130% data qualification limits)
460-38780-25MS	BF-2995g-002-0'-4.5'_04/04/12MS	MS		5035	8260B		04/06/12 23:43:20	04/13/12 09:08:00	NA	1	XYLENES, TOTAL	*	82	122		Low average MS/MSD recovery (75%)	None (recovery within 70-130% data qualification limits)
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	1,1,1-TRICHLOROETHANE	*	78	117		Low average MS/MSD recovery (74.5%)	None (recovery within 70-130% data qualification limits)
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	1,2,4-TRIMETHYLBENZENE	*	81	121		Low average MS/MSD recovery (66%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	1,2-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (65%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	*	82	122		Low average MS/MSD recovery (66.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	1,3-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (64.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	1,4-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (64.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	BENZENE	*	77	117		Low average MS/MSD recovery (74%)	None (recovery within 70-130% data qualification limits)
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	CARBON TETRACHLORIDE	*	79	118		Low average MS/MSD recovery (70%)	None (recovery within 70-130% data qualification limits)
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	CHLOROBENZENE	*	80	120		Low average MS/MSD recovery (70.5%)	None (recovery within 70-130% data qualification limits)
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	ETHYLBENZENE	*	81	121		Low average MS/MSD recovery (71%)	None (recovery within 70-130% data qualification limits)
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	*	77	117		Low average MS/MSD recovery (82%)	None (recovery within 70-130% data qualification limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	n-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (59%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	n-PROPYLBENZENE	*	81	121		Low average MS/MSD recovery (63.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	SEC-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (62%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	t-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (65%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	TERt-BUTYL METHYL ETHER	*	78	120		Low average MS/MSD recovery (75%)	None (recovery within 70-130% data qualification limits)
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	TETRACHLORO-ETHYLENE(PCE)	*	80	120		Low average MS/MSD recovery (65.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	TOLUENE	*	75	115		Low average MS/MSD recovery (69.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	TRANS-1,2-DICHLOROETHENE	*	75	122		Low average MS/MSD recovery (78%)	None (recovery within 70-130% data qualification limits)
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	TRICHLORO-ETHYLENE (TCE)	*	79	119		Low average MS/MSD recovery (67.5%)	J-/UJ to detects/NDs for BF samples analyzed in the same batch
460-39249-11MS	BF-3000g-002-0'-8'_04/18/12MS	MS		5035	8260B		04/19/12 20:03:54	04/25/12 03:25:00	NA	1	XYLENES, TOTAL	*	82	122		Low average MS/MSD recovery (71%)	None (recovery within 70-130% data qualification limits)
460-38780-26MS	BF-2995c-001-0'-4.5'_04/04/12MS	MS		3541	8270C		04/09/12 10:50:00	04/12/12 21:46:00	NA	1	PENTACHLORO-PHENOL	J*	19	113		Extremely low average MS/MSD recovery (4.5%)	J-/R to detects/NDs for BF samples extracted in the same batch
460-38859-3MS	BF-3233c-001-0'-6'_04/05/12MS	MS		3541	8270C		04/10/12 12:00:00	04/15/12 02:38:00	NA	1	BENZO(a)PYRENE	*	36	89		High average MS/MSD recovery (94.5%)	None (recovery within 70-130% data qualification limits)
460-38859-3MS	BF-3233c-001-0'-6'_04/05/12MS	MS		3541	8270C		04/10/12 12:00:00	04/15/12 02:38:00	NA	1	PENTACHLORO-PHENOL	J*	19	113		Extremely low MSD recovery (9%), Low average MS/MSD recovery (10%)	J-/R to detects/NDs for BF samples extracted in the same batch
460-39249-12MS	BF-3000c-001-0'-8'_04/18/12MS	MS		3541	8270C		04/24/12 10:00:00	04/26/12 16:36:00	NA	1	BENZO(a)PYRENE	*	36	89		High average MS/MSD recovery (92%)	None (recovery within 70-130% data qualification limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC	D	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col	F		Qual	LCL	UCL	CL		
460-39249-12MS	BF-3000c-001-0'-8'_04/18/12MS	MS		3541	8270C		04/24/12 10:00:00	04/26/12 16:36:00	NA	1	BENZO(b)FLUOR-ANTHENE	*	33	96		High average MS/MSD recovery (102%)	None (recovery within 70-130% data qualification limits)
SURROGATE RECOVERY																	
460108279/1A	460108279/1A	MB		3541	8081A		04/05/12 05:25:05	04/06/12 21:06:00	1C	1	2,4,5,6-TETRACHLORO-META-XYLENE	*	40	150		High surrogate recovery (164%)	None (no effect on environmental sample results)
460108279/1A	460108279/1A	MB		3541	8081A		04/05/12 05:25:05	04/06/12 21:06:00	2C	1	DECACHLORO-BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	53	150		High surrogate recovery (165%)	None (no effect on environmental sample results)
460108279/2A	460108279/2A	LCS		3541	8081A		04/05/12 05:25:05	04/06/12 17:09:00	1C	1	2,4,5,6-TETRACHLORO-META-XYLENE	*	40	150		High surrogate recovery (156%)	None (no effect on environmental sample results)
460108279/2A	460108279/2A	LCS		3541	8081A		04/05/12 05:25:05	04/06/12 17:09:00	2C	1	DECACHLORO-BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	53	150		High surrogate recovery (159%)	None (no effect on environmental sample results)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	INV		3541	8270C		04/10/12 12:00:00	04/15/12 23:15:00	NA	1	2-FLUOROPHENOL	*	37	125		Low acid surrogate recovery (36%)	J-/UJ to detects/NDs for acid analytes in this sample
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	INV		3541	8270C		04/10/12 12:00:00	04/15/12 23:15:00	NA	1	NITROBENZENE-D5	*	38	105		Low B/N surrogate recovery (36%)	J-/UJ to detects/NDs for B/N analytes in this sample
460-39249-9	BF-2985c-001-0'-8'_04/18/12	INV		3541	8081A		04/23/12 03:14:32	04/23/12 20:33:00	2C	1	DECACHLORO-BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	53	150		Low surrogate recovery (51%)	J-/UJ to detects/NDs for all analytes in this sample
LABORATORY BLANK CONTAMINATION																	
460107922/1B5	460107922/1B5	PB	1311	3010A	6010B	04/02/12 15:53:40	04/03/12 11:37:45	04/03/12 16:14:52	NA	5	LEAD	J				Leach blank contamination (0.021 J mg/l)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples leached in the same batch
460110255/1I5	460110255/1I5	LB	1311	3010A	6010B	04/23/12 13:30:00	04/25/12 08:33:54	04/25/12 12:42:10	NA	5	LEAD					Leach blank contamination (28.05 ug/l)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples leached in the same batch
460110423/1B5	460110423/1B5	LB	1311	3010A	6010B	04/24/12 15:30:00	04/26/12 09:35:27	04/27/12 00:25:34	NA	5	LEAD					Leach blank contamination (351.1 ug/l)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples leached in the same batch (none)
460108250/1A	460108250/1A	PB		5035	8260B		04/04/12 22:05:34	04/07/12 08:05:00	NA	1	ACETONE	J				Preparation blank contamination (0.0065 J mg/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples prepped in the same batch

Lab ID	Sample Code	Type	Method			Date and Time			GC	D	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col	F		Qual	LCL	UCL	CL		
460108250/1A	460108250/1A	PB		5035	8260B		04/04/12 22:05:34	04/07/12 08:05:00	NA	1	METHYLENE CHLORIDE					Preparation blank contamination (0.00142 mg/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples prepped in the same batch
460108314/5	460108314/5	MB			8260B			04/05/12 05:59:00	NA	1	ACETONE	J				Method blank contamination (0.00352 J mg/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch (all ND)
460108314/5	460108314/5	MB			8260B			04/05/12 05:59:00	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.000401 J mg/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch (none)
460108540/5	460108540/5	MB			8260B			04/06/12 20:21:00	NA	1	ACETONE					Method blank contamination (0.0141 mg/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460108540/5	460108540/5	MB			8260B			04/06/12 20:21:00	NA	1	METHYLENE CHLORIDE					Method blank contamination (0.00217 mg/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460108567/5	460108567/5	MB			8260B			04/07/12 08:30:00	NA	1	ACETONE	J				Method blank contamination (0.00716 J mg/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460108567/5	460108567/5	MB			8260B			04/07/12 08:30:00	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.000228 J mg/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch (none)
460108630/5	460108630/5	MB			8260B			04/09/12 08:06:00	NA	1	ACETONE	J				Method blank contamination (0.00414 J mg/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460108916/5	460108916/5	MB			8260B			04/11/12 07:21:00	NA	1	ACETONE	J				Method blank contamination (0.00565 J mg/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460108552/1A	460108552/1A	PB		5035	8260B		04/06/12 23:04:59	04/12/12 21:28:00	NA	1	ACETONE	J				Preparation blank contamination (2.99 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples prepped in the same batch
460108552/1A	460108552/1A	PB		5035	8260B		04/06/12 23:04:59	04/12/12 21:28:00	NA	1	METHYLENE CHLORIDE	J				Preparation blank contamination (0.937 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples prepped in the same batch

Lab ID	Sample Code	Type	Method			Date and Time			GC	D	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col	F		Qual	LCL	UCL	CL		
460109095/10	460109095/10	MB			8260B			04/12/12 11:33:00	NA	1	ACETONE	J				Method blank contamination (3.65 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460109095/10	460109095/10	MB			8260B			04/12/12 11:33:00	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.451 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460109185/5	460109185/5	MB			8260B			04/12/12 21:03:00	NA	1	METHYLENE CHLORIDE					Method blank contamination (3.22 ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460109228/5	460109228/5	MB			8260B			04/13/12 07:29:00	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.688 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460108875/1A	460108875/1A	PB		5035	8260B		04/10/12 17:34:50	04/13/12 10:23:00	NA	1	METHYLENE CHLORIDE	J				Preparation blank contamination (0.427 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples prepped in the same batch
460109362/5	460109362/5	MB			8260B			04/14/12 08:50:00	NA	1	ACETONE	J				Method blank contamination (2.41 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460109362/5	460109362/5	MB			8260B			04/14/12 08:50:00	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.346 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460109395/5	460109395/5	MB			8260B			04/15/12 11:00:00	NA	1	ACETONE	J				Method blank contamination (1.83 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460109395/5	460109395/5	MB			8260B			04/15/12 11:00:00	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.227 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
460109970/1A	460109970/1A	PB		5035	8260B		04/19/12 19:40:36	04/21/12 00:05:00	NA	1	METHYLENE CHLORIDE	J				Preparation blank contamination (0.498 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples prepped in the same batch
460110121/5	460110121/5	MB			8260B			04/20/12 22:51:00	NA	1	ACETONE	J				Method blank contamination (1.99 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	D F	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460110121/5	460110121/5	MB			8260B			04/20/12 22:51:00	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.364 J ug/kg)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples analyzed in the same batch
TRIP BLANK CONTAMINATION																	
460-38780-39	Trip Blank_04/04/12	TB			8260B			04/12/12 16:57:00	NA	1	CHLOROFORM	J				Trip blank contamination (0.25 J ug/l)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples shipped in the same container (none)
460-38780-39	Trip Blank_04/04/12	TB			8260B			04/12/12 16:57:00	NA	1	METHYLENE CHLORIDE					Trip blank contamination (2.3 ug/l)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples shipped in the same container
460-38859-28	TB_04/05/12	TB			8260B			04/12/12 00:46:00	NA	1	CHLOROFORM	J				Trip blank contamination (0.25 J ug/l)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples shipped in the same container (none)
460-38859-28	TB_04/05/12	TB			8260B			04/12/12 00:46:00	NA	1	METHYLENE CHLORIDE					Trip blank contamination (2.1 ug/l)	U at RL to Js, J+ to detects <2x blank equivalent concentration for samples shipped in the same container
INITIAL CALIBRATION (ICAL)																	
IC 460-107683/2-7	IC 460-107683/2-7	ICAL			8260B			03/30/12 01:43:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for each ICAL standard < 0.005 advisory level (at 0.0035-0.0041), visible peak with area of 6374 counts in 100-ppb standard	J to detects/UJ to NDs for samples quantitated with this ICAL (professional judgement - RRF is advisory, clear response observed in standard at the ACL of 0.1 ppm)
IC 460-109095/2-7	IC 460-109095/2-7	ICAL			8260B			04/12/12 06:24:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for each ICAL standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard	J to detects/UJ to NDs for samples quantitated with this ICAL (professional judgement - RRF is advisory, clear response observed in standard at the ACL of 0.1 ppm)
CONTINUING CALIBRATION VERIFICATION (CCV)																	
CCVIS 460-108970/4	CCVIS 460-108970/4	CCV			8081A			04/11/12 09:36:00	1C	1	METHOXYCHLOR					Calibration drift secondary column (%D= +21.1)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-108970/28	CCVIS 460-108970/28	CCV			8081A			04/11/12 15:23:00	2C	1	ALDRIN					Calibration drift primary column (%D= +17.6)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-108970/28	CCVIS 460-108970/28	CCV			8081A			04/11/12 15:23:00	2C	1	DIELDRIN					Calibration drift primary column (%D= +17)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-108970/28	CCVIS 460-108970/28	CCV			8081A			04/11/12 15:23:00	2C	1	ALPHA ENDOSULFAN					Calibration drift primary column (%D= +15.1)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-108970/28	CCVIS 460-108970/28	CCV			8081A			04/11/12 15:23:00	1C	1	METHOXYCHLOR					Calibration drift secondary column (%D= +21.1)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109244/26	CCVIS 460-109244/26	CCV			8081A			04/12/12 20:06:00	2C	1	DELTA BHC (DELTA HEXACHLORO-CYCLOHEXANE)					Calibration drift primary column (%D= +20.3)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109244/26	CCVIS 460-109244/26	CCV			8081A			04/12/12 20:06:00	2C	1	p,p'-DDD					Calibration drift primary column (%D= +20.3)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109244/26	CCVIS 460-109244/26	CCV			8081A			04/12/12 20:06:00	2C	1	p,p'-DDE					Calibration drift primary column (%D= +17.4)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-108896/2	CCVIS 460-108896/2	CCV			8082			04/10/12 16:43:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 6					Calibration drift primary column (%D= +33.5)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-108896/28	CCVIS 460-108896/28	CCV			8082			04/10/12 23:59:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 5					Calibration drift primary column (%D= +16.2)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-108896/28	CCVIS 460-108896/28	CCV			8082			04/10/12 23:59:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 6					Calibration drift primary column (%D= +30)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-108896/28	CCVIS 460-108896/28	CCV			8082			04/10/12 23:59:00	1C	1	PCB-1260 (AROCLOR 1260) - Peak 7					Calibration drift secondary column (%D= -45.7)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)

Lab ID	Sample Code	Type	Method			Date and Time			GC	D	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col	F		Qual	LCL	UCL	CL		
CCVIS 460-109197/2	CCVIS 460-109197/2	CCV			8082			04/12/12 03:52:00	2C	1	PCB-1016 (AROCLOR 1016) - Peak 4					Calibration drift primary column (%D= +16.3)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/2	CCVIS 460-109197/2	CCV			8082			04/12/12 03:52:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 5					Calibration drift primary column (%D= +16.8)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/2	CCVIS 460-109197/2	CCV			8082			04/12/12 03:52:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 6					Calibration drift primary column (%D= +31.5)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/2	CCVIS 460-109197/2	CCV			8082			04/12/12 03:52:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 8					Calibration drift primary column (%D= +20.1)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/2	CCVIS 460-109197/2	CCV			8082			04/12/12 03:52:00	1C	1	PCB-1016 (AROCLOR 1016) - Peak 7					Calibration drift secondary column (%D= -81.2)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCVIS 460-109197/28	CCVIS 460-109197/28	CCV			8082			04/12/12 11:00:00	2C	1	PCB-1016 (AROCLOR 1016) - Peak 1					Calibration drift primary column (%D= +17.9)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/28	CCVIS 460-109197/28	CCV			8082			04/12/12 11:00:00	2C	1	PCB-1016 (AROCLOR 1016) - Peak 3					Calibration drift primary column (%D= +18.5)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/28	CCVIS 460-109197/28	CCV			8082			04/12/12 11:00:00	2C	1	PCB-1016 (AROCLOR 1016) - Peak 5					Calibration drift primary column (%D= +19.1)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/28	CCVIS 460-109197/28	CCV			8082			04/12/12 11:00:00	2C	1	PCB-1016 (AROCLOR 1016) - Peak 7					Calibration drift primary column (%D= +20.5)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/28	CCVIS 460-109197/28	CCV			8082			04/12/12 11:00:00	2C	1	PCB-1016 (AROCLOR 1016) - Peak 8					Calibration drift primary column (%D= +95.9)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/28	CCVIS 460-109197/28	CCV			8082			04/12/12 11:00:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 3					Calibration drift primary column (%D= +16.5)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-109197/28	CCVIS 460-109197/28	CCV			8082			04/12/12 11:00:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 6					Calibration drift primary column (%D= +36.5)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/28	CCVIS 460-109197/28	CCV			8082			04/12/12 11:00:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 8					Calibration drift primary column (%D= +26.8)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/28	CCVIS 460-109197/28	CCV			8082			04/12/12 11:00:00	1C	1	PCB-1260 (AROCLOR 1260) - Peak 6					Calibration drift secondary column (%D= +16)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-109197/28	CCVIS 460-109197/28	CCV			8082			04/12/12 11:00:00	1C	1	PCB-1260 (AROCLOR 1260) - Peak 8					Calibration drift secondary column (%D= +16)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-108314/2	CCVIS 460-108314/2	CCV			8260B			04/05/12 03:30:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-108540/2	CCVIS 460-108540/2	CCV			8260B			04/06/12 17:50:00	NA	1	ACETONE					Calibration drift (%D= +43.4)	J+ to detects, UJ to NDs for samples analyzed this shift (all detects)
CCVIS 460-108540/2	CCVIS 460-108540/2	CCV			8260B			04/06/12 17:50:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-108567/2	CCVIS 460-108567/2	CCV			8260B			04/07/12 05:08:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-108630/2	CCVIS 460-108630/2	CCV			8260B			04/08/12 05:30:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-108540/2	CCVIS 460-108916/2	CCV			8260B			04/11/12 04:40:00	NA	1	ACETONE					Calibration drift (%D= +35.3)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-108540/2	CCVIS 460-108916/2	CCV			8260B			04/11/12 04:40:00	NA	1	METHYL ETHYL KETONE (2-BUTANONE)					Calibration drift (%D= +26.4)	J+ to detects only since < +40% for samples analyzed this shift (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-108540/2	CCVIS 460-108916/2	CCV			8260B			04/11/12 04:40:00	NA	1	1,2-DICHLOROETHANE					Calibration drift (%D= +21.3)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-108916/2	CCVIS 460-108916/2	CCV			8260B			04/11/12 04:40:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-108540/2	CCVIS 460-108916/2	CCV			8260B			04/11/12 04:40:00	NA	1	n-BUTYLBENZENE					Calibration drift (%D= +24.9)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-109185/2	CCVIS 460-109185/2	CCV			8260B			04/12/12 18:22:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-109185/2	CCVIS 460-109185/2	CCV			8260B			04/12/12 18:22:00	NA	1	ACETONE					Calibration drift (%D= +29.2)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-109185/2	CCVIS 460-109185/2	CCV			8260B			04/12/12 18:22:00	NA	1	METHYL ETHYL KETONE (2-BUTANONE)					Calibration drift (%D= +20.8)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-109228/2	CCVIS 460-109228/2	CCV			8260B			04/12/12 04:50:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-109362/2	CCVIS 460-109362/2	CCV			8260B			04/14/12 06:35:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-109395/2	CCVIS 460-109395/2	CCV			8260B			04/15/12 07:35:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-110121/2	CCVIS 460-110121/2	CCV			8260B			04/20/12 18:56:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-110121/2	CCVIS 460-110121/2	CCV			8260B			04/20/12 18:56:00	NA	1	ACETONE					Calibration drift (%D= +29.5)	J+ to detects only since < +40% for samples analyzed this shift

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-110169/2	CCVIS 460-110169/2	CCV			8260B			04/23/12 03:13:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-110443/2	CCVIS 460-110443/2	CCV			8260B			04/24/12 18:50:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-110443/2	CCVIS 460-110443/2	CCV			8260B			04/24/12 18:50:00	NA	1	ACETONE					Calibration drift (%D= +35.8)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-110443/2	CCVIS 460-110443/2	CCV			8260B			04/24/12 18:50:00	NA	1	METHYLENE CHLORIDE					Calibration drift (%D= +33.6)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-109267/2	CCVIS 460-109267/2	CCV			8270C			04/12/12 17:29:00	NA	1	INDENO(1,2,3-C,D)PYRENE					Calibration drift (%D= +25.7)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-109267/2	CCVIS 460-109267/2	CCV			8270C			04/12/12 17:29:00	NA	1	BENZO(g,h,i) PERYLENE					Calibration drift (%D= +23)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-109274/2	CCVIS 460-109274/2	CCV			8270C			04/13/12 07:40:00	NA	1	BENZO(g,h,i) PERYLENE					Calibration drift (%D= +21.9)	J+ to detects only since < +40% for samples analyzed this shift (none)

DF – Dilution Factor

LCL – Lower Control Limit

UCL – Upper Control Limit

TABLE 4
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase I Remedial Design/ Remedial Action

QUALIFIED RESULTS FOR FIELD SAMPLES

Lab ID	Field ID_Date	Analyte	Lab Result [1]			DVQ	QC Issue
TCLP METALS							
460-38437-10	ECS-SSA2-SW_03/28/12	1311 Lead	194		ug/l	J+	Leach blank contamination (0.021 J mg/l)
460-38437-13	ECS-SSA32-SE_03/28/12	1311 Lead	106		ug/l	J+	Leach blank contamination (0.021 J mg/l)
460-38437-14	ECS-SSA32-SS_03/28/12	1311 Lead	172		ug/l	J+	Leach blank contamination (0.021 J mg/l)
460-38437-21	ECS-SSA13-SW_03/28/12	1311 Lead	107		ug/l	J+	Leach blank contamination (0.021 J mg/l)
460-39092-6	ECS-33-F_04/13/12	1311 Lead	25	U	ug/l	UJ	Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate
460-39092-7	ECS-33-FX_04/13/12	1311 Lead	810		ug/l	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate
460-39135-1	ECS-32-F_04/16/12	1311 Lead	506		ug/l	J	Poor field duplicate precision (49 RPD), use higher result from field duplicate
460-39135-2	ECS-32-FX_04/16/12	1311 Lead	836		ug/l	J	Poor field duplicate precision (49 RPD), use higher result from field duplicate
460-39254-1	ECS-15-F_04/17/12	1311 Lead	62.3		ug/l	J+	Leach blank contamination (28.05 ug/l)
460-39254-2	ECS-23-F_04/17/12	1311 Lead	190		ug/l	J+	Leach blank contamination (28.05 ug/l)
460-39254-4	ECS-17-F_04/17/12	1311 Lead	25	J	ug/l	U	Leach blank contamination (28.05 ug/l); Result is between MDL and RL
460-39254-5	ECS-14-F_04/17/12	1311 Lead	155		ug/l	J+	Leach blank contamination (28.05 ug/l)
460-39775-9	ECS-6-F_05/01/12	1311 Lead	123		ug/l	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate
460-39775-10	ECS-6-F-X_05/01/12	1311 Lead	319		ug/l	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate
460-39775-16	ECS-4-F_05/01/12	1311 Lead	25	U	ug/l	UJ	Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate
460-39775-17	ECS-4-FX_05/01/12	1311 Lead	123		ug/l	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate
TOTAL METALS							
460-39614-5	ECS-BF-DEC-001R-F2-0-1' _04/27/12	Antimony	2.3	U	mg/kg	UJ	Low matrix spike recovery (67%)
460-38780-2	BF-2994g-002-0'-6.5'_04/04/12	Arsenic	7.1		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38780-3	BF-2994c-001-0'-6.5'_04/04/12	Arsenic	8.6		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38780-6	BF-2991c-001-0'-6'_04/04/12	Arsenic	8.4		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38780-9	BF-2987c-001-0'-8.5'_04/04/12	Arsenic	6.4		mg/kg	J	Poor lab duplicate precision (44 RPD)

Lab ID	Field ID_Date	Analyte	Lab Result [1]			DVQ	QC Issue
460-38780-11	BF-2987c-001x-0'-8.5'_04/04/12	Arsenic	7.7		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38780-14	BF-2984c-001-0'-10'_04/04/12	Arsenic	10.6		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38780-17	BF-2980c-001-0'-7.5'_04/04/12	Arsenic	8.4		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38780-20	BF-2988c-001-0'-7.5'_04/04/12	Arsenic	7.8		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38780-23	BF-2992c-001-0'-7'_04/04/12	Arsenic	7.5		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38780-26	BF-2995c-001-0'-4.5'_04/04/12	Arsenic	5.1		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38780-29	BF-2998c-001-0'-3.5'_04/04/12	Arsenic	4.7		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38780-32	BF-3225c-001-0'-3'_04/04/12	Arsenic	6.9		mg/kg	J	Poor lab duplicate precision (44 RPD)
460-38653-8	BF-2972c-001-0'-8'_04/03/12	Barium	30.5	J	mg/kg	J	Result is between MDL and RL
460-38653-9	BF-2972c-002-0'-8'_04/03/12	Barium	29.1	J	mg/kg	J	Result is between MDL and RL
460-38653-12	BF-2975c-001-0'-4'_04/03/12	Barium	29.3	J	mg/kg	J	Result is between MDL and RL
460-38653-15	BF-2978c-001-0'-6'_04/03/12	Barium	29	J	mg/kg	J	Result is between MDL and RL
460-38653-18	BF-2982c-001-0'-5'_04/03/12	Barium	30.6	J	mg/kg	J	Result is between MDL and RL
460-38653-21	BF-2979c-001-0'-8.5'_04/03/12	Barium	36.7	J	mg/kg	J	Result is between MDL and RL
460-38653-24	BF-2976c-001-0'-7.5'_04/03/12	Barium	39.9	J	mg/kg	J	Result is between MDL and RL
460-38653-27	BF-2973c-001-0'-4'_04/03/12	Barium	31.3	J	mg/kg	J	Result is between MDL and RL
460-38653-30	BF-2974c-001-0'-3.5'_04/03/12	Barium	32.5	J	mg/kg	J	Result is between MDL and RL
460-38653-33	BF-2977c-001-0'-3.5'_04/03/12	Barium	33.2	J	mg/kg	J	Result is between MDL and RL
460-38653-36	BF-2983c-001-0'-9'_04/03/12	Barium	37.8	J	mg/kg	J	Result is between MDL and RL
460-38653-42	BF-2990c-001-0'-7.5'_04/03/12	Barium	34.1	J	mg/kg	J	Result is between MDL and RL
460-38780-2	BF-2994g-002-0'-6.5'_04/04/12	Barium	25.7	J	mg/kg	J	Result is between MDL and RL
460-38780-3	BF-2994c-001-0'-6.5'_04/04/12	Barium	36.1	J	mg/kg	J	Result is between MDL and RL
460-38780-9	BF-2987c-001-0'-8.5'_04/04/12	Barium	32.1	J	mg/kg	J	Result is between MDL and RL
460-38780-11	BF-2987c-001x-0'-8.5'_04/04/12	Barium	29.2	J	mg/kg	J	Result is between MDL and RL
460-38780-14	BF-2984c-001-0'-10'_04/04/12	Barium	41.3	J	mg/kg	J	Result is between MDL and RL
460-38780-20	BF-2988c-001-0'-7.5'_04/04/12	Barium	34.2	J	mg/kg	J	Result is between MDL and RL
460-38780-29	BF-2998c-001-0'-3.5'_04/04/12	Barium	28	J	mg/kg	J	Result is between MDL and RL
460-38780-32	BF-3225c-001-0'-3'_04/04/12	Barium	30.6	J	mg/kg	J	Result is between MDL and RL
460-38780-35	BF-3226c-001-0'-3'_04/04/12	Barium	44.5	J	mg/kg	J	Result is between MDL and RL
460-38780-38	BF-3229c-001-0'-5'_04/04/12	Barium	36.6	J	mg/kg	J	Result is between MDL and RL
460-38859-6	BF-3234c-001-0'-5'_04/05/12	Barium	40.6	J	mg/kg	J	Result is between MDL and RL
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Barium	37.9	J	mg/kg	J	Result is between MDL and RL
460-38859-15	BF-2999c-001-0'-5'_04/05/12	Barium	38.2	J	mg/kg	J	Result is between MDL and RL
460-38859-18	BF-2996c-001-0'-5'_04/05/12	Barium	39.6	J	mg/kg	J	Result is between MDL and RL
460-38859-21	BF-3235c-001-0'-6'_04/05/12	Barium	46.7	J	mg/kg	J	Result is between MDL and RL
460-38859-24	BF-3231c-001-0'-8'_04/05/12	Barium	33.1	J	mg/kg	J	Result is between MDL and RL
460-39249-5	BF-2981c-001-0'-5'_04/18/12	Barium	38.8	J	mg/kg	J	Result is between MDL and RL
460-39249-6	BF-2981c-001x-0-5'_04/18/12	Barium	42	J	mg/kg	J	Result is between MDL and RL
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Barium	32.3	J	mg/kg	J	Result is between MDL and RL
460-39249-18	BF-3232c-001-1'-5'_04/18/12	Barium	38.7	J	mg/kg	J	Result is between MDL and RL
460-39249-27	BF-2993c-001-1'-6'_04/18/12	Barium	43.9	J	mg/kg	J	Result is between MDL and RL
460-39249-30	BF-2997c-001-1'-6'_04/18/12	Barium	34.2	J	mg/kg	J	Result is between MDL and RL
460-39614-5	ECS-BF-DEC-001R-F2-0-1' _04/27/12	Barium	42.4	J	mg/kg	J	Result is between MDL and RL
460-38653-27	BF-2973c-001-0'-4'_04/03/12	Beryllium	0.39	J	mg/kg	J	Result is between MDL and RL
460-38653-33	BF-2977c-001-0'-3.5'_04/03/12	Beryllium	0.38	J	mg/kg	J	Result is between MDL and RL
460-38653-36	BF-2983c-001-0'-9'_04/03/12	Beryllium	0.44	J	mg/kg	J	Result is between MDL and RL
460-38780-29	BF-2998c-001-0'-3.5'_04/04/12	Beryllium	0.42	J	mg/kg	J	Result is between MDL and RL
460-38859-6	BF-3234c-001-0'-5'_04/05/12	Beryllium	0.47	J	mg/kg	J	Result is between MDL and RL
460-38859-21	BF-3235c-001-0'-6'_04/05/12	Beryllium	0.43	J	mg/kg	J	Result is between MDL and RL
460-38859-24	BF-3231c-001-0'-8'_04/05/12	Beryllium	0.42	J	mg/kg	J	Result is between MDL and RL
460-39614-5	ECS-BF-DEC-001R-F2-0-1' _04/27/12	Beryllium	0.41	J	mg/kg	J	Result is between MDL and RL
460-38653-36	BF-2983c-001-0'-9'_04/03/12	Cadmium	0.31	J	mg/kg	J	Result is between MDL and RL

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38859-12	BF-3227c-001-0'-6'_04/05/12	Cadmium	0.16 J mg/kg	J	Result is between MDL and RL
460-39092-15	ECS-25-F_04/13/12	Cadmium	0.26 J mg/kg	J	Result is between MDL and RL
460-39775-23	ECS-1-SN_05/01/12	Cadmium	0.23 J mg/kg	J	Result is between MDL and RL
460-39092-15	ECS-25-F_04/13/12	Calcium	897 J mg/kg	J	Result is between MDL and RL
460-39135-3	ECS-37-F_04/16/12	Calcium	810 J mg/kg	J	Result is between MDL and RL
460-39614-5	ECS-BF-DEC-001R-F2-0-1' _04/27/12	Calcium	277 J mg/kg	J	Result is between MDL and RL
460-39775-23	ECS-1-SN_05/01/12	Calcium	1090 J mg/kg	J	Result is between MDL and RL
460-39249-15	BF-3228c-001-1'-7'_04/18/12	Chromium, Hexavalent	0.21 J mg/kg	J	Result is between MDL and RL
460-39249-18	BF-3232c-001-1'-5'_04/18/12	Chromium, Hexavalent	0.21 J mg/kg	J	Result is between MDL and RL
460-39249-21	BF-3224c-001-1'-4'_04/18/12	Chromium, Hexavalent	0.33 J mg/kg	J	Result is between MDL and RL
460-39249-27	BF-2993c-001-1'-6'_04/18/12	Chromium, Hexavalent	0.14 J mg/kg	J	Result is between MDL and RL
460-39092-15	ECS-25-F_04/13/12	Cobalt	9.9 J mg/kg	J	Result is between MDL and RL
460-39614-5	ECS-BF-DEC-001R-F2-0-1' _04/27/12	Cobalt	8.7 J mg/kg	J	Result is between MDL and RL
460-39775-23	ECS-1-SN_05/01/12	Cobalt	8.9 J mg/kg	J	Result is between MDL and RL
460-39845-2	ECS-SSA23-SE1-0-6"_05/03/12	Cobalt	8 J mg/kg	J	Result is between MDL and RL
460-38437-15	ECS-SSA32-F_03/28/12	Lead	139 mg/kg	J-	Low matrix spike recovery (45%)
460-38437-21	ECS-SSA13-SW_03/28/12	Lead	128 mg/kg	J	Poor lab duplicate precision (25 RPD)
460-38437-22	ECS-SSA11-F_03/28/12	Lead	143 mg/kg	J	Poor lab duplicate precision (25 RPD)
460-38437-23	ECS-SSA11-SN_03/28/12	Lead	538 mg/kg	J	Poor lab duplicate precision (25 RPD)
460-38437-24	ECS-SSA11-SE_03/28/12	Lead	3070 mg/kg	J	Poor lab duplicate precision (25 RPD)
460-38437-25	ECS-SSA11-SS_03/28/12	Lead	174 mg/kg	J	Poor lab duplicate precision (25 RPD)
460-38437-26	ECS-SSA11-SW_03/28/12	Lead	533 mg/kg	J-	Low matrix spike recovery (45%)
460-38653-8	BF-2972c-001-0'-8'_04/03/12	Lead	25.5 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38653-9	BF-2972c-002-0'-8'_04/03/12	Lead	22.5 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38653-12	BF-2975c-001-0'-4'_04/03/12	Lead	21.5 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38653-15	BF-2978c-001-0'-6'_04/03/12	Lead	21.8 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38653-18	BF-2982c-001-0'-5'_04/03/12	Lead	20 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38653-21	BF-2979c-001-0'-8.5'_04/03/12	Lead	23 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38653-24	BF-2976c-001-0'-7.5'_04/03/12	Lead	17.1 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38653-27	BF-2973c-001-0'-4'_04/03/12	Lead	21.4 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38653-30	BF-2974c-001-0'-3.5'_04/03/12	Lead	91.1 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38653-33	BF-2977c-001-0'-3.5'_04/03/12	Lead	58.7 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38653-36	BF-2983c-001-0'-9'_04/03/12	Lead	804 mg/kg	J	Poor lab duplicate precision (22 RPD)
460-38780-2	BF-2994g-002-0'-6.5'_04/04/12	Lead	15 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-3	BF-2994c-001-0'-6.5'_04/04/12	Lead	28.2 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-6	BF-2991c-001-0'-6'_04/04/12	Lead	54.6 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-9	BF-2987c-001-0'-8.5'_04/04/12	Lead	23.7 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-11	BF-2987c-001x-0'-8.5'_04/04/12	Lead	22.9 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-14	BF-2984c-001-0'-10'_04/04/12	Lead	38 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-17	BF-2980c-001-0'-7.5'_04/04/12	Lead	114 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-20	BF-2988c-001-0'-7.5'_04/04/12	Lead	18.6 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-23	BF-2992c-001-0'-7'_04/04/12	Lead	35 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-26	BF-2995c-001-0'-4.5'_04/04/12	Lead	24.1 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-29	BF-2998c-001-0'-3.5'_04/04/12	Lead	14.1 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-38780-32	BF-3225c-001-0'-3'_04/04/12	Lead	15.6 mg/kg	J	Poor lab duplicate precision (35 RPD)
460-39363-4	ECS-1-F_04/20/12	Lead	79 mg/kg	J	Poor lab duplicate precision (50 RPD)
460-39363-5	ECS-2-F_04/20/12	Lead	46.6 mg/kg	J	Poor lab duplicate precision (50 RPD)
460-39363-6	ECS-2-Fx_04/20/12	Lead	39.8 mg/kg	J	Poor lab duplicate precision (50 RPD)
460-39365-1	ECS-13-F_04/18/12	Lead	31.2 mg/kg	J	Poor lab duplicate precision (50 RPD)
460-39845-4	ECS-SSA23-F1x-1'_05/03/12	Lead	33.1 mg/kg	J	Poor lab duplicate precision (71 RPD)
460-39845-5	ECS-SSA23-F2-1'_05/03/12	Lead	146 mg/kg	J	Poor lab duplicate precision (71 RPD)
460-39845-6	ECS-SSA23-SE2-0-6"_05/03/12	Lead	611 mg/kg	J	Poor lab duplicate precision (71 RPD)

Lab ID	Field ID_Date	Analyte	Lab Result [1]			DVQ	QC Issue
460-39845-7	ECS-SSA20-SE-0-6"_05/03/12	Lead	722		mg/kg	J	Poor lab duplicate precision (71 RPD)
460-39845-8	ECS-SSA-20-F-1'_05/03/12	Lead	19.4		mg/kg	J	Poor lab duplicate precision (71 RPD)
460-39845-9	ECS-SSA 19-F-1'_05/03/12	Lead	35.6		mg/kg	J	Poor lab duplicate precision (71 RPD)
460-39845-10	ECS-SSA 19-SE-0-6"_05/03/12	Lead	743		mg/kg	J	Poor lab duplicate precision (71 RPD)
460-39845-11	ECS-SSA-19-Sn-0-6"_05/03/12	Lead	20.1		mg/kg	J	Poor lab duplicate precision (71 RPD)
460-38780-2	BF-2994g-002-0'-6.5'_04/04/12	Manganese	360		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-3	BF-2994c-001-0'-6.5'_04/04/12	Manganese	711		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-6	BF-2991c-001-0'-6'_04/04/12	Manganese	676		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-9	BF-2987c-001-0'-8.5'_04/04/12	Manganese	506		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-11	BF-2987c-001x-0'-8.5'_04/04/12	Manganese	612		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-14	BF-2984c-001-0'-10'_04/04/12	Manganese	853		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-17	BF-2980c-001-0'-7.5'_04/04/12	Manganese	625		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-20	BF-2988c-001-0'-7.5'_04/04/12	Manganese	650		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-23	BF-2992c-001-0'-7'_04/04/12	Manganese	985		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-26	BF-2995c-001-0'-4.5'_04/04/12	Manganese	767		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-29	BF-2998c-001-0'-3.5'_04/04/12	Manganese	438		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-38780-32	BF-3225c-001-0'-3'_04/04/12	Manganese	447		mg/kg	J	Poor lab duplicate precision (57 RPD)
460-39614-5	ECS-BF-DEC-001R-F2-0-1' _04/27/12	Manganese	394		mg/kg	J	Poor lab duplicate precision (29 RPD)
460-38653-21	BF-2979c-001-0'-8.5'_04/03/12	Mercury	0.028	J	mg/kg	J	Result is between MDL and RL
460-38653-24	BF-2976c-001-0'-7.5'_04/03/12	Mercury	0.028	J	mg/kg	J	Result is between MDL and RL
460-38653-30	BF-2974c-001-0'-3.5'_04/03/12	Mercury	0.03	J	mg/kg	J	Result is between MDL and RL
460-38653-33	BF-2977c-001-0'-3.5'_04/03/12	Mercury	0.031	J	mg/kg	J	Result is between MDL and RL
460-38780-9	BF-2987c-001-0'-8.5'_04/04/12	Mercury	0.03	J	mg/kg	J	Result is between MDL and RL
460-38780-14	BF-2984c-001-0'-10'_04/04/12	Mercury	0.029	J	mg/kg	J	Result is between MDL and RL
460-38780-23	BF-2992c-001-0'-7'_04/04/12	Mercury	0.026	J	mg/kg	J	Result is between MDL and RL
460-38859-3	BF-3233c-001-0'-6'_04/05/12	Mercury	0.032	J	mg/kg	J	Result is between MDL and RL
460-38859-18	BF-2996c-001-0'-5'_04/05/12	Mercury	0.034	J	mg/kg	J	Result is between MDL and RL
460-38859-24	BF-3231c-001-0'-8'_04/05/12	Mercury	0.029	J	mg/kg	J	Result is between MDL and RL
460-38859-27	BF-3236c-001-0'-6'_04/05/12	Mercury	0.031	J	mg/kg	J	Result is between MDL and RL
460-39249-6	BF-2981c-001x-0-5'_04/18/12	Mercury	0.031	J	mg/kg	J	Result is between MDL and RL
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Mercury	0.032	J	mg/kg	J	Result is between MDL and RL
460-39249-12	BF-3000c-001-0'-8'_04/18/12	Mercury	0.036	J	mg/kg	J	Result is between MDL and RL
460-39249-21	BF-3224c-001-1'-4'_04/18/12	Mercury	0.032	J	mg/kg	J	Result is between MDL and RL
460-39249-24	BF-2989c-001-1'-4'_04/18/12	Mercury	0.032	J	mg/kg	J	Result is between MDL and RL
460-39249-27	BF-2993c-001-1'-6'_04/18/12	Mercury	0.031	J	mg/kg	J	Result is between MDL and RL
460-39092-15	ECS-25-F_04/13/12	Potassium	1050	J	mg/kg	J	Result is between MDL and RL
460-39135-3	ECS-37-F_04/16/12	Potassium	830	J	mg/kg	J	Result is between MDL and RL
460-39614-5	ECS-BF-DEC-001R-F2-0-1' _04/27/12	Potassium	321	J	mg/kg	J	Result is between MDL and RL
460-39775-23	ECS-1-SN_05/01/12	Potassium	732	J	mg/kg	J	Result is between MDL and RL
460-38780-14	BF-2984c-001-0'-10'_04/04/12	Selenium	1.9	J	mg/kg	J	Result is between MDL and RL
460-38780-38	BF-3229c-001-0'-5'_04/04/12	Selenium	2	J	mg/kg	J	Result is between MDL and RL
460-38859-12	BF-3227c-001-0'-6'_04/05/12	Selenium	2.1	J	mg/kg	J	Result is between MDL and RL
460-38859-27	BF-3236c-001-0'-6'_04/05/12	Selenium	1.7	J	mg/kg	J	Result is between MDL and RL
460-38947-1	ECS-SSA11-SER1-0"-6" _04/10/12	Selenium	1.4	J	mg/kg	J	Result is between MDL and RL
460-39249-12	BF-3000c-001-0'-8'_04/18/12	Selenium	1.5	J	mg/kg	J	Result is between MDL and RL
460-38653-8	BF-2972c-001-0'-8'_04/03/12	Silver	2.3	U	mg/kg	UJ	Low matrix spike recovery (67%)
460-38653-9	BF-2972c-002-0'-8'_04/03/12	Silver	2.1	U	mg/kg	UJ	Low matrix spike recovery (67%)
460-38653-12	BF-2975c-001-0'-4'_04/03/12	Silver	0.25	J	mg/kg	J	Low matrix spike recovery (67%); Result is between MDL and RL
460-38653-15	BF-2978c-001-0'-6'_04/03/12	Silver	0.23	J	mg/kg	J	Low matrix spike recovery (67%); Result is between MDL and RL

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38653-18	BF-2982c-001-0'-5'_04/03/12	Silver	0.31 J mg/kg	J	Low matrix spike recovery (67%); Result is between MDL and RL
460-38653-21	BF-2979c-001-0'-8.5'_04/03/12	Silver	2.4 U mg/kg	UJ	Low matrix spike recovery (67%)
460-38653-24	BF-2976c-001-0'-7.5'_04/03/12	Silver	2.3 U mg/kg	UJ	Low matrix spike recovery (67%)
460-38653-27	BF-2973c-001-0'-4'_04/03/12	Silver	2.4 U mg/kg	UJ	Low matrix spike recovery (67%)
460-38653-30	BF-2974c-001-0'-3.5'_04/03/12	Silver	2.2 U mg/kg	UJ	Low matrix spike recovery (67%)
460-38653-33	BF-2977c-001-0'-3.5'_04/03/12	Silver	0.22 J mg/kg	J	Low matrix spike recovery (67%); Result is between MDL and RL
460-38653-36	BF-2983c-001-0'-9'_04/03/12	Silver	2.4 U mg/kg	UJ	Low matrix spike recovery (67%)
460-39092-15	ECS-25-F_04/13/12	Silver	0.33 J mg/kg	J	Result is between MDL and RL
460-39092-15	ECS-25-F_04/13/12	Sodium	362 J mg/kg	J	Result is between MDL and RL
460-39135-3	ECS-37-F_04/16/12	Sodium	357 J mg/kg	J	Result is between MDL and RL
PESTICIDES					
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Aldrin	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Alpha BHC (Alpha Hexachlorocyclohexane)	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Alpha Endosulfan	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Beta BHC (Beta Hexachlorocyclohexane)	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Beta Endosulfan	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Chlordane	85 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Delta BHC (Delta Hexachlorocyclohexane)	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Dieldrin	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Endosulfan Sulfate	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Endrin	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Gamma BHC (Lindane)	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	Heptachlor	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	p,p'-DDD	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	p,p'-DDE	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	p,p'-DDT	8.5 U ug/kg	UJ	Low surrogate recovery (51%)
PCB AROCLORS					
460-38859-3	BF-3233c-001-0'-6'_04/05/12	PCB-1016 (Aroclor 1016)	80 U ug/kg	UJ	Calibration drift secondary column (%D= -81.2)
460-38859-6	BF-3234c-001-0'-5'_04/05/12	PCB-1016 (Aroclor 1016)	83 U ug/kg	UJ	Calibration drift secondary column (%D= -81.2)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	PCB-1016 (Aroclor 1016)	79 U ug/kg	UJ	Calibration drift secondary column (%D= -81.2)
460-38859-12	BF-3227c-001-0'-6'_04/05/12	PCB-1016 (Aroclor 1016)	80 U ug/kg	UJ	Calibration drift secondary column (%D= -81.2)
460-38859-15	BF-2999c-001-0'-5'_04/05/12	PCB-1016 (Aroclor 1016)	80 U ug/kg	UJ	Calibration drift secondary column (%D= -81.2)
460-38859-18	BF-2996c-001-0'-5'_04/05/12	PCB-1016 (Aroclor 1016)	76 U ug/kg	UJ	Calibration drift secondary column (%D= -81.2)
460-38859-21	BF-3235c-001-0'-6'_04/05/12	PCB-1016 (Aroclor 1016)	80 U ug/kg	UJ	Calibration drift secondary column (%D= -81.2)
460-38859-24	BF-3231c-001-0'-8'_04/05/12	PCB-1016 (Aroclor 1016)	79 U ug/kg	UJ	Calibration drift secondary column (%D= -81.2)
460-38859-27	BF-3236c-001-0'-6'_04/05/12	PCB-1016 (Aroclor 1016)	81 U ug/kg	UJ	Calibration drift secondary column (%D= -81.2)
460-38653-21	BF-2979c-001-0'-8.5'_04/03/12	PCB-1254 (Aroclor 1254)	0.04 J mg/kg	J	Result is between MDL and RL
460-38780-2	BF-2994g-002-0'-6.5'_04/04/12	PCB-1260 (Aroclor 1260)	80 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38780-3	BF-2994c-001-0'-6.5'_04/04/12	PCB-1260 (Aroclor 1260)	78 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-6	BF-2991c-001-0'-6'_04/04/12	PCB-1260 (Aroclor 1260)	84 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-9	BF-2987c-001-0'-8.5'_04/04/12	PCB-1260 (Aroclor 1260)	82 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-11	BF-2987c-001x-0'-8.5'_04/04/12	PCB-1260 (Aroclor 1260)	84 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-14	BF-2984c-001-0'-10'_04/04/12	PCB-1260 (Aroclor 1260)	80 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-17	BF-2980c-001-0'-7.5'_04/04/12	PCB-1260 (Aroclor 1260)	82 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-20	BF-2988c-001-0'-7.5'_04/04/12	PCB-1260 (Aroclor 1260)	82 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-23	BF-2992c-001-0'-7'_04/04/12	PCB-1260 (Aroclor 1260)	80 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-26	BF-2995c-001-0'-4.5'_04/04/12	PCB-1260 (Aroclor 1260)	86 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-29	BF-2998c-001-0'-3.5'_04/04/12	PCB-1260 (Aroclor 1260)	80 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-32	BF-3225c-001-0'-3'_04/04/12	PCB-1260 (Aroclor 1260)	78 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-35	BF-3226c-001-0'-3'_04/04/12	PCB-1260 (Aroclor 1260)	81 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-38780-38	BF-3229c-001-0'-5'_04/04/12	PCB-1260 (Aroclor 1260)	76 U ug/kg	UJ	Calibration drift secondary column (%D= -45.7)
460-39249-5	BF-2981c-001-0'-5'_04/18/12	PCB-1260 (Aroclor 1260)	78 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-39249-6	BF-2981c-001x-0-5'_04/18/12	PCB-1260 (Aroclor 1260)	78 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-39249-9	BF-2985c-001-0'-8'_04/18/12	PCB-1260 (Aroclor 1260)	85 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-39249-12	BF-3000c-001-0'-8'_04/18/12	PCB-1260 (Aroclor 1260)	77 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-39249-15	BF-3228c-001-1'-7'_04/18/12	PCB-1260 (Aroclor 1260)	83 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-39249-18	BF-3232c-001-1'-5'_04/18/12	PCB-1260 (Aroclor 1260)	80 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-39249-21	BF-3224c-001-1'-4'_04/18/12	PCB-1260 (Aroclor 1260)	79 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-39249-24	BF-2989c-001-1'-4'_04/18/12	PCB-1260 (Aroclor 1260)	79 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-39249-27	BF-2993c-001-1'-6'_04/18/12	PCB-1260 (Aroclor 1260)	78 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-39249-30	BF-2997c-001-1'-6'_04/18/12	PCB-1260 (Aroclor 1260)	73 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
VOLATILE ORGANIC COMPOUNDS (VOC)					
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	1,2,4-Trimethylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	1,2,4-Trimethylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	1,2,4-Trimethylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-30	BF-3225g-001-0'-3'_04/04/12	1,2,4-Trimethylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38780-31	BF-3225g-002-0'-3'_04/04/12	1,2,4-Trimethylbenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-36	BF-3229g-001-0'-5'_04/04/12	1,2,4-Trimethylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-37	BF-3229g-002-0'-5'_04/04/12	1,2,4-Trimethylbenzene	1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-39249-11	BF-3000g-002-0'-8'_04/18/12	1,2,4-Trimethylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (66%)
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	1,2-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62%)
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	1,2-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62%)
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	1,2-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62%)
460-38780-30	BF-3225g-001-0'-3'_04/04/12	1,2-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62%)
460-38780-31	BF-3225g-002-0'-3'_04/04/12	1,2-Dichlorobenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (62%)
460-38780-36	BF-3229g-001-0'-5'_04/04/12	1,2-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62%)
460-38780-37	BF-3229g-002-0'-5'_04/04/12	1,2-Dichlorobenzene	1 U ug/kg	UJ	Low average MS/MSD recovery (62%)
460-39249-11	BF-3000g-002-0'-8'_04/18/12	1,2-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	1,3,5-Trimethylbenzene (Mesitylene)	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	1,3,5-Trimethylbenzene (Mesitylene)	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	1,3,5-Trimethylbenzene (Mesitylene)	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-30	BF-3225g-001-0'-3'_04/04/12	1,3,5-Trimethylbenzene (Mesitylene)	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-31	BF-3225g-002-0'-3'_04/04/12	1,3,5-Trimethylbenzene (Mesitylene)	1.2 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-36	BF-3229g-001-0'-5'_04/04/12	1,3,5-Trimethylbenzene (Mesitylene)	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-37	BF-3229g-002-0'-5'_04/04/12	1,3,5-Trimethylbenzene (Mesitylene)	1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-39249-11	BF-3000g-002-0'-8'_04/18/12	1,3,5-Trimethylbenzene (Mesitylene)	1.1 U ug/kg	UJ	Low average MS/MSD recovery (66.5%)
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	1,3-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	1,3-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	1,3-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-38780-30	BF-3225g-001-0'-3'_04/04/12	1,3-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-38780-31	BF-3225g-002-0'-3'_04/04/12	1,3-Dichlorobenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-38780-36	BF-3229g-001-0'-5'_04/04/12	1,3-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-38780-37	BF-3229g-002-0'-5'_04/04/12	1,3-Dichlorobenzene	1 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-39249-11	BF-3000g-002-0'-8'_04/18/12	1,3-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (64.5%)
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	1,4-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62.5%)
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	1,4-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62.5%)
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	1,4-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62.5%)
460-38780-30	BF-3225g-001-0'-3'_04/04/12	1,4-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62.5%)
460-38780-31	BF-3225g-002-0'-3'_04/04/12	1,4-Dichlorobenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (62.5%)
460-38780-36	BF-3229g-001-0'-5'_04/04/12	1,4-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62.5%)
460-38780-37	BF-3229g-002-0'-5'_04/04/12	1,4-Dichlorobenzene	1 U ug/kg	UJ	Low average MS/MSD recovery (62.5%)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-39249-11	BF-3000g-002-0'-8'_04/18/12	1,4-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (64.5%)
460-38653-1	BF-2972g-001-0'-8'_04/03/12	1,4-Dioxane (P-Dioxane)	0.052 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-2	BF-2972g-002-0'-8'_04/03/12	1,4-Dioxane (P-Dioxane)	0.055 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-3	BF-2972g-003-0'-8'_04/03/12	1,4-Dioxane (P-Dioxane)	0.054 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-4	BF-2972g-004-0'-8'_04/03/12	1,4-Dioxane (P-Dioxane)	0.049 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-5	BF-2972g-005-0'-8'_04/03/12	1,4-Dioxane (P-Dioxane)	0.052 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-6	BF-2972g-006-0'-8'_04/03/12	1,4-Dioxane (P-Dioxane)	0.052 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-7	BF-2972g-007-0'-8'_04/03/12	1,4-Dioxane (P-Dioxane)	0.048 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-10	BF-2975g-001-0'-4'_04/03/12	1,4-Dioxane (P-Dioxane)	0.05 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-11	BF-2975g-002-0'-4'_04/03/12	1,4-Dioxane (P-Dioxane)	0.052 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-13	BF-2978g-001-0'-6'_04/03/12	1,4-Dioxane (P-Dioxane)	0.05 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38653-14	BF-2978g-002-0'-6'_04/03/12	1,4-Dioxane (P-Dioxane)	0.048 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-16	BF-2982g-001-0'-5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.054 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-17	BF-2982g-002-0'-5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.051 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-19	BF-2979g-001-0'-8.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.054 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-20	BF-2979g-002-0'-8.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.055 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-22	BF-2976g-001-0'-7.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.051 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-23	BF-2976g-002-0'-7.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.051 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-25	BF-2973g-001-0'-4'_04/03/12	1,4-Dioxane (P-Dioxane)	0.059 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-26	BF-2973g-002-0'-4'_04/03/12	1,4-Dioxane (P-Dioxane)	0.049 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-28	BF-2974g-001-0'-3.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.051 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-29	BF-2974g-002-0'-3.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.054 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38653-31	BF-2977g-001-0'-3.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.056 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-32	BF-2977g-002-0'-3.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.059 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-34	BF-2983g-001-0'-9'_04/03/12	1,4-Dioxane (P-Dioxane)	0.056 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-35	BF-2983g-002-0'-9'_04/03/12	1,4-Dioxane (P-Dioxane)	0.054 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-37	BF-2986g-001-0'-13.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.06 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-38	BF-2986g-002-0'-13.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.049 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-40	BF-2990g-001-0'-7.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.055 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38653-41	BF-2990g-002-0'-7.5'_04/03/12	1,4-Dioxane (P-Dioxane)	0.055 U mg/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0035-0.0043), visible peak with area of 6374 counts in 100-ppb standard
460-38780-1	BF-2994g-001-0'-6.5'_04/04/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-2	BF-2994g-002-0'-6.5'_04/04/12	1,4-Dioxane (P-Dioxane)	52 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-4	BF-2991g-001-0'-6'_04/04/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38780-5	BF-2991g-002-0'-6'_04/04/12	1,4-Dioxane (P-Dioxane)	59 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-7	BF-2987g-001-0'-8.5'_04/04/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-8	BF-2987g-002-0'-8.5'_04/04/12	1,4-Dioxane (P-Dioxane)	56 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-10	BF-2987g-001x-0'-8.5'_04/04/12	1,4-Dioxane (P-Dioxane)	58 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-12	BF-2984g-001-0'-10'_04/04/12	1,4-Dioxane (P-Dioxane)	49 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-13	BF-2984g-002-0'-10'_04/04/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-15	BF-2980g-001-0'-7.5'_04/04/12	1,4-Dioxane (P-Dioxane)	58 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-16	BF-2980g-002-0'-7.5'_04/04/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-18	BF-2988g-001-0'-7.5'_04/04/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-19	BF-2988g-002-0'-7.5'_04/04/12	1,4-Dioxane (P-Dioxane)	52 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-21	BF-2992g-001-0'-7'_04/04/12	1,4-Dioxane (P-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38780-22	BF-2992g-002-0'-7'_04/04/12	1,4-Dioxane (P-Dioxane)	51 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-24	BF-2995g-001-0'-4.5'_04/04/12	1,4-Dioxane (P-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	1,4-Dioxane (P-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	1,4-Dioxane (P-Dioxane)	55 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	1,4-Dioxane (P-Dioxane)	56 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-30	BF-3225g-001-0'-3'_04/04/12	1,4-Dioxane (P-Dioxane)	56 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-31	BF-3225g-002-0'-3'_04/04/12	1,4-Dioxane (P-Dioxane)	60 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-33	BF-3226g-001-0'-3'_04/04/12	1,4-Dioxane (P-Dioxane)	52 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-34	BF-3226g-002-0'-3'_04/04/12	1,4-Dioxane (P-Dioxane)	55 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-36	BF-3229g-001-0'-5'_04/04/12	1,4-Dioxane (P-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38780-37	BF-3229g-002-0'-5'_04/04/12	1,4-Dioxane (P-Dioxane)	52 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38859-1	BF-3233g-001-0'-6'_04/05/12	1,4-Dioxane (P-Dioxane)	59 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-2	BF-3233g-002-0'-6'_04/05/12	1,4-Dioxane (P-Dioxane)	54 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-4	BF-3234g-001-0'-5'_04/05/12	1,4-Dioxane (P-Dioxane)	55 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-5	BF-3234g-002-0'-5'_04/05/12	1,4-Dioxane (P-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-7	BF-3230g-001-0'-4.5'_04/05/12	1,4-Dioxane (P-Dioxane)	49 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-8	BF-3230g-002-0'-4.5'_04/05/12	1,4-Dioxane (P-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-10	BF-3227g-001-0'-6'_04/05/12	1,4-Dioxane (P-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-11	BF-3227g-002-0'-6'_04/05/12	1,4-Dioxane (P-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-13	BF-2999g-001-0'-5'_04/05/12	1,4-Dioxane (P-Dioxane)	59 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-14	BF-2999g-002-0'-5'_04/05/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-16	BF-2996g-001-0'-5'_04/05/12	1,4-Dioxane (P-Dioxane)	51 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38859-17	BF-2996g-002-0'-5'_04/05/12	1,4-Dioxane (P-Dioxane)	60 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-19	BF-3235g-001-0'-6'_04/05/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-20	BF-3235g-002-0'-6'_04/05/12	1,4-Dioxane (P-Dioxane)	69 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-22	BF-3231g-001-0'-8'_04/05/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-23	BF-3231g-002-0'-8'_04/05/12	1,4-Dioxane (P-Dioxane)	54 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-25	BF-3236g-001-0'-6'_04/05/12	1,4-Dioxane (P-Dioxane)	58 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38859-26	BF-3236g-002-0'-6'_04/05/12	1,4-Dioxane (P-Dioxane)	55 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-1	BF-2981g-001-0'-5'_04/18/12	1,4-Dioxane (P-Dioxane)	49 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-2	BF-2981g-001x-0'-5'_04/18/12	1,4-Dioxane (P-Dioxane)	54 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-3	BF-2981g-002-0'5'_04/18/12	1,4-Dioxane (P-Dioxane)	60 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-4	BF-2981g-002x-0'-5'_04/18/12	1,4-Dioxane (P-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-39249-7	BF-2985g-001-0'-8'_04/18/12	1,4-Dioxane (P-Dioxane)	51 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-8	BF-2985g-002-0'-8'_04/18/12	1,4-Dioxane (P-Dioxane)	51 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-10	BF-3000g-001-0'-8'_04/18/12	1,4-Dioxane (P-Dioxane)	56 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-11	BF-3000g-002-0'-8'_04/18/12	1,4-Dioxane (P-Dioxane)	54 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-13	BF-3228g-001-1'-7'_04/18/12	1,4-Dioxane (P-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-14	BF-3228g-002-1'-7'_04/18/12	1,4-Dioxane (P-Dioxane)	54 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-16	BF-3232g-001-1'-5'_04/18/12	1,4-Dioxane (P-Dioxane)	58 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-17	BF-3232g-002-1'-5'_04/18/12	1,4-Dioxane (P-Dioxane)	59 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-19	BF-3224g-001-1'-4'_04/18/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-20	BF-3224g-002-1'-4'_04/18/12	1,4-Dioxane (P-Dioxane)	60 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-22	BF-2989g-001-1'-4'_04/18/12	1,4-Dioxane (P-Dioxane)	51 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-39249-23	BF-2989g-002-1'-4'_04/18/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-25	BF-2993g-001-1'-6'_04/18/12	1,4-Dioxane (P-Dioxane)	51 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-26	BF-2993g-002-1'-6'_04/18/12	1,4-Dioxane (P-Dioxane)	50 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-28	BF-2997g-001-1'-6'_04/18/12	1,4-Dioxane (P-Dioxane)	53 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-39249-29	BF-2997g-002-1'-6'_04/18/12	1,4-Dioxane (P-Dioxane)	56 U ug/kg	UJ	RRF for each ICAL standard and the CCV standard < 0.005 advisory level (at 0.0031-0.0045), visible peak with area of 3581 counts in 100-ppb standard
460-38653-1	BF-2972g-001-0'-8'_04/03/12	Acetone	0.01 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.0141 mg/kg); Calibration drift (%D= +43.4); Result is between MDL and RL
460-38653-2	BF-2972g-002-0'-8'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.0141 mg/kg); Calibration drift (%D= +43.4); Result is between MDL and RL
460-38653-3	BF-2972g-003-0'-8'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.0141 mg/kg); Calibration drift (%D= +43.4); Result is between MDL and RL
460-38653-6	BF-2972g-006-0'-8'_04/03/12	Acetone	0.01 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00565 J mg/kg); Calibration drift (%D= +35.3); Result is between MDL and RL
460-38653-7	BF-2972g-007-0'-8'_04/03/12	Acetone	0.0096 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.0141 mg/kg); Calibration drift (%D= +43.4); Result is between MDL and RL
460-38653-10	BF-2975g-001-0'-4'_04/03/12	Acetone	0.01 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00716 J mg/kg); Result is between MDL and RL

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38653-11	BF-2975g-002-0'-4'_04/03/12	Acetone	0.01 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.0141 mg/kg); Calibration drift (%D= +43.4); Result is between MDL and RL
460-38653-13	BF-2978g-001-0'-6'_04/03/12	Acetone	0.0099 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.0141 mg/kg); Calibration drift (%D= +43.4); Result is between MDL and RL
460-38653-14	BF-2978g-002-0'-6'_04/03/12	Acetone	0.0096 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.0141 mg/kg); Calibration drift (%D= +43.4); Result is between MDL and RL
460-38653-16	BF-2982g-001-0'-5'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.0141 mg/kg); Calibration drift (%D= +43.4); Result is between MDL and RL
460-38653-17	BF-2982g-002-0'-5'_04/03/12	Acetone	0.01 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00716 J mg/kg); Result is between MDL and RL
460-38653-19	BF-2979g-001-0'-8.5'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00716 J mg/kg); Result is between MDL and RL
460-38653-20	BF-2979g-002-0'-8.5'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00716 J mg/kg); Result is between MDL and RL
460-38653-22	BF-2976g-001-0'-7.5'_04/03/12	Acetone	0.01 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00565 J mg/kg); Calibration drift (%D= +35.3); Result is between MDL and RL
460-38653-23	BF-2976g-002-0'-7.5'_04/03/12	Acetone	0.01 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00716 J mg/kg); Result is between MDL and RL
460-38653-25	BF-2973g-001-0'-4'_04/03/12	Acetone	0.012 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00716 J mg/kg); Result is between MDL and RL
460-38653-26	BF-2973g-002-0'-4'_04/03/12	Acetone	0.0098 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00716 J mg/kg); Result is between MDL and RL
460-38653-28	BF-2974g-001-0'-3.5'_04/03/12	Acetone	0.01 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00716 J mg/kg); Result is between MDL and RL

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38653-29	BF-2974g-002-0'-3.5'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00716 J mg/kg); Result is between MDL and RL
460-38653-31	BF-2977g-001-0'-3.5'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00414 J mg/kg); Result is between MDL and RL
460-38653-32	BF-2977g-002-0'-3.5'_04/03/12	Acetone	0.012 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00414 J mg/kg); Result is between MDL and RL
460-38653-34	BF-2983g-001-0'-9'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00414 J mg/kg); Result is between MDL and RL
460-38653-35	BF-2983g-002-0'-9'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00414 J mg/kg); Result is between MDL and RL
460-38653-37	BF-2986g-001-0'-13.5'_04/03/12	Acetone	0.012 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00414 J mg/kg); Result is between MDL and RL
460-38653-38	BF-2986g-002-0'-13.5'_04/03/12	Acetone	0.0098 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00414 J mg/kg); Result is between MDL and RL
460-38653-40	BF-2990g-001-0'-7.5'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00414 J mg/kg); Result is between MDL and RL
460-38653-41	BF-2990g-002-0'-7.5'_04/03/12	Acetone	0.011 JB mg/kg	U	Preparation blank contamination (0.0065 J mg/kg); Method blank contamination (0.00414 J mg/kg); Result is between MDL and RL
460-38780-1	BF-2994g-001-0'-6.5'_04/04/12	Acetone	10 JB ug/kg	J	Result is between MDL and RL
460-38780-2	BF-2994g-002-0'-6.5'_04/04/12	Acetone	10 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Method blank contamination (3.65 J ug/kg); Result is between MDL and RL
460-38780-4	BF-2991g-001-0'-6'_04/04/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Method blank contamination (3.65 J ug/kg); Result is between MDL and RL
460-38780-7	BF-2987g-001-0'-8.5'_04/04/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Method blank contamination (3.65 J ug/kg); Result is between MDL and RL
460-38780-12	BF-2984g-001-0'-10'_04/04/12	Acetone	9.8 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Calibration drift (%D= +29.2); Result is between MDL and RL
460-38780-15	BF-2980g-001-0'-7.5'_04/04/12	Acetone	12 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Calibration drift (%D= +29.2); Result is between MDL and RL

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38780-16	BF-2980g-002-0'-7.5'_04/04/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Calibration drift (%D= +29.2); Result is between MDL and RL
460-38780-18	BF-2988g-001-0'-7.5'_04/04/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Calibration drift (%D= +29.2); Result is between MDL and RL
460-38780-19	BF-2988g-002-0'-7.5'_04/04/12	Acetone	10 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Calibration drift (%D= +29.2); Result is between MDL and RL
460-38780-24	BF-2995g-001-0'-4.5'_04/04/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Calibration drift (%D= +29.2); Result is between MDL and RL
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Result is between MDL and RL
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Result is between MDL and RL
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	Acetone	8.1 JB ug/kg	J	Result is between MDL and RL
460-38780-34	BF-3226g-002-0'-3'_04/04/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.99 J ug/kg); Calibration drift (%D= +29.2); Result is between MDL and RL
460-38780-37	BF-3229g-002-0'-5'_04/04/12	Acetone	2.9 JB ug/kg	J	Result is between MDL and RL
460-38859-1	BF-3233g-001-0'-6'_04/05/12	Acetone	12 JB ug/kg	U	Method blank contamination (2.41 J ug/kg); Result is between MDL and RL
460-38859-2	BF-3233g-002-0'-6'_04/05/12	Acetone	11 JB ug/kg	U	Method blank contamination (2.41 J ug/kg); Result is between MDL and RL
460-38859-4	BF-3234g-001-0'-5'_04/05/12	Acetone	11 JB ug/kg	U	Method blank contamination (2.41 J ug/kg); Result is between MDL and RL
460-38859-5	BF-3234g-002-0'-5'_04/05/12	Acetone	11 JB ug/kg	U	Method blank contamination (2.41 J ug/kg); Result is between MDL and RL
460-38859-7	BF-3230g-001-0'-4.5'_04/05/12	Acetone	9.8 JB ug/kg	U	Method blank contamination (2.41 J ug/kg); Result is between MDL and RL
460-38859-8	BF-3230g-002-0'-4.5'_04/05/12	Acetone	11 JB ug/kg	U	Method blank contamination (2.41 J ug/kg); Result is between MDL and RL
460-38859-10	BF-3227g-001-0'-6'_04/05/12	Acetone	11 JB ug/kg	U	Method blank contamination (2.41 J ug/kg); Result is between MDL and RL
460-38859-11	BF-3227g-002-0'-6'_04/05/12	Acetone	11 JB ug/kg	U	Method blank contamination (2.41 J ug/kg); Result is between MDL and RL
460-38859-25	BF-3236g-001-0'-6'_04/05/12	Acetone	4.8 JB ug/kg	J	Result is between MDL and RL
460-38859-26	BF-3236g-002-0'-6'_04/05/12	Acetone	11 JB ug/kg	U	Method blank contamination (1.83 J ug/kg); Result is between MDL and RL
460-39249-16	BF-3232g-001-1'-5'_04/18/12	Acetone	17 B ug/kg	J+	Calibration drift (%D= +29.5)
460-38780-5	BF-2991g-002-0'-6'_04/04/12	Methyl Ethyl Ketone (2-Butanone)	2.8 J ug/kg	J	Result is between MDL and RL
460-38653-1	BF-2972g-001-0'-8'_04/03/12	Methylene Chloride	0.002 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg); Method blank contamination (0.00217 mg/kg)
460-38653-2	BF-2972g-002-0'-8'_04/03/12	Methylene Chloride	0.0024 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg); Method blank contamination (0.00217 mg/kg)
460-38653-3	BF-2972g-003-0'-8'_04/03/12	Methylene Chloride	0.0024 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg); Method blank contamination (0.00217 mg/kg)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38653-6	BF-2972g-006-0'-8'_04/03/12	Methylene Chloride	0.0024 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-10	BF-2975g-001-0'-4'_04/03/12	Methylene Chloride	0.0027 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-11	BF-2975g-002-0'-4'_04/03/12	Methylene Chloride	0.0021 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg); Method blank contamination (0.00217 mg/kg)
460-38653-13	BF-2978g-001-0'-6'_04/03/12	Methylene Chloride	0.004 B mg/kg	J+	Method blank contamination (0.00217 mg/kg)
460-38653-14	BF-2978g-002-0'-6'_04/03/12	Methylene Chloride	0.0033 B mg/kg	J+	Method blank contamination (0.00217 mg/kg)
460-38653-16	BF-2982g-001-0'-5'_04/03/12	Methylene Chloride	0.0029 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg); Method blank contamination (0.00217 mg/kg)
460-38653-19	BF-2979g-001-0'-8.5'_04/03/12	Methylene Chloride	0.0017 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-20	BF-2979g-002-0'-8.5'_04/03/12	Methylene Chloride	0.0019 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-23	BF-2976g-002-0'-7.5'_04/03/12	Methylene Chloride	0.0027 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-25	BF-2973g-001-0'-4'_04/03/12	Methylene Chloride	0.0026 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-26	BF-2973g-002-0'-4'_04/03/12	Methylene Chloride	0.0021 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-28	BF-2974g-001-0'-3.5'_04/03/12	Methylene Chloride	0.0028 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-31	BF-2977g-001-0'-3.5'_04/03/12	Methylene Chloride	0.0016 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-32	BF-2977g-002-0'-3.5'_04/03/12	Methylene Chloride	0.0019 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-34	BF-2983g-001-0'-9'_04/03/12	Methylene Chloride	0.0011 JB mg/kg	U	Preparation blank contamination (0.00142 mg/kg); Result is between MDL and RL
460-38653-35	BF-2983g-002-0'-9'_04/03/12	Methylene Chloride	0.0011 JB mg/kg	U	Preparation blank contamination (0.00142 mg/kg); Result is between MDL and RL
460-38653-37	BF-2986g-001-0'-13.5'_04/03/12	Methylene Chloride	0.0018 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-38	BF-2986g-002-0'-13.5'_04/03/12	Methylene Chloride	0.0022 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38653-40	BF-2990g-001-0'-7.5'_04/03/12	Methylene Chloride	0.0011 JB mg/kg	U	Preparation blank contamination (0.00142 mg/kg); Result is between MDL and RL
460-38653-41	BF-2990g-002-0'-7.5'_04/03/12	Methylene Chloride	0.0022 B mg/kg	J+	Preparation blank contamination (0.00142 mg/kg)
460-38780-1	BF-2994g-001-0'-6.5'_04/04/12	Methylene Chloride	1.2 B ug/kg	J+	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg)
460-38780-2	BF-2994g-002-0'-6.5'_04/04/12	Methylene Chloride	1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Result is between MDL and RL
460-38780-4	BF-2991g-001-0'-6'_04/04/12	Methylene Chloride	2.4 B ug/kg	J+	Trip blank contamination (2.3 ug/l)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38780-5	BF-2991g-002-0'-6'_04/04/12	Methylene Chloride	1.2 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (0.451 J ug/kg); Result is between MDL and RL
460-38780-7	BF-2987g-001-0'-8.5'_04/04/12	Methylene Chloride	1.2 B ug/kg	J+	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg)
460-38780-8	BF-2987g-002-0'-8.5'_04/04/12	Methylene Chloride	1.3 B ug/kg	J+	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg)
460-38780-10	BF-2987g-001x-0'-8.5'_04/04/12	Methylene Chloride	1.8 B ug/kg	J+	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg)
460-38780-12	BF-2984g-001-0'-10'_04/04/12	Methylene Chloride	1.2 B ug/kg	J+	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg)
460-38780-13	BF-2984g-002-0'-10'_04/04/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg); Result is between MDL and RL
460-38780-15	BF-2980g-001-0'-7.5'_04/04/12	Methylene Chloride	1.2 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg); Result is between MDL and RL
460-38780-16	BF-2980g-002-0'-7.5'_04/04/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg); Result is between MDL and RL
460-38780-18	BF-2988g-001-0'-7.5'_04/04/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg); Result is between MDL and RL
460-38780-19	BF-2988g-002-0'-7.5'_04/04/12	Methylene Chloride	1 B ug/kg	J+	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg)
460-38780-21	BF-2992g-001-0'-7'_04/04/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg); Result is between MDL and RL
460-38780-22	BF-2992g-002-0'-7'_04/04/12	Methylene Chloride	1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg); Result is between MDL and RL

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38780-24	BF-2995g-001-0'-4.5'_04/04/12	Methylene Chloride	1.1 B ug/kg	J+	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg)
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (0.688 J ug/kg); Result is between MDL and RL
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (0.688 J ug/kg); Result is between MDL and RL
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	Methylene Chloride	1.2 B ug/kg	J+	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (0.688 J ug/kg)
460-38780-30	BF-3225g-001-0'-3'_04/04/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (0.688 J ug/kg); Result is between MDL and RL
460-38780-31	BF-3225g-002-0'-3'_04/04/12	Methylene Chloride	1.2 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (0.688 J ug/kg); Result is between MDL and RL
460-38780-33	BF-3226g-001-0'-3'_04/04/12	Methylene Chloride	1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg); Result is between MDL and RL
460-38780-34	BF-3226g-002-0'-3'_04/04/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (3.22 ug/kg); Result is between MDL and RL
460-38780-36	BF-3229g-001-0'-5'_04/04/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (0.688 J ug/kg); Result is between MDL and RL
460-38780-37	BF-3229g-002-0'-5'_04/04/12	Methylene Chloride	1.2 B ug/kg	J+	Trip blank contamination (2.3 ug/l); Preparation blank contamination (0.937 J ug/kg); Method blank contamination (0.688 J ug/kg)
460-38859-1	BF-3233g-001-0'-6'_04/05/12	Methylene Chloride	1.2 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.346 J ug/kg); Result is between MDL and RL

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38859-2	BF-3233g-002-0'-6'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.346 J ug/kg); Result is between MDL and RL
460-38859-4	BF-3234g-001-0'-5'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.346 J ug/kg); Result is between MDL and RL
460-38859-5	BF-3234g-002-0'-5'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.346 J ug/kg); Result is between MDL and RL
460-38859-7	BF-3230g-001-0'-4.5'_04/05/12	Methylene Chloride	1 B ug/kg	J+	Trip blank contamination (2.1 ug/l)
460-38859-8	BF-3230g-002-0'-4.5'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.346 J ug/kg); Result is between MDL and RL
460-38859-10	BF-3227g-001-0'-6'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.346 J ug/kg); Result is between MDL and RL
460-38859-11	BF-3227g-002-0'-6'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Result is between MDL and RL
460-38859-13	BF-2999g-001-0'-5'_04/05/12	Methylene Chloride	1.2 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.227 J ug/kg); Result is between MDL and RL
460-38859-14	BF-2999g-002-0'-5'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Result is between MDL and RL
460-38859-16	BF-2996g-001-0'-5'_04/05/12	Methylene Chloride	1.1 B ug/kg	J+	Trip blank contamination (2.1 ug/l)
460-38859-17	BF-2996g-002-0'-5'_04/05/12	Methylene Chloride	1.2 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.227 J ug/kg); Result is between MDL and RL
460-38859-19	BF-3235g-001-0'-6'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Result is between MDL and RL
460-38859-20	BF-3235g-002-0'-6'_04/05/12	Methylene Chloride	1.4 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.227 J ug/kg); Result is between MDL and RL

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38859-22	BF-3231g-001-0'-8'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.227 J ug/kg); Result is between MDL and RL
460-38859-23	BF-3231g-002-0'-8'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Method blank contamination (0.227 J ug/kg); Result is between MDL and RL
460-38859-25	BF-3236g-001-0'-6'_04/05/12	Methylene Chloride	1.2 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Result is between MDL and RL
460-38859-26	BF-3236g-002-0'-6'_04/05/12	Methylene Chloride	1.1 JB ug/kg	U	Trip blank contamination (2.1 ug/l); Preparation blank contamination (0.427 J ug/kg); Result is between MDL and RL
460-39249-1	BF-2981g-001-0'-5'_04/18/12	Methylene Chloride	0.98 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL
460-39249-2	BF-2981g-001x-0'-5'_04/18/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL
460-39249-3	BF-2981g-002-0'5'_04/18/12	Methylene Chloride	1.2 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL
460-39249-4	BF-2981g-002x-0'-5'_04/18/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL
460-39249-7	BF-2985g-001-0'-8'_04/18/12	Methylene Chloride	1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL
460-39249-8	BF-2985g-002-0'-8'_04/18/12	Methylene Chloride	1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL
460-39249-10	BF-3000g-001-0'-8'_04/18/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL
460-39249-11	BF-3000g-002-0'-8'_04/18/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Calibration drift (%D= +33.6); Result is between MDL and RL
460-39249-13	BF-3228g-001-1'-7'_04/18/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-39249-14	BF-3228g-002-1'-7'_04/18/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL
460-39249-19	BF-3224g-001-1'-4'_04/18/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL
460-39249-20	BF-3224g-002-1'-4'_04/18/12	Methylene Chloride	1.2 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Method blank contamination (0.364 J ug/kg); Result is between MDL and RL
460-39249-23	BF-2989g-002-1'-4'_04/18/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Result is between MDL and RL
460-39249-26	BF-2993g-002-1'-6'_04/18/12	Methylene Chloride	1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Result is between MDL and RL
460-39249-28	BF-2997g-001-1'-6'_04/18/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Result is between MDL and RL
460-39249-29	BF-2997g-002-1'-6'_04/18/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.498 J ug/kg); Result is between MDL and RL
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (59%)
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (59%)
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (59%)
460-38780-30	BF-3225g-001-0'-3'_04/04/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (59%)
460-38780-31	BF-3225g-002-0'-3'_04/04/12	n-Butylbenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (59%)
460-38780-36	BF-3229g-001-0'-5'_04/04/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (59%)
460-38780-37	BF-3229g-002-0'-5'_04/04/12	n-Butylbenzene	1 U ug/kg	UJ	Low average MS/MSD recovery (59%)
460-39249-11	BF-3000g-002-0'-8'_04/18/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (59%)
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	n-Propylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (68%)
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	n-Propylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (68%)
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	n-Propylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (68%)
460-38780-30	BF-3225g-001-0'-3'_04/04/12	n-Propylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (68%)
460-38780-31	BF-3225g-002-0'-3'_04/04/12	n-Propylbenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (68%)
460-38780-36	BF-3229g-001-0'-5'_04/04/12	n-Propylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (68%)
460-38780-37	BF-3229g-002-0'-5'_04/04/12	n-Propylbenzene	1 U ug/kg	UJ	Low average MS/MSD recovery (68%)
460-39249-11	BF-3000g-002-0'-8'_04/18/12	n-Propylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (63.5%)
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	sec-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (64%)
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	sec-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (64%)
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	sec-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (64%)
460-38780-30	BF-3225g-001-0'-3'_04/04/12	sec-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (64%)
460-38780-31	BF-3225g-002-0'-3'_04/04/12	sec-Butylbenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (64%)
460-38780-36	BF-3229g-001-0'-5'_04/04/12	sec-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (64%)
460-38780-37	BF-3229g-002-0'-5'_04/04/12	sec-Butylbenzene	1 U ug/kg	UJ	Low average MS/MSD recovery (64%)
460-39249-11	BF-3000g-002-0'-8'_04/18/12	sec-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (62%)
460-38780-25	BF-2995g-002-0'-4.5'_04/04/12	t-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-27	BF-2998g-001-0'-3.5'_04/04/12	t-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-28	BF-2998g-002-0'-3.5'_04/04/12	t-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38780-30	BF-3225g-001-0'-3'_04/04/12	t-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-31	BF-3225g-002-0'-3'_04/04/12	t-Butylbenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-36	BF-3229g-001-0'-5'_04/04/12	t-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-38780-37	BF-3229g-002-0'-5'_04/04/12	t-Butylbenzene	1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-39249-11	BF-3000g-002-0'-8'_04/18/12	t-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-39249-11	BF-3000g-002-0'-8'_04/18/12	Tetrachloroethylene (PCE)	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-38780-5	BF-2991g-002-0'-6'_04/04/12	Toluene	0.27 J ug/kg	J	Result is between MDL and RL
460-38780-7	BF-2987g-001-0'-8.5'_04/04/12	Toluene	0.29 J ug/kg	J	Result is between MDL and RL
460-38780-18	BF-2988g-001-0'-7.5'_04/04/12	Toluene	0.21 J ug/kg	J	Result is between MDL and RL
460-38780-31	BF-3225g-002-0'-3'_04/04/12	Toluene	0.23 J ug/kg	J	Result is between MDL and RL
460-39249-1	BF-2981g-001-0'-5'_04/18/12	Toluene	0.18 J ug/kg	J	Result is between MDL and RL
460-39249-11	BF-3000g-002-0'-8'_04/18/12	Toluene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (69.5%)
460-39249-11	BF-3000g-002-0'-8'_04/18/12	Trichloroethylene (TCE)	1.1 U ug/kg	UJ	Low average MS/MSD recovery (67.5%)
SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)					
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	2-Methylphenol (o-Cresol)	390 U ug/kg	UJ	Low acid surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Acenaphthene	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Acenaphthylene	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Anthracene	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Benzo(a)Anthracene	39 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Benzo(a)Pyrene	39 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38653-36	BF-2983c-001-0'-9'_04/03/12	Benzo(b)Fluoranthene	0.014 J mg/kg	J	Result is between MDL and RL
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Benzo(b)Fluoranthene	39 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Benzo(g,h,i)Perylene	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38653-36	BF-2983c-001-0'-9'_04/03/12	Benzo(k)Fluoranthene	0.0083 J mg/kg	J	Result is between MDL and RL
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Benzo(k)Fluoranthene	39 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Chrysene	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Cresols, m & p	390 U ug/kg	UJ	Low acid surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Dibenz(a,h)Anthracene	39 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Dibenzofuran	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Fluoranthene	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Fluorene	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Hexachlorobenzene	39 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38653-36	BF-2983c-001-0'-9'_04/03/12	Indeno(1,2,3-C,D) Pyrene	0.01 J mg/kg	J	Result is between MDL and RL
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Indeno(1,2,3-C,D) Pyrene	39 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Naphthalene	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38780-26	BF-2995c-001-0'-4.5'_04/04/12	Pentachlorophenol	1300 U ug/kg	R	Extremely low average MS/MSD recovery (4.5%)
460-38780-32	BF-3225c-001-0'-3'_04/04/12	Pentachlorophenol	1200 U ug/kg	R	Extremely low average MS/MSD recovery (4.5%)
460-38859-3	BF-3233c-001-0'-6'_04/05/12	Pentachlorophenol	1200 U ug/kg	R	Extremely low MSD recovery (9%), Low average MS/MSD recovery (10%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Pentachlorophenol	1200 U ug/kg	R	Extremely low MSD recovery (9%), Low average MS/MSD recovery (10%); Low acid surrogate recovery (36%)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-38859-12	BF-3227c-001-0'-6'_04/05/12	Pentachlorophenol	1200 U ug/kg	R	Extremely low MSD recovery (9%), Low average MS/MSD recovery (10%)
460-38859-18	BF-2996c-001-0'-5'_04/05/12	Pentachlorophenol	1100 U ug/kg	R	Extremely low MSD recovery (9%), Low average MS/MSD recovery (10%)
460-38859-21	BF-3235c-001-0'-6'_04/05/12	Pentachlorophenol	1200 U ug/kg	R	Extremely low MSD recovery (9%), Low average MS/MSD recovery (10%)
460-38859-24	BF-3231c-001-0'-8'_04/05/12	Pentachlorophenol	1200 U ug/kg	R	Extremely low MSD recovery (9%), Low average MS/MSD recovery (10%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Phenanthrene	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Phenol	390 U ug/kg	UJ	Low acid surrogate recovery (36%)
460-38859-9	BF-3230c-001-0'-4.5'_04/05/12	Pyrene	390 U ug/kg	UJ	Low B/N surrogate recovery (36%)

1) Results in red have been elevated to the reporting limit per the NFG. The laboratory reported a detect between the MDL and RL for this analyte, but the result has been qualified (U flag) and raised to the reporting limit due to laboratory or field contamination.

TABLE 5
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase I Remedial Design/ Remedial Action

FIELD DUPLICATE RESULTS

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-38437-16	460-38437-17	ECS-SSA13-F_03/28/12	1311 Lead	344		ug/l	362		ug/l	NA	NA	5.1	y
460-38437-16	460-38437-17	ECS-SSA13-F_03/28/12	Arsenic	12.2		mg/kg	14.6		mg/kg	NA	NA	17.9	y
460-38437-16	460-38437-17	ECS-SSA13-F_03/28/12	Lead	453		mg/kg	541		mg/kg	NA	NA	17.7	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	1,1,1-Trichloroethane	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	1,1-Dichloroethane	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	1,1-Dichloroethene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	1,2,4-Trimethylbenzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	1,2-Dichlorobenzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	1,2-Dichloroethane	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	1,3,5-Trimethylbenzene (Mesitylene)	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	1,3-Dichlorobenzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	1,4-Dichlorobenzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	1,4-Dioxane (P-Dioxane)	53	U	ug/kg	58	U	ug/kg	5	116	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Acetone	2.3	JB	ug/kg	12	U	ug/kg	9.7	24	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Benzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Carbon Tetrachloride	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Chlorobenzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Chloroform	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	cis-1,2-Dichloroethylene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Ethylbenzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Methyl Ethyl Ketone (2-Butanone)	11	U	ug/kg	12	U	ug/kg	1	24	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Methylene Chloride	1.2	B	ug/kg	1.8	B	ug/kg	0.6	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	n-Butylbenzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	n-Propylbenzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	sec-Butylbenzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	t-Butylbenzene	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Tert-Butyl Methyl Ether	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Tetrachloroethylene(PCE)	1.1	U	ug/kg	1.2	U	ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Toluene	0.29	J	ug/kg	1.2	U	ug/kg	0.91	2.4	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	trans-1,2-Dichloroethene	1.1 U ug/kg	1.2 U ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Trichloroethylene (TCE)	1.1 U ug/kg	1.2 U ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Vinyl Chloride	1.1 U ug/kg	1.2 U ug/kg	0.1	2.4	NA	y
460-38780-7	460-38780-10	BF-2987g-001-0'-8.5'_04/04/12	Xylenes, Total	3.2 U ug/kg	3.5 U ug/kg	0.3	7	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Arsenic	6.4 mg/kg	7.7 mg/kg	NA	NA	18.4	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Barium	32.1 J mg/kg	29.2 J mg/kg	2.9	93	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Beryllium	0.48 mg/kg	0.57 mg/kg	0.09	0.94	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Cadmium	1.2 U mg/kg	1.1 U mg/kg	0.1	2.4	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Chromium, Total	13.3 mg/kg	13.8 mg/kg	NA	NA	3.7	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Copper	23.5 mg/kg	23.1 mg/kg	0.4	11.6	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Lead	23.7 mg/kg	22.9 mg/kg	NA	NA	3.4	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Manganese	506 mg/kg	612 mg/kg	NA	NA	19.0	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Nickel	19.3 mg/kg	19.8 mg/kg	0.5	18.6	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Selenium	2.3 U mg/kg	2.3 U mg/kg	0	4.6	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Silver	2.3 U mg/kg	2.3 U mg/kg	0	4.6	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Zinc	55.8 mg/kg	55.9 mg/kg	NA	NA	0.2	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Chromium III	13.3 mg/kg	13.8 mg/kg	NA	NA	3.7	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Chromium, Hexavalent	2.5 U mg/kg	2.6 U mg/kg	0.1	5.2	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Mercury	0.03 J mg/kg	0.041 U mg/kg	0.011	0.082	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Aldrin	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Alpha BHC (Alpha Hexachlorocyclohexane)	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Alpha Endosulfan	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Beta BHC (Beta Hexachlorocyclohexane)	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Beta Endosulfan	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Chlordane	82 U ug/kg	84 U ug/kg	2	168	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Delta BHC (Delta Hexachlorocyclohexane)	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Dieldrin	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Endosulfan Sulfate	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Endrin	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Endrin Aldehyde	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Endrin Ketone	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Gamma BHC (Lindane)	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Heptachlor	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Heptachlor Epoxide	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Methoxychlor	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	p,p'-DDD	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	p,p'-DDE	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	p,p'-DDT	8.2 U ug/kg	8.4 U ug/kg	0.2	16.8	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Toxaphene	82 U ug/kg	84 U ug/kg	2	168	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	PCB-1016 (Aroclor 1016)	82 U ug/kg	84 U ug/kg	2	168	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	PCB-1221 (Aroclor 1221)	82 U ug/kg	84 U ug/kg	2	168	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	PCB-1232 (Aroclor 1232)	82 U ug/kg	84 U ug/kg	2	168	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	PCB-1242 (Aroclor 1242)	82 U ug/kg	84 U ug/kg	2	168	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	PCB-1248 (Aroclor 1248)	82 U ug/kg	84 U ug/kg	2	168	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	PCB-1254 (Aroclor 1254)	82 U ug/kg	84 U ug/kg	2	168	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	PCB-1260 (Aroclor 1260)	82 U ug/kg	84 U ug/kg	2	168	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Silvex (2,4,5-TP)	21 U ug/kg	21 U ug/kg	0	42	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	2-Methylphenol (o-Cresol)	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Acenaphthene	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Acenaphthylene	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Anthracene	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Benzo(a)Anthracene	40 U ug/kg	41 U ug/kg	1	82	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Benzo(a)Pyrene	40 U ug/kg	41 U ug/kg	1	82	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Benzo(b)Fluoranthene	40 U ug/kg	41 U ug/kg	1	82	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Benzo(g,h,i)Perylene	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Benzo(k)Fluoranthene	40 U ug/kg	41 U ug/kg	1	82	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Chrysene	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Cresols, m & p	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Dibenz(a,h)Anthracene	40 U ug/kg	41 U ug/kg	1	82	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Dibenzofuran	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Fluoranthene	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Fluorene	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Hexachlorobenzene	40 U ug/kg	41 U ug/kg	1	82	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Indeno(1,2,3-C,D)Pyrene	40 U ug/kg	41 U ug/kg	1	82	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Naphthalene	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Pentachlorophenol	1200 U ug/kg	1200 U ug/kg	0	2400	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Phenanthrene	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Phenol	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Pyrene	400 U ug/kg	410 U ug/kg	10	820	NA	y
460-38780-9	460-38780-11	BF-2987c-001-0'-8.5'_04/04/12	Cyanide	0.61 U mg/kg	0.63 U mg/kg	0.02	1.26	NA	y
460-39092-6	460-39092-7	ECS-33-F_04/13/12	1311 Lead	25 U ug/l	810 ug/l	785	50	NA	NO
460-39135-1	460-39135-2	ECS-32-F_04/16/12	1311 Lead	506 ug/l	836 ug/l	NA	NA	49.2	NO
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	1,1,1-Trichloroethane	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	1,1-Dichloroethane	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	1,1-Dichloroethene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	1,2,4-Trimethylbenzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	1,2-Dichlorobenzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	1,2-Dichloroethane	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	1,3,5-Trimethylbenzene (Mesitylene)	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	1,3-Dichlorobenzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	1,4-Dichlorobenzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	1,4-Dioxane (P-Dioxane)	49 U ug/kg	54 U ug/kg	5	108	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Acetone	9.8 U ug/kg	11 U ug/kg	1.2	22	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Benzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Carbon Tetrachloride	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Chlorobenzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Chloroform	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	cis-1,2-Dichloroethylene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Ethylbenzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Methyl Ethyl Ketone (2-Butanone)	9.8 U ug/kg	11 U ug/kg	1.2	22	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Methylene Chloride	0.43 JB ug/kg	0.32 JB ug/kg	0.11	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	n-Butylbenzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	n-Propylbenzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	sec-Butylbenzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	t-Butylbenzene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Tert-Butyl Methyl Ether	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Tetrachloroethylene(PCE)	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Toluene	0.18 J ug/kg	1.1 U ug/kg	0.92	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	trans-1,2-Dichloroethene	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Trichloroethylene (TCE)	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Vinyl Chloride	0.98 U ug/kg	1.1 U ug/kg	0.12	2.2	NA	y
460-39249-1	460-39249-2	BF-2981g-001-0'-5'_04/18/12	Xylenes, Total	2.9 U ug/kg	3.2 U ug/kg	0.3	6.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	1,1,1-Trichloroethane	1.2 U ug/kg	1.1 U ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	1,1-Dichloroethane	1.2 U ug/kg	1.1 U ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	1,1-Dichloroethene	1.2 U ug/kg	1.1 U ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	1,2,4-Trimethylbenzene	1.2 U ug/kg	1.1 U ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	1,2-Dichlorobenzene	1.2 U ug/kg	1.1 U ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	1,2-Dichloroethane	1.2 U ug/kg	1.1 U ug/kg	0.1	2.4	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	1,3,5-Trimethylbenzene (Mesitylene)	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	1,3-Dichlorobenzene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	1,4-Dichlorobenzene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	1,4-Dioxane (P-Dioxane)	60	U	ug/kg	57	U	ug/kg	3	120	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Acetone	12	U	ug/kg	11	U	ug/kg	1	24	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Benzene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Carbon Tetrachloride	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Chlorobenzene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Chloroform	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	cis-1,2-Dichloroethylene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Ethylbenzene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Methyl Ethyl Ketone (2-Butanone)	12	U	ug/kg	11	U	ug/kg	1	24	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Methylene Chloride	0.36	JB	ug/kg	0.37	JB	ug/kg	0.01	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	n-Butylbenzene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	n-Propylbenzene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	sec-Butylbenzene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	t-Butylbenzene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Tert-Butyl Methyl Ether	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Tetrachloroethylene(PCE)	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Toluene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	trans-1,2-Dichloroethene	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Trichloroethylene (TCE)	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Vinyl Chloride	1.2	U	ug/kg	1.1	U	ug/kg	0.1	2.4	NA	y
460-39249-3	460-39249-4	BF-2981g-002-0'5'_04/18/12	Xylenes, Total	3.6	U	ug/kg	3.4	U	ug/kg	0.2	7.2	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Arsenic	7.6		mg/kg	8.1		mg/kg	NA	NA	6.4	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Barium	38.8	J	mg/kg	42	J	mg/kg	3.2	92.4	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Beryllium	0.58		mg/kg	0.56		mg/kg	0.02	0.92	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Cadmium	1.2	U	mg/kg	1.1	U	mg/kg	0.1	2.4	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Chromium, Total	17.8		mg/kg	17.1		mg/kg	NA	NA	4.0	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Copper	27.8		mg/kg	29.9		mg/kg	2.1	11.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Lead	29.8		mg/kg	41.3		mg/kg	NA	NA	32.3	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Manganese	887		mg/kg	719		mg/kg	NA	NA	20.9	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Nickel	25.2		mg/kg	26.1		mg/kg	0.9	18.4	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Selenium	2.3	U	mg/kg	2.3	U	mg/kg	0	4.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Silver	2.3	U	mg/kg	2.3	U	mg/kg	0	4.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Zinc	64.5		mg/kg	65.4		mg/kg	NA	NA	1.4	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Chromium III	17.8		mg/kg	17.1		mg/kg	NA	NA	4.0	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Chromium, Hexavalent	0.46	U	mg/kg	0.46	U	mg/kg	0	0.92	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Mercury	0.047		mg/kg	0.031	J	mg/kg	0.016	0.078	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Aldrin	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Alpha BHC (Alpha Hexachlorocyclohexane)	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Alpha Endosulfan	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Beta BHC (Beta Hexachlorocyclohexane)	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Beta Endosulfan	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Chlordane	78	U	ug/kg	78	U	ug/kg	0	156	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Delta BHC (Delta Hexachlorocyclohexane)	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Dieldrin	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Endosulfan Sulfate	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Endrin	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Gamma BHC (Lindane)	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Heptachlor	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	p,p'-DDD	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	p,p'-DDE	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	p,p'-DDT	7.8	U	ug/kg	7.8	U	ug/kg	0	15.6	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	PCB-1016 (Aroclor 1016)	78	U	ug/kg	78	U	ug/kg	0	156	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	PCB-1221 (Aroclor 1221)	78	U	ug/kg	78	U	ug/kg	0	156	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	PCB-1232 (Aroclor 1232)	78	U	ug/kg	78	U	ug/kg	0	156	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	PCB-1242 (Aroclor 1242)	78	U	ug/kg	78	U	ug/kg	0	156	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	PCB-1248 (Aroclor 1248)	78	U	ug/kg	78	U	ug/kg	0	156	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	PCB-1254 (Aroclor 1254)	78	U	ug/kg	78	U	ug/kg	0	156	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	PCB-1260 (Aroclor 1260)	78	U	ug/kg	78	U	ug/kg	0	156	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Silvex (2,4,5-TP)	20	U	ug/kg	20	U	ug/kg	0	40	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	2-Methylphenol (o-Cresol)	390	U	ug/kg	390	U	ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Acenaphthene	390	U	ug/kg	390	U	ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Acenaphthylene	390	U	ug/kg	390	U	ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Anthracene	390	U	ug/kg	390	U	ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Benzo(a)Anthracene	39	U	ug/kg	39	U	ug/kg	0	78	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Benzo(a)Pyrene	39	U	ug/kg	39	U	ug/kg	0	78	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Benzo(b)Fluoranthene	39	U	ug/kg	39	U	ug/kg	0	78	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Benzo(g,h,i)Perylene	390	U	ug/kg	390	U	ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Benzo(k)Fluoranthene	39	U	ug/kg	39	U	ug/kg	0	78	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Chrysene	390 U ug/kg	390 U ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Cresols, m & p	390 U ug/kg	390 U ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Dibenz(a,h)Anthracene	39 U ug/kg	39 U ug/kg	0	78	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Dibenzofuran	390 U ug/kg	390 U ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Fluoranthene	390 U ug/kg	390 U ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Fluorene	390 U ug/kg	390 U ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Hexachlorobenzene	39 U ug/kg	39 U ug/kg	0	78	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Indeno(1,2,3-C,D)Pyrene	39 U ug/kg	39 U ug/kg	0	78	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Naphthalene	390 U ug/kg	390 U ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Pentachlorophenol	1200 U ug/kg	1200 U ug/kg	0	2400	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Phenanthrene	390 U ug/kg	390 U ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Phenol	390 U ug/kg	390 U ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Pyrene	390 U ug/kg	390 U ug/kg	0	780	NA	y
460-39249-5	460-39249-6	BF-2981c-001-0'-5'_04/18/12	Cyanide	0.58 U mg/kg	0.59 U mg/kg	0.01	1.18	NA	y
460-39363-1	460-39363-2	ECS-11-F_04/20/12	1311 Lead	144 ug/l	167 ug/l	NA	NA	14.8	y
460-39363-5	460-39363-6	ECS-2-F_04/20/12	1311 Lead	68.9 ug/l	57.4 ug/l	11.5	50	NA	y
460-39363-5	460-39363-6	ECS-2-F_04/20/12	Arsenic	8.9 mg/kg	8.1 mg/kg	NA	NA	9.4	y
460-39363-5	460-39363-6	ECS-2-F_04/20/12	Lead	46.6 mg/kg	39.8 mg/kg	NA	NA	15.7	y
460-39364-3	460-39364-4	DS-12-SW_04/18/12	1311 Lead	112000 B ug/l	137000 B ug/l	NA	NA	20.1	y
460-39614-1	460-39614-2	ECS-BF-DEC-001R-F1-0-1'_04/27/12	1311 Lead	30.8 ug/l	37.1 ug/l	6.3	50	NA	y
460-39614-1	460-39614-2	ECS-BF-DEC-001R-F1-0-1'_04/27/12	Arsenic	7.2 mg/kg	7.4 mg/kg	NA	NA	2.7	y
460-39614-1	460-39614-2	ECS-BF-DEC-001R-F1-0-1'_04/27/12	Lead	20.6 mg/kg	19.7 mg/kg	NA	NA	4.5	y
460-39775-16	460-39775-17	ECS-4-F_05/01/12	1311 Lead	25 U ug/l	123 ug/l	98	50	NA	NO
460-39775-9	460-39775-10	ECS-6-F_05/01/12	1311 Lead	123 ug/l	319 ug/l	196	50	NA	NO
460-39845-3	460-39845-4	ECS-SSA23-F1-1'_05/03/12	1311 Lead	69.7 ug/l	43.4 ug/l	26.3	50	NA	y
460-39845-3	460-39845-4	ECS-SSA23-F1-1'_05/03/12	Arsenic	7.3 mg/kg	7.7 mg/kg	NA	NA	5.3	y
460-39845-3	460-39845-4	ECS-SSA23-F1-1'_05/03/12	Lead	35.1 mg/kg	33.1 mg/kg	NA	NA	5.9	y

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact	Project Number/ Manager: E7976/ Jenny Self
Site Name: Revere Smelting and Refining	QC Level: IV
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see below
Reviewer: Taryn Scholz	Date Checked: 6/15/12
Parameters: TCLP Pb, Metals, CrIII/VI, Pesticide, PCB, Herbicide, VOC, SVOC, CN	Methods: 1311/6010B, 6010B/7470A/7471A, 7196A, 8081A, 8082, 8151A, 8260B, 8270C, 9012A

ITEM	YES	NO	N/A	(CRITERIA) COMMENT
Laboratory NELAP/ELAP accredited?	x			NYDOH (NELAP) #11452, NYDOH (ELAP) #11452
Signed Narrative included?	x			
Narrative issues noted by lab?	x			See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(Workplan Table 2 - all soils, no preserv required)
COCs properly executed and seals used?		x		see Comment no. 1
Samples received within 2 days?		x		(DER10 - recommended) 460-39364-1, 460-39365-1 rec'd day 3
Analytical Results				
All requested analyses reported?		x		see Comment no. 1A
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'quantitation_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' (SQL), J-values reported NOTE: For metals in soils, MDL 0.47 & MQL = 0.5 ppm for Arsenic so SDL=SQL for some
Target analyte list complete?	x			(Workplan Table 3 and/or DER-10 App 5 plus CLP TAL) see Comment no. 2
RLs acceptable?		x		(ASP Exh C Part III and/or DER-10 App 5) see Comment no. 3
No elevated RLs for NDs?	x			Note: 4x std dilution for total metals in soil, 5x std dilution for TCLP
Prep/Analysis method references included and approved?				(Workplan Table 2 and/or ASP Exh D) see Comment no. 4
If analytical cleanup used, method ref included and approved?	x			(ASP Exh D) see Comment no. 4A
Sample matrix included?	x			
Soils on dry weight basis?	x*			
Correct and consistent units?		x		Organics in mg/L and mg/kg for laboratory job number 460-38653-1 and in ug/L and ug/kg for rest; Inorganics in mg/kg or ug/L (TCLP except QC for laboratory job number 460-38437-1, which is in mg/L)
Holding time to analysis not expired?	x**			(Workplan Table 2, SW846 for those not in table per ASP Exh I, which gives only aq HTs)
Holding time to preparation not expired?	x**			same as above
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory		x		No trip blank analyzed with the VOC samples in laboratory job number 460-39249-1 (BF samples collected on 4/18/12)
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)	x			Total samples = 130 confirmation + 43 BF composite + 89 BF grab = 262; Total FD = 15
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible	x			MS/LR used for inorganics (ICP, Hg, Cr VI, CN); 262 total samples, 29 LR/MS or MS/SD with at least 1 per 20 for every test
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 6039/6047=99.9%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-38437-1, 460-38653-1, 460-38780-1, 460-38859-1, 460-38947-1, 460-39091-1, 460-39092-1, 460-39135-1, 460-39136-1, 460-39249-1, 460-39254 1, 460-39256-1, 460-39258-1, 460-39363-1, 460-39364-1, 460-39365-1, 460-39614-1, 460-39775-1, 460-39845-1, 460-40362-1

*For the 7196A analyses, Cr III is shown as not dry-weight corrected for TALED and as dry-weight corrected for TALPITTS. For both labs, Cr III is calculated from the results for Cr VI and Total Cr, which are dry-weight corrected, and thus the Cr III is not directly dry-weight corrected but is on a dry-weight basis.

** The holding time was calculated using dates only with regard to the time of day since all holding times are greater than 24 hours.

1. Issues for custody records:

No seals on the shipping coolers for several laboratory job numbers 460-38437-1, 460-38859-1, 460-38947-1, 460-39249-1, 460-39254-1, 460-39256-1, 460-39258-1, 460-39363-1, 460-39364-1, 460-39365-1, 460-39775-1, 460-39845-1, and 460-40362-1). In each case, the laboratory sample custodian noted that the cooler and the samples did not appear to have been compromised or tampered with.

The sampler did not enter any of the trip blanks (lab sample ID 460-38653-43, 460-38653-44, 460-38780-39, and 460-38859-28) on the custody records. All trip blanks were logged in for VOC analysis upon receipt at the laboratory per Entact.

The sampler did not enter the time relinquinshed on the custody record for laboratory job numbers 460-38859-1 and 460-39614-1. The date relinquished and release signature are present.

The laboratory sample custodian did not enter the date/time relinquished on page 2 of the custody record for laboratory job number 460-39845-1. The release signature is present and the date/time is entered on page 1.

Samples IDs for the following required correction/clarification as follows:

Lab Sample ID	Client Sample ID	Date/Time Sampled	Action
460-38859-16	BF-2996g-001-0'-5'	04/05/2012 13:35:00	The laboratory logged in an incorrect sample ID (BF-2996c-001-0'-5'). Corrected to match the custody record.
460-38947-1	ECS-SSA11-SER1-0"-6"	04/10/2012 13:25:00	The laboratory logged in an incorrect sample ID (ECS-SSA11-SER1-0"-6'). Corrected to match the custody record.
460-38947-2	ECS-SSA13-SSR1-0"-6"	04/10/2012 13:30:00	The laboratory logged in an incorrect sample ID (ECS-SSA13-SSR1-0"-6'). Corrected to match the custody record.
460-39135-5	ECS-27-F	04/16/2012 13:50:00	The sample label reads DS-27-SW. Logged in with the sample ID on the custody record. Confirmed correct by Entact field crew.
460-39136-7	DS-16-SN	04/16/2012 15:25:00	The sample label reads DS-20-SW while the jar top reads DS-16-SN. Logged in with the sample ID on the custody record. Confirmed correct by Entact field crew.
460-39249-1	BF-2981c-001x-0-5'	04/18/2012 08:55:00	The laboratory logged in an incorrect sample ID (BF-2981c-001v-0-5'). Corrected to match the custody record.
460-39614-12	ECS-BF-DEC-001R-F5-0-1'	04/27/2012 13:50:00	The sampler entered an incorrect sample ID (ECS-BF-DEC-001R-F5-0-1") on the custody record. Corrected to match collection data.
460-39845-1	ECS-SSA23-SS-0-6"	05/03/2012 13:35:00	The laboratory logged in an incorrect sample ID (ECS-SSA23-SS-0-6-"). Corrected to match the custody record.
460-39845-2	ECS-SSA23-SE1-0-6"	05/03/2012 13:40:00	The laboratory logged in an incorrect sample ID (ECS-SSA23-SE1-0-6-"). Corrected to match the custody record.

The following changes were made at the laboratory per Entact's instructions: Total Lead/Arsenic was cancelled on 4/16/12 for all samples in laboratory job number 460-39092-1

1A. Analysis Requests:

For sample BF-2994g-002-0'-6.5', only VOCs were requested. The laboratory inadvertently also reported all DER-10 analytes excluding mercury and Cr III.

For samples ECS-1-F, ECS-2-F, and ECS-2-Fx, the laboratory reported Total Lead/Arsenic per Entact's request after the samples were received.

For sample ECS-BF-DEC-001R-F2-0-1', the laboratory reported TAL metals instead of only Total Pb/As per Entact's request after the samples were received.

For all 8081 composite samples and the associated QC samples in laboratory job number 460-38780-1, the laboratory inadvertently reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of just the DER-10 analytes as requested.

For all 8081 QC samples in laboratory job number 460-38780-1, the laboratory inadvertently reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of just the DER-10 analytes as requested and reported for the 8081 composite samples.

For 7196 samples in laboratory job number 460-39249-1 (analyzed by TALPITT), the EDD does not include records for the LB, soluble BS, insoluble BS, or insoluble MS. Results for these QC samples are included in the hardcopy report and all pass the criteria and thus no further action was taken.

2. Analyte List:

Workplan Table 3 and DER10 App5 list m-cresol, o-cresol, and p-cresol separately. The laboratory reported m,p-cresol and o-cresol as it is not possible to separate m-cresol and p-cresol using method 8270C. WP Table 3 also mistakenly lists Antimony. This metal does not appear in DER10 Appendix 5 and was not reported by the laboratory for the backfill samples.

For all BF samples, the laboratory reported technical Chlordane rather than Chlordane (alpha) as listed in the workplan and DER10 Appendix 5.

3. The MQL (Unadj) for several DER-10 analytes is above the CRQL, but in each case, it is below the Allowable Constituent Level in DER10 App 5 except for Pentachlorophenol. The actual lab RL is above the CRQL and the ACL in DER10 App5 for this analyte. The MDL is < 1/8 the ACL and J-values are reported, so NDs for undiluted samples may show conformance. Additionally, the MQL (Unadj) for the TAL metal Iron is above the CRQL. There are no action levels for this analyte.

4. VOCs in soil collected in 4-oz jars using bulk technique and analyzed using a low-level DI water extraction (on day 1 to day 5) with heated purge-n-trap per workplan rather than using closed system purge-n-trap or methanol extraction as indicated by preparation method (5035) referenced by the laboratory.

4A. Per laboratory, Florisil cleanup (SW3620B) used for Pesticide analyses and sulfuric acid cleanup (SW3665A) used for PCB analyses (not indicated in package or EDD). No cleanup used for SVOC or Herbicides.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
	All for this event	TCLP Metals	All analyses	Diluted 5x before analysis as standard practice	noted in QA report narrative
		Total Metals	All analyses	Diluted 2-4x before analysis as standard practice	noted in QA report narrative
			All samples	Required 4x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
EN206	460-38437-1	TCLP Metals	107922	Lead >MDL but <RL in leach blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			460-38221-9	Lead > RPD limit for the duplicate of this non-project sample	none required (non-project QC)
			460-38444-5	Lead > RPD limit for the duplicate of this non-project sample	none required (non-project QC)
		Total Metals	107847	Lead > %R limit for MS of sample 460-38437-13, '4' qualifier indicates conc of unspiked > 4x spike amout	none required (QC check inconclusive)
			107826	Lead < %R limit for MS of sample 460-38437-15	Associated samples flagged per NFG
			460-38437-23	Lead > RPD limit for the duplicate of this project sample	Associated samples flagged per NFG
EN207	460-38653-1	Pesticides	108279	Both SUs high for MB and LCS	none required (sample results not affected)
		VOCs	108250	Methylene chloride >RL in leach blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			108250	Acetone >MDL but <RL in leach blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			108314	Acetone and methylene chloride >MDL but <RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			108450	Acetone and methylene chloride >RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			108567	Acetone and methylene chloride >MDL but <RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			108630	Acetone >MDL but <RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			108916	Acetone >MDL but <RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			460-38653-7,13	Peaks at 12.5 and 14.0 are column bleed and therefore not reported as TICs	noted in QA report narrative
			460-38653-14,16	Peak at 12.5 is column bleed and therefore not reported as TIC	noted in QA report narrative
EN208	460-38780-1	Total Metals	109442	Manganese < %R limit for MS of sample 460-38780-26	none required (QC check inconclusive)
			460-38780-26	Arsenic, Lead, Manganese > RPD limit for the duplicate of this project sample	Associated samples flagged per NFG
		Pesticides	108970	alpha-BHC, Aldrin, Endo I, Dieldrin on primary column and Methoxychlor on the secondary column > %R limit for the closing CCV; associated samples ND for these analytes, thus data reported	Associated samples flagged per NFG
		VOCs	108552	Acetone and methylene chloride >MDL but <RL in leach blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			109095	Acetone >RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG (actually >MDL, <RL)
			109095	Methylene chloride >MDL but <RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			109185	Methylene chloride >RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			109228	Methylene chloride >MDL but <RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			109185	Several analytes < %R limit for MS/MSD of sample 460-38780-24	Associated samples flagged per NFG
			109185	1,4-Dioxane > RPD limit for MS/MSD of sample 460-38780-24	Associated samples flagged per NFG
			109228	Several analytes < %R limit for MS/MSD of sample 460-38780-25	Associated samples flagged per NFG
		SVOCs	109267 (prep 108652)	Pentachlorophenol < %R limit, > RPD limit for MS/MSD of sample 460-38790-26	Associated samples flagged per NFG
EN209	460-38859-1	Pesticides	109244	4,4-DDD and Endrin ketone on primary column > %R limit for the closing CCV; associated samples ND for these analytes, thus data reported	Endrin ketone not a target analyte for samples
		VOCs	108875	Methylene chloride >MDL but <RL in leach blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
			109228	Methylene chloride >MDL but <RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			109362	Acetone >RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG (actually >MDL, <RL)
			109362	Methylene chloride >MDL but <RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			109395	Acetone and methylene chloride >MDL but <RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
		SVOCs	460-38859-9	2-Fluorophenol, Nitrobenzene-d5 < %R limit for this sample	Sample flagged per NFG
			109402 (prep 108812)	Pentachlorophenol < %R limit for MS/MSD of sample 460-38859-3	Associated samples flagged per NFG
			109402 (prep 108812)	Benzo(a)pyrene > %R limit for MS/MSD of sample 460-38859-3	Associated samples flagged per NFG
EN210	460-38947-1	-	-	No deficiencies noted	NA
EN211	460-39091-1	Total Metals	460-39091-2	Required 100x dilution prior to analysis; RLs adjusted accordingly	NA - result is not non-detect
EN212	460-39092-1	-	-	No deficiencies noted	NA
EN213	460-39135-1	-	-	No deficiencies noted	NA
EN214	460-39136-1	TCLP Metals	460-39136-4,5,6,7	Required 50-500x dilution prior to analysis; RLs adjusted accordingly	NA - result is not non-detect
			110255	Lead >RL in leach blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
EN215	460-39249-1	Total Metals	110413	Sb, Ca < %R limit for MS of sample 460-39249-12	none required (not target metals)
			110413	Al, Fe, Mg, Mn > %R limit for MS of sample 460-39249-12	Associated samples flagged per NFG (only Mn is a target analyte)
			460-39249-12	Ca > RPD limit for duplicate of this project sample	none required (not a target metal)
			460-39308-3	Cr > RPD limit for duplicate of this non-project sample	none required (non-project QC)
		Pesticides	460-39249-9	DCB < %R limit for this sample	Sample flagged per NFG
		PCBs	110233	Ar 1260 < %R limit for MS/MSD of sample 460-39249-12	Associated samples flagged per NFG
		VOCs	109970	Methylene chloride >MDL but <RL in leach blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			110121	Acetone and methylene chloride >MDL but <RL in method blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			110443	Several analytes < %R limit for MS/MSD of sample 460-39249-11, '4' qualifier indicates conc of unspiked > 4x spike amout	Associated samples flagged per NFG
			460-39249-17,22,23	Peaks at 12.5 and 14.0 are column bleed and therefore not reported as TICs	noted in QA report narrative
			460-39249-28	Peak at 12.5 is column bleed and therefore not reported as TIC	noted in QA report narrative
		SVOCs	110818	Benzo(a)pyrene, Benzo(b)fluoranthene > %R limit for MS/MSD of sample 460-39249-12	Associated samples flagged per NFG
EN216	460-39254-1	-	-	No deficiencies noted	NA
EN217	460-39256-1	-	-	No deficiencies noted	NA
EN218	460-39258-1	TCLP Metals	460-39258-1,2	Required 20-100x dilution prior to analysis; RLs adjusted accordingly	NA - result is not non-detect
			110255	Lead >RL in leach blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
EN220	460-39363-1	TCLP Metals	110423	Lead >MDL in method blank, conc < 5% of sample conc, thus re-extraction not performed	Associated samples flagged per NFG
			460-39363-5,6	Insufficient samples to perform leaching with required 100-g. Volume of leaching fluid adjusted to maintain 20:1 ratio, RLs not affected.	NA - RLs not affected
		Total Metals	NA	Lead < %R limit for MS of sample 460-39363-4	none required (recovery within 70-130%)
			460-39363-4	Lead > RPD limit for duplicate of this project sample	Associated samples flagged per NFG
EN221	460-39364-1	TCLP Metals	110423	Lead >RL in leach blank, detects in associated samples flagged 'B'	Associated samples flagged per NFG
			460-39364-2,4	Required 100x dilution prior to analysis; RLs adjusted accordingly	NA - result is not non-detect
EN222	460-39365-1	-	-	No deficiencies noted	NA

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
EN223	460-39614-1	Total Metals	111379	Sb, Fe < %R limit for MS of sample 460-39614-5	Associated samples flagged per NFG (QC check inconclusive for Fe)
			111379	Al > %R limit for MS of sample 460-39614-5	none required (QC check inconclusive)
			460-39614-5	Mn > RPD limit for the duplicate of this project sample	Associated samples flagged per NFG
EN224	460-39775-1	TCLP Metals	460-39775-2,3,6,8	Required 20-100x dilution prior to analysis; RLs adjusted accordingly	NA - result is not non-detect
EN225	460-39845-1	Total Metals	460-39845-9	Lead > RPD limit for the duplicate of this project sample	Associated samples flagged per NFG
EN226	460-40362-1	-	-	No deficiencies noted	NA

Data Validation Checklist: Metals/Wet Chem

Client Name: Entact	Project Number/ Manager: E7976/ Jenny Self
Site Name: Revere Smelting and Refining	QC Level: IV
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see below
Reviewer: Taryn Scholz	Date Checked: 6/15/12
Parameters: TCLP Pb, Metals, CrIII/VI, CN	Methods: 1311/6010B, 6010B/7470A/7471A, 7196A, 9012A

	%PERFORMED/ ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)		x		see QC Deficiencies
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			
100	%R criteria met?	x			method (lab but within 50-200%)
	Matrix spike data included in lab package?	x			
100	%R criteria met?		x		method (75-125%) see QC Deficiencies
	Sample duplicate data included in lab package?	x			
100	RPD criteria met?		x		method (20% if >10xMDL) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)			x	CL per ASP Exh E - not reported
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	Intensities within limits? (min 30-120% of calib std)			x	
10	Analyte quantitation/RLs correct?				
10	QC parameters calculated correctly?				

COMMENTS

Laboratory Job No: 460-38437-1, 460-38653-1, 460-38780-1, 460-38859-1, 460-38947-1, 460-39091-1, 460-39092-1, 460-39135-1, 460-39136-1, 460-39249-1, 460-39254-1, 460-39256-1, 460-39258-1, 460-39363-1, 460-39364-1, 460-39365-1, 460-39614-1, 460-39775-1, 460-39845-1, 460-

*No QC reported for Chromium III, which is calculated from the Total Chromium and Chromium VI result.

TOTAL METALS VS LEACHED - all leach results < max possible

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976/ Jenny Self
Site Name: Revere Smelting and Refining	QC Level: IV
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see below
Reviewer: Taryn Scholz	Date Checked: 6/15/12
Parameters: TCLP Pb	Methods: 1311/6010B

%PERFORMED/	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			rpm NA
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)		x		see QC Deficiencies

COMMENTS

Laboratory Job No: 460-38437-1, 460-38947-1, 460-39091-1, 460-39092-1, 460-39135-1, 460-39136-1, 460-39254-1, 460-39256-1, 460-39258-1, 460-39363-1, 460-39364-1, 460-39365-1, 460-39614-1, 460-39775-1, 460-39845-1, 460-40362-1

Data Validation Checklist: GC

Client Name: Entact			Project Number/ Manager: E7976/ Jenny Self			
Site Name: Revere Smelting and Refining			QC Level: IV			
Laboratory: TestAmerica (Edison, NJ)			Laboratory Job No: see below			
Reviewer: Taryn Scholz			Date Checked: 6/15/12			
Parameters: Pesticide, PCB, Herbicide			Methods: 8081A, 8082, 8151A			
%PERFORMED/ ITEM			**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)		x			
100	Criteria met for field blanks? (<MDL)				x	
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			With the exception of multi-component Chlordane (technical) andToxaphene
	%R criteria met?		x			method (lab but within 50-200%)
100	RPD criteria met?		x			
	Matrix spike data included in lab package?		x			
	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?		x			method (lab but within 40%)
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)		x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Initial calibration documentation included in lab package?		x			8 peaks used for all multi-comp Pest/PCB
	All target analytes included?		x			
100	%RSD criteria met? (max 20% or min r/COD 0.99)		x			
100	DDT/Endrin %breakdown max 15%?		x			
	Calibration verification data included in lab package?		x			
100	%R criteria met? (max +/-15%)			x		see QC Deficiencies
100	Dual column/detector confirmation data incl in lab package?		x			
100	%Difference criteria met? (<40%)		x			
10	Analyte qualitative ID criteria met?					
10	Analyte quantitation/RLs correct?					
10	QC parameters calculated correctly?					
	Surrogate	**Control Limits**				
PEST/	Decachlorobiphenyl					
PCB	Tetrachloro-m-xylene					
HERB	2,4-DCPA					

COMMENTS

Laboratory Job No: 460-38653-1, 460-38780-1, 460-38859-1, 460-39249-1

Data Validation Checklist: GC/MS

Client Name: Entact			Project Number/ Manager: E7976/ Jenny Self			
Site Name: Revere Smelting and Refining			QC Level: IV			
Laboratory: TestAmerica (Edison, NJ)			Laboratory Job No: see below			
Reviewer: Taryn Scholz			Date Checked: 6/15/12			
Parameters: VOC, SVOC			Methods: 8260B, 8270C			
%PERFORMED/ ITEM			**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)			x		see QC Deficiencies
100	Criteria met for field blanks? (<MDL)			x		see QC Deficiencies
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			
100	%R criteria met?		x			method (lab but within 50-200%)
100	RPD criteria met?		x			method (lab but within 40%)
	Matrix spike data included in lab package?		x			
100	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?			x		method (lab but within 40%) see QC Deficiencies
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?			x		method (lab but within 10-200%) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)		x			20% aq, 35% solid (+/-2RL aq, +/-3RL sol if either≤5RL)
	Instrument Tune (12-hr) for GC/MS included in lab package?		x			
100	Instrument Tune method criteria met?		x			
	Initial calibration documentation included in lab package?		x			
	All target analytes included at min 5 levels w low≤ RL?		x			
	RRF met SPCCs/14Dioxane(advisory)/PoorPerf/TAs (*/0.005/0.01/0.05)?			x		*11DCA 0.1, CB 0.3; SVOC 0.05, see QC Deficiencies
100	%RSD criteria met for CCCs/TAs? (30% max for CCC, 15% max (mean) for TAs or curve min r 0.99, 20% qualify)		x			
	Calibration verification data included in lab package?		x			
	RRF met SPCCs/14Dioxane(advisory)/PoorPerf/TAs (*/0.005/0.01/0.05)?			x		*11DCA 0.1, CB 0.3; SVOC 0.05, see QC Deficiencies
100	%D criteria met for CCC/TAs? (20% max, 25% qualify)			x		see QC Deficiencies
100	Internal standard data included in lab package?		x			
100	Areas within limits (within -50/+100% of last calib check)?		x			for CCV and samples
100	RTs within limits (<30 sec diff from last calib check)?		x			
10	Analyte qualitative ID criteria met?					
10	Analyte quantitation/RLs correct?					
10	QC parameters calculated correctly?					
	Surrogate	**Control Limits**				
VOC	1,2-Dichloroethane-d4					
	Dibromofluoromethane					
	Toluene-d8					
	Bromofluorobenzene					
SVOC	2,4,6-Tribromophenol					
	Terphenyl-d14					
	2-Fluorobiphenyl					
	Nitrobenzene-d5					
	2-Fluorophenol					
	Phenol-d5					

COMMENTS

Laboratory Job No: 460-38653-1, 460-38780-1, 460-38859-1, 460-39249-1

DATA USABILITY SUMMARY REPORT

REVERE SMELTING AND REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-A Remedial Design/ Remedial Action

Prepared by:

Quality Assurance Associates (*QAA, L.L.C.*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

April 1, 2013

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 4

3.0 DATA VALIDATION RESULTS 6

3.1 PRECISION 6
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 6
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 6
3.1.3 Field Duplicate (FD) Precision 6
3.2 ACCURACY 7
3.2.1 Laboratory Control Spike (LCS) Accuracy 7
3.2.2 Matrix Spike (MS) Accuracy 7
3.2.3 Serial Dilution (SD) %Difference 8
3.2.4 Surrogate (SU) Recovery 8
3.3 REPRESENTATIVENESS 8
3.3.1 Chain-of-Custody and Analysis Requests 9
3.3.2 Sample Preservation and Holding Time 9
3.3.3 Laboratory and Method Selection 9
3.3.4 Blanks (Laboratory and Field) 10
3.3.5 Analytical Procedures 10
3.4 COMPLETENESS 12
3.4.1 Laboratory Deliverables Completeness 12
3.4.2 EDD Correctness 12
3.4.3 Analytical Completeness 13
3.5 COMPARABILITY 13

LIST OF TABLES

Table 1 – Samples Collected and Tests Performed
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – QC Deficiencies and Data Qualification Actions
Table 4 – Qualified Results for Field Samples
Table 5 – Field Duplicate Results

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting and Refining Site Operable Unit 1 in Middletown, New York. The independent data review was completed in accord with the *Phase I Remedial Design/ Remedial Action Workplan* (Revision 1, December 2011), hereinafter called the P1 Workplan, and the *Phase II-A Remedial Design/ Remedial Action Workplan* (August 2012), hereinafter called the P2A Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 84 investigative soil samples plus the associated field QC samples, which were collected by ENTACT in August through December 2012 with the intended use of verifying that remediation goals have been achieved in excavated grids (Phase I), confirming that backfill materials are suitable for use on-site (Phase I), and confirming that containment cell materials are suitable for use (Phase II-A). A complete listing of the samples collected and tests performed is shown in Table 1. QAA performed a full validation of the data and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) as specified in Section 5.9 of the P1 Workplan and Section 4.9 of the P2A Workplan. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Data Review* (October 2004) and *National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplans.

PARCC EVALUATION

Section 5.3 of the P1 Workplan and Section 4.3 of the P2A Workplan present data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The Workplans stipulate that the precision control limits will be dictated by the analytical method and the limits are 10-30 RPD, depending upon the test. The validator assessed precision using the laboratory and field duplicates. The laboratory prepared laboratory control spike duplicates (LCSD) using reagent water or sand for the HERB and VOC tests plus at least one unspiked matrix duplicate (MD) or matrix spike duplicate (MSD) using a sample from the site for every test. All LCS/LCSD RPDs are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. The RPDs for the matrix duplicates are within the limits, which indicates good precision for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the duplicate. Of the 2,287 total results for field samples (investigative samples and field duplicates), only 18 results (all of which are for metals) are qualified as estimated (UJ or J) based on laboratory duplicate precision. Additionally, the sampler collected 10 field duplicates with the 84 investigative samples and the RPDs are within the limits, which indicates good precision for the sampling and analytical technique on the given matrix, or the validator qualified the results for the original and duplicate sample. Only three of the 325 pairs of results are qualified as estimated (J) based on field duplicate precision. For each qualified pair, the higher result (i.e., from either the original or duplicate sample) should be used for project decisions. This gives a conservative approach relative to protection of the environment. (For field duplicate pairs that pass the precision criteria, the value should be selected based on accepted convention for the site and/or agency requirements, e.g., select the value reported for the original sample, the average of the two values, etc.)

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The Workplans stipulate that the accuracy control limits will be dictated by the analytical method. For most tests, the analytical method stipulates that the laboratory calculate in-house performance criteria. In order to better assess data usability, limits of 50-200% were employed where the laboratory limit for a spiked analyte falls outside these values. The validator assessed accuracy using the laboratory spikes and matrix spikes. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with each analytical batch and reported the recovery for every target compound except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, one SVOC target analyte (m,p-Cresol), and Chromium III (which is a calculated rather than measured result). The laboratory also prepared a laboratory control spike duplicate (LCSD) with each HERB analytical batch and several of the VOC analytical batches. All LCS/LCSD recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects, with minor exceptions. Two non-detects for Pyrene are qualified as estimated (UJ) due to marginally low laboratory spike recovery (49%). Additionally, the laboratory prepared several matrix spikes (MS) and matrix spike duplicates (MSD) plus serial dilutions (SD) for the metals analyses using a sample from the site, including at least one for every test. All SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy of metals results that are substantially above the reporting limit. The MS/MSD recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the MS/MSD. Of the 2,287 total results for field samples, 66 results (most of which are for volatile organic compounds) are qualified as estimated based on matrix spike recovery. The qualification includes the expected direction of bias where known (i.e., J+ for high MS/MSD recovery and J- for low MS/MSD recovery). Additionally, the laboratory utilized one or more surrogate spikes for each organic analysis. The surrogate recoveries are within the laboratory limits for all field samples.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplans state that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, investigative samples were collected as required in the approved sampling and analysis plans with the exception of deviations that were approved by NYSDEC (e.g., sidewalls that will be excavated in Phase II-B were not sampled). All other planned samples were collected in addition to a number of unplanned samples (e.g., additional confirmation samples were collected due to unanticipated excavations, additional floor samples were collected based on the grid floor square footage, etc.). Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory and field QC blanks, and analytical instrument setup (i.e., tuning, calibration, interference correction, etc.) For all samples, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank with each analytical batch and the sampler collected three trip blanks with the VOC samples. The laboratory and field QC blanks show no contamination, which indicates the samples were not affected by laboratory or field procedures, or the validator qualified the samples associated with the blank that have a concentration similar to that in the blank. The qualified results are for Acetone (which was detected in 28 of the 35

VOC soil samples and all 28 detects are qualified due to laboratory blank contamination) and Methylene Chloride (which was detected in all 35 VOC soil samples and 21 detects are qualified due to laboratory and/or trip blank contamination while the remaining detects are qualified as estimated with a high bias (J+) due to high matrix spike recovery or positive calibration drift). Per the NFG, the validator qualified detects above the reporting limit with a J+ flag while detects below the reporting limit (i.e., laboratory J-values) were qualified with a U flag. Results with a U flag should be considered not detected at the reporting limit, and thus the validator replaced the concentration reported by the laboratory with the reporting limit. Proper analytical procedures were used and calibration results met the method requirements or the validator qualified the affected samples. Fourteen (14) non-detect results for 1,4-Dioxane are qualified as rejected (R) due to extremely low instrument response (relative response factor (RRF) less than the 0.005 advisory level and no discernible peak on the chromatogram for the 100-ppb standard). The remaining 21 non-detect results for 1,4-Dioxane are qualified as estimated (UJ) due to low instrument response (RRF less than the 0.005 advisory level with a discernible peak and adequate area count on the chromatogram for the 100-ppb or lower standard). Additionally, 35 results (for Acetone, Methylene Chloride, and Aroclor 1260) are qualified due to calibration drift.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplans state that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. All analyses of field samples produced valid analytical measurements, with the exception of 14 non-detect results for 1,4-Dioxane. With 2,287 total results for field samples, this gives a completeness of 99.4%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplans. The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics for all field samples.

DATA USABILITY

The results for 1,4-Dioxane in 14 backfill samples are qualified as rejected (R) and thus are not suitable for use. The absence or presence of this analyte cannot be confirmed in the qualified samples due to extremely low instrument response. All other results for the samples are acceptable for use with the qualifications shown in Table 4. Results that are qualified with a UJ should be considered not present above the reporting limit; however the reporting limit is an estimated value. Results that are qualified with a J- (biased low) can be used for determining the presence of the analyte and as an indication that the concentration of the analyte exceeds a given criterion. However, the concentration reported for detects may be low. Results that are qualified with a J+ (biased high) can be used for determining the presence of the analyte and as an indication that the concentration of the analyte is less than a given criterion. However, the concentration reported for detects may be high. Similarly, results that are qualified with a J (estimated) may be either low or high. For results qualified with a U (blank contamination), the analyte should be considered not detected at the reporting limit.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include hardcopy data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Instrument Tuning and Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD),
- Field Duplicates (FD),
- Dual Column Confirmation,
- Surrogates (SU), and
- Internal Standards (IS).

Additionally, the validator examined the raw data for 10% of the sample batches (randomly selected by the validator across the various analysis dates and tests) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are typically the laboratory-derived recovery control limits based on historical performance (but not less than 50% lower limit or greater than 200% upper limit)
- Laboratory Precision – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which range from 10-30 RPD
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 30% for inorganics, 20% for purgeable organics (VOC), and 10% for extractable organics were used. The data

validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

The laboratory analyzed an LCSD and reported RPDs for all target compounds for each HERB batch (maximum 20 samples) and the VOC batches that do not include an MS/MSD prepared using a sample from the site. All RPDs are at or below the control limit.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every inorganics analytical batch (maximum 20 samples) and an MSD for every organics analytical batch (maximum 20 samples) and reported RPDs for MD and MSD prepared using a sample from the site. Eight soil samples (as designated by the sampler on the custody record) were used to prepare an MD or MSD for each test requested for the sample. With a total of 84 investigative soil samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Additionally, the validator noted that at least one MD or MSD is reported for each type of analytical test and sample media (i.e., backfill, containment cell, or excavation confirmation).

Some MD and MSD RPDs are above the control limit and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that, for cases where either result for the duplicate pair is non-detect, the check does not apply and the laboratory reported the RPD as NC (not calculable) in the hardcopy report and as 0 in the EDD. Additionally, the validator considered samples of the same media (i.e., backfill, containment cell, or excavation confirmation) to be of similar matrix (e.g., if deficiencies were noted for a MD or MSD prepared using a backfill sample, all backfill samples in the same analytical batch were qualified).

3.1.3 FIELD DUPLICATE (FD) PRECISION

The samplers collected 10 FD with the 84 investigative samples, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Results for the field duplicates are summarized in Table 5.

Three pairs of results are outside the field precision criteria and the validator qualified the data as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the remaining 322 pairs of FD results meet the criteria, which indicates good overall precision, and thus the validator only qualified the original and duplicate sample for the three FD deficiencies.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD), matrix spikes (MS/MSD), serial dilutions (SD), and surrogate (SU) spikes. LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit. Surrogates are added to each sample before preparation and analysis and provide an indication of accuracy for each individual sample analysis.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS and/or LCSD for every analytical batch (maximum 20 samples) as required and reported recoveries for all target compounds except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, one SVOC target analyte (m,p-Cresol), and Chromium III (which is a calculated rather than measured result).

Some LCS recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

Note that the following cases required professional judgment to assess data quality:

- For HERB prep batch 460-132013, Silvex (2,4,5-TP) was not recovered in the LCS or LCSD on the primary column. The laboratory noted interference on this column due to the presence of Pentachlorophenol. (Pentachlorophenol is a SVOC target analyte for the Revere site. It is also a laboratory analyte for HERB method 8151. For method 8151, it requires a separate calibration due to interference issues but it is included in the multi-analyte LCS spiking solution.) The validator reviewed the LCS chromatogram and verified that interference is present on the primary column. The LCS and LCSD recoveries pass on the secondary column, which validates the analysis and thus the validator determined that no data qualification is necessary.
- For PEST prep batch 460-132123, Methoxychlor was not recovered in the LCS on the primary column. The validator reviewed the LCS chromatogram and determined that the peak is present but was missed due to a data system and/or analyst error. The LCS recovery passes on the secondary column and no unidentified peaks are present for the field samples analyzed with the LCS. Thus, the validator determined that no data qualification is necessary.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS for every inorganics analytical batch (maximum 20 samples) and an MS/MSD for every organics analytical batch (maximum 20 samples) and reported recoveries for MS and MSD prepared using a sample from the site. Eight soil samples from the site were used to prepare a matrix spike for each test requested for the sample. With a total of 84 investigative soil samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Additionally, the validator noted that at least one matrix spike is reported for each type of analytical test and sample media (i.e., backfill, containment cell, or excavation confirmation).

Some MS and MSD recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that if an analyte was detected in the unspiked parent sample at a concentration well above (greater than four times) the concentration of spike added to the sample, thereby rendering the recoveries inconclusive, the check was waived and the validator did not qualify the data. For cases where the MS or MSD recovery is outside the control limits but greater than the data rejection limit (30% for inorganics, 20% for purgeable organics (VOC), and 10% for extractable organics) and the average MS/MSD recovery is in control, the validator did not qualify the data. The validator also did not qualify the data for cases where the MS or MSD recovery is outside the control limits (i.e., the laboratory-derived recovery control limits based on historical performance or 50-200%, whichever is more stringent) but within 70-130% since this is considered within the inherent method error and suitable for the intended use. Additionally, the validator considered samples of the same media (i.e., backfill, containment cell, or excavation confirmation) to be of similar matrix (e.g., if deficiencies were noted for a MS/MSD prepared using a backfill sample, all backfill samples in the same analytical batch were qualified).

Note that the following case required professional judgment to assess data quality:

- For HERB prep batch 460-132013, Silvex (2,4,5-TP) was not recovered in the MS or MSD on the primary column. The laboratory noted interference on this column due to the presence of Pentachlorophenol. (Pentachlorophenol is a SVOC target analyte for the Revere site. It is also a laboratory analyte for HERB method 8151. For method 8151, it requires a separate calibration due to interference issues but it is included in the multi-analyte LCS spiking solution.) The validator reviewed the MS and MSD chromatograms and verified that interference is present on the primary column. The MS and MSD recoveries pass on the secondary column, which validates the analysis and thus the validator determined that no data qualification is necessary.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all target compounds detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.2.4 SURROGATE (SU) RECOVERY

The laboratory spiked each organic sample with one or more surrogates before preparation and analysis.

A few surrogate recoveries are outside the control limits for some QC samples (i.e., LCS or MS) as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Data quality for field samples was evaluated based on the recovery of spiked analytes for these LCS and MS, and thus the validator determined no further data qualification is required.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

All samples were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records, which confirms that sample integrity was maintained. The validator noted the following regarding the custody records and sample log-in at the laboratory:

- All samples were received within two days of collection as recommended in DER-10 except those in laboratory job numbers 460-45895-1, 460-45896-1, and 460-46911-1 (samples 1 through 11 only), which were received three days after collection in good condition.
- Custody seals were not used on the shipping coolers but were used on the individual sample containers. Additionally, the laboratory sample custodian noted that the coolers and the samples did not appear to have been compromised or tampered with.
- The sampler did not enter one of the trip blanks (lab ID 460-45384-22) on the custody record. This trip blank was logged in for VOC analysis upon receipt at the laboratory per ENTACT.
- The sampler did not enter the time relinquished on the custody record for laboratory job number 460-45896-1. The date relinquished and release signature are present.
- The laboratory sample custodian did not sign or enter the date/time relinquished on the second page of the custody record for laboratory job number 460-47389-1. The release signature and the date/time are entered on the first page. Note that the only sample on the second page is a trip blank.

All field samples were analyzed for the tests requested on the chain-of-custody except as follows:

- For all of the backfill composite samples and cell containment samples, the laboratory inadvertently reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of the DER-10 analytes as requested.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

All samples were properly preserved and analyzed within the holding times listed in Table 2 of the P1 Workplan, Table 1 of the P2A Workplan, and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the P1 Workplan and Section 4.4 of the P2A Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 5.7.2 of the P1 Workplan and Section 4.7.2 of the P2A Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the P1 Workplan or Table 1 of the P2A Workplan were used for the sample analyses. (For VOCs, the validator noted that the VOC soil samples were collected in 4-oz jars using a bulk technique and analyzed using a low-level deionized water extraction (on day 1 to day 5) with heated purge-n-trap per the Workplan rather than using closed system purge-n-trap or methanol extraction as indicated by the preparation method (SW-846 5035) referenced by the laboratory.)

For the backfill and containment cell samples, the target analyte list includes all DER-10 analytes and the nominal reporting limits (i.e., without dry-weight correction or sample dilution and based on the standard sample weight and final volume) are at

or below the levels of concern (i.e., the Allowable Constituent Levels (ACLs) for imported fill or soil from Appendix 5 of the DER-10), except as follows:

- DER-10 Appendix 5 lists m-Cresol(s), o-Cresol(s), and p-Cresol(s). The laboratory reported m & p-Cresols and o-Cresol as it is not possible to separate m-Cresol and p-Cresol using method 8270C.
- DER-10 Appendix 5 lists Chlordane (alpha). The laboratory reported technical Chlordane, which is a commercial mixture that contains alpha-Chlordane and gamma-Chlordane along with other related compounds.
- The nominal reporting limit for Pentachlorophenol of 1 mg/kg is slightly above the ACL of 0.8 mg/kg. Note however that the laboratory reported any confirmed detects above the method detection limit (MDL) but below the reporting limit (i.e., J-values) and the laboratory's MDL for Pentachlorophenol is well below the ACL at 0.099 mg/kg.

For the excavation confirmation samples, the target analyte list includes total Arsenic, total Lead, and/or TCLP Lead as requested and all Contract Laboratory Program (CLP) metals for the TAL metals. The nominal reporting limits are below the levels of concern (i.e., the remedial goals) for total Arsenic, total Lead, and TCLP Lead. There are no established levels of concern for TAL metals. The nominal reporting limits comply with the requirements in the ASP for TAL metals with the exception of Iron, which has a nominal reporting limit of 30 mg/kg for the soil samples that is above the ASP reporting limit of 20 mg/kg.

(Note: The laboratory dilutes all total metals samples 2-4x before analysis as standard practice. All Revere samples were diluted 4x and thus nominal reporting limits were determined at this dilution rate. The laboratory also dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank (and leachate blank for TCLP) for every analytical batch (maximum 20 samples) and a calibration blank for every 10 metals analyses as required per the analytical methodology. Additionally, a trip blank was included with each shipment of VOC samples, which meets the Workplan requirement. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used.

Several detects are reported in the laboratory and trip blanks, primarily at concentrations between the MDL and RL (i.e., laboratory J-values) and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator calculated a blank equivalent concentration taking into account the sample weight, moisture content, and dilution factor for each sample when determining if the contamination in the blank is near that in the sample, and thus if data quality is affected for that sample. When comparing aqueous blank concentrations (e.g., for trip blanks) to solid samples, the validator assumed that all contamination found in the aqueous blank aliquot analyzed is potentially present in the solid sample aliquot analyzed.

3.3.5 ANALYTICAL PROCEDURES

The analytical procedures (instrument tuning and initial calibration, continuing calibration verification, dual column confirmation, and internal standards), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method with some exceptions primarily for the VOC analyte 1,4-Dioxane. The validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

Additionally, the validator noted the following regarding the analytical procedures:

- For PCB, the validator did not delineate cases where one of the seven or eight peaks used for Aroclor identification has a continuing calibration verification (CCV) %difference above the control limit on just one column since all of the field samples are non-detect for Aroclor and thus data quality is not affected. These cases are identified in the validator's checklist.
- For HERB, the validator did not delineate cases where the surrogate has a continuing calibration verification (CCV) %difference above the control limit on just one column since surrogate recoveries for each sample are evaluated separately and the sample results are not affected by high CCV %difference for the surrogate. These cases are identified in the validator's checklist.
- For samples 1 through 9 in work order 460-43348-1, approximately 50-g of sample was used to perform the TCLP leaching procedure because insufficient sample was provided to use 100-g as specified in the method. Likewise, for samples 1 through 9 in work order 460-43377-1, approximately 35-g of sample was used for the TCLP procedure. In each case, the volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of fluid to sample weight, and thus the validator determined that no data qualification is necessary.
- For laboratory job no. 460-47389-1, Form X (Identification Summary) for HERB shows a dual column confirmation %difference of 0.0 for the LCS, LCSD, MS, and MSD rather than the calculated value. The validator calculated the %difference from the raw data and found it passes in each case and thus determined that no further action is necessary.
- For laboratory job no. 460-48738-1, the TCLP batch worksheet has an incorrect batch end date. The correct date is shown on the TCLP batch worksheet for samples in job no. 460-48739-1, which were leached in the same batch (140868), and thus the validator determined that no further action is necessary.

No issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes 50 analytical batches and the validator re-calculated sample results and QC check parameters for five batches and made the following observations from the review of the raw data:

- Total As and Pb batch 140888 – The laboratory reports the RPD for matrix duplicates (MD) as NC (not calculable) if either result is less than the reporting limit and the serial dilution (SD) %difference as NC (not calculable) if the undiluted result is less than 50x MDL since the checks are waived below these levels.
- PEST batch 130663 – The laboratory used dual column confirmation for all GC analyses (including PEST, PCB, and HERB) selecting the result from either the first column or second column for each analysis (unless chromatographic performance is better on one column and it is therefore used for all analyses). For field and QC analyses, the laboratory reports the result from the column with the higher concentration, provided that the RPD between the two columns is less than 40%. If the RPD is greater than 40%, the column with the lower concentration is reported with a note in the narrative and the result is reported with a P flag. There are no cases where the RPD exceeded 40% for this data set.
- HERB batch 132259 – All results were reported from the DB-5 column.
- VOC batch 137271 – The laboratory prepares all bulk soil samples for both a deionized (DI) water and a methanol extraction and uses the DI water extract where possible for lower reporting limits. All samples for this data set, which were collected as bulk soils in 4-oz jars, were analyzed as low level DI extracts. Additionally, the laboratory determined that the peaks at 12.5 and 14 minutes on the VOC chromatograms are column bleed and therefore would not be reported as TICs. This is also noted for other batches analyzed on this instrument (MS12).
- CN batch 136819 – No additional observations.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The Level 4 data packages and EDD contain all necessary information or the laboratory submitted a revision upon request as follows:

Laboratory Job No.	Action
460-43348-1	A revised package and EDD were submitted with TCLP results reported in µg/L and with the correct MDL.
460-45384-1	A revised package was submitted with missing raw data (the 10/9/12 ICAL on GC3 for HERB).
460-45895-1	A revised package was submitted with missing QC results (laboratory blank and LCS results for PCB batch 132122) and missing raw data (the 10/9/12 ICAL on GC3 for HERB).
460-45896-1	A revised package was submitted with missing raw data (the 10/9/12 ICAL on GC3 for HERB).

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	Sample(s)	EDD Field(s)	Action
460-45384-1 460-45895-1 460-45896-1	all field and QC samples	analysis_date sample_date sample_receipt_date prep_date	The validator changed the format from text (yyyy/mm/dd hh:mm:ss) to date (mm/dd/yyyy hh:mm:ss)
460-43348-1 460-45377-1 460-46911-1 460-47389-1 460-48738-1 460-48739-1	all field and QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.
460-43348-1	ECS-1A-F ECS-1B-F ECS-2A-F ECS-2B-F ECS-3A-F ECS-3B-F ECS-4A-F ECS-5A-F ECS-6A-F	sampling_company_code	The validator changed the entry from UNK to ENTACT for consistency with other job numbers.
460-43348-1	all field and QC samples	task_code	The validator changed the entry from SM to RC for consistency with other job numbers.

Laboratory Job No.	Sample(s)	EDD Field(s)	Action
460-43348-1	ECS-1A-F ECS-1B-F ECS-2A-F ECS-2B-F ECS-3A-F ECS-3B-F ECS-4A-F ECS-5A-F ECS-6A-F	lab_matrix_code	The validator changed the entry for the TCLP results from WL to SO for consistency with other job numbers.
460-43348-1	all field and QC samples	qc_level	The validator corrected the entry from SCREEN to QUANT to agree with the analytical methods used.

3.4.3 ANALYTICAL COMPLETENESS

The validator rejected 14 non-detect results for 1,4-Dioxane due to extremely low instrument response. With 2,287 total results for field samples (investigative samples and field duplicates), this gives a completeness of 99.4%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplans and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which a target analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which a target analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size and include dry-weight correction for all soil samples as required per Section 5.7.1 of the P1 Workplan and Section 4.7.1 of the P2A Workplan. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results for the investigative samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics. (For the 7196A analyses, Trivalent Chromium is shown as not dry-weight corrected. Trivalent Chromium is calculated from the results for Hexavalent Chromium and total Chromium, which are dry-weight corrected, and thus the Trivalent Chromium is not directly dry-weight corrected but is on a dry-weight basis.)

The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase I and II-A Remedial Design/ Remedial Action

SAMPLES COLLECTED AND TESTS PERFORMED

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-43348-1	ECS-1A-F	8/9/12	INV	ECS	Soil	x	x										
460-43348-1LR	ECS-1A-FLR	8/9/12	MD	ECS	Soil	x											
460-43348-1MS	ECS-1A-FMS	8/9/12	MS	ECS	Soil	x											
460-43348-2	ECS-1B-F	8/9/12	INV	ECS	Soil	x	x										
460-43348-3	ECS-2A-F	8/9/12	INV	ECS	Soil	x	x										
460-43348-4	ECS-2B-F	8/9/12	INV	ECS	Soil	x	x										
460-43348-5	ECS-3A-F	8/9/12	INV	ECS	Soil	x	x										
460-43348-6	ECS-3B-F	8/9/12	INV	ECS	Soil	x	x										
460-43348-7	ECS-4A-F	8/9/12	INV	ECS	Soil	x	x										
460-43348-8	ECS-5A-F	8/9/12	INV	ECS	Soil	x	x										
460-43348-9	ECS-6A-F	8/9/12	INV	ECS	Soil	x	x										
460-45377-1	ECS-Hill-1-F	10/3/12	INV	ECS	Soil	x	x										
460-45377-2	ECS-Hill-2-F	10/3/12	INV	ECS	Soil	x	x										
460-45377-3	ECS-Hill-3-F	10/3/12	INV	ECS	Soil	x	x										
460-45377-4	ECS-Hill-4-F	10/3/12	INV	ECS	Soil	x	x										
460-45377-5	ECS-Hill-5-F	10/3/12	INV	ECS	Soil	x	x										
460-45377-6	ECS-Hill-6-F	10/3/12	INV	ECS	Soil	x	x										
460-45377-7	ECS-Hill-7-F	10/3/12	INV	ECS	Soil	x	x										
460-45377-8	ECS-Hill-8-F	10/3/12	INV	ECS	Soil	x	x										
460-45377-9	ECS-Hill-8-F-X	10/3/12	FD	ECS	Soil	x	x										
460-45384-1	BF-4003G-001-1-7'	10/3/12	INV	BF	Soil										x		
460-45384-2	BF-4003G-002-1-7'	10/3/12	INV	BF	Soil										x		
460-45384-3	BF-4003C-001-1-7'	10/3/12	INV	BF	Soil				x	x	x	x	x	x		x	x
460-45384-4	BF-4003G-001X-1-7'	10/3/12	FD	BF	Soil										x		
460-45384-5	BF-4003G-002X-1-7'	10/3/12	FD	BF	Soil										x		
460-45384-6	BF-4003C-001X-1-7'	10/3/12	FD	BF	Soil				x	x	x	x	x	x		x	x
460-45384-7	BF-4004G-001-1-7'	10/3/12	INV	BF	Soil										x		
460-45384-8	BF-4004G-002-1-7'	10/3/12	INV	BF	Soil										x		
460-45384-9	BF-4004C-001-1-7'	10/3/12	INV	BF	Soil				x	x	x	x	x	x		x	x
460-45384-10	BF-4005G-001-1-6'	10/3/12	INV	BF	Soil										x		
460-45384-10MS	BF-4005G-001-1-6'MS	10/3/12	MS	BF	Soil										x		
460-45384-10SD	BF-4005G-001-1-6'SD	10/3/12	MSD	BF	Soil										x		

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-45384-11	BF-4005G-002-1-6'	10/3/12	INV	BF	Soil										x		
460-45384-11MS	BF-4005G-002-1-6'MS	10/3/12	MS	BF	Soil										x		
460-45384-11SD	BF-4005G-002-1-6'SD	10/3/12	MSD	BF	Soil										x		
460-45384-12	BF-4000G-001-1-7'	10/3/12	INV	BF	Soil										x		
460-45384-13	BF-4000G-002-1-7'	10/3/12	INV	BF	Soil										x		
460-45384-14	BF-4000C-001-1-7'	10/3/12	INV	BF	Soil				x	x	x	x	x	x		x	x
460-45384-15	BF-4001G-001-1-7'	10/3/12	INV	BF	Soil										x		
460-45384-16	BF-4001G-002-1-7'	10/3/12	INV	BF	Soil										x		
460-45384-17	BF-4001C-001-1-7'	10/3/12	INV	BF	Soil				x	x	x	x	x	x		x	x
460-45384-18	BF-4002G-001-1-6'	10/3/12	INV	BF	Soil										x		
460-45384-19	BF-4002G-002-1-6'	10/3/12	INV	BF	Soil										x		
460-45384-20	BF-4002C-001-1-6'	10/3/12	INV	BF	Soil				x	x	x	x	x	x		x	x
460-45384-21	BF-4005C-001-1-6'	10/3/12	INV	BF	Soil				x	x	x	x	x	x		x	x
460-45384-21LR	BF-4005C-001-1-6'LR	10/3/12	MD	BF	Soil				x	x	x						
460-45384-21MS	BF-4005C-001-1-6'MS	10/3/12	MS	BF	Soil				x	x	x	x	x	x		x	x
460-45384-21SD	BF-4005C-001-1-6'SD	10/3/12	MSD	BF	Soil							x	x	x		x	x
460-45384-22	TRIPBLANK	10/3/12	TB	TB	Water										x		
460-45895-1	CC-BL-1G-001	10/12/12	INV	CC	Soil										x		
460-45895-2	CC-BL-1G-002	10/12/12	INV	CC	Soil										x		
460-45895-3	CC-BL-1G-003	10/12/12	INV	CC	Soil										x		
460-45895-4	CC-BL-1G-004	10/12/12	INV	CC	Soil										x		
460-45895-5	CC-BL-1G-005	10/12/12	INV	CC	Soil										x		
460-45895-6	CC-BL-1G-006	10/12/12	INV	CC	Soil										x		
460-45895-7	CC-BL-1G-007	10/12/12	INV	CC	Soil										x		
460-45895-8	CC-BL-1C-001	10/12/12	INV	CC	Soil				x	x	x	x	x	x		x	x
460-45895-9	CC-BL-1C-002	10/12/12	INV	CC	Soil				x	x	x	x	x	x		x	x
460-45895-10	CC-BL-2G-001	10/12/12	INV	CC	Soil										x		
460-45895-11	CC-BL-2G-002	10/12/12	INV	CC	Soil										x		
460-45895-12	CC-BL-2C-001	10/12/12	INV	CC	Soil				x	x	x	x	x	x		x	x
460-45896-1	CC-BL-3G-001	10/12/12	INV	CC	Soil										x		
460-45896-2	CC-BL-3G-001X	10/12/12	FD	CC	Soil										x		
460-45896-3	CC-BL-3G-002	10/12/12	INV	CC	Soil										x		
460-45896-4	CC-BL-3C-001	10/12/12	INV	CC	Soil				x	x	x	x	x	x		x	x
460-45896-5	CC-BL-3C-001X	10/12/12	FD	CC	Soil				x	x	x	x	x	x		x	x
460-45896-6	CC-BL-4G-001	10/12/12	INV	CC	Soil										x		
460-45896-6MS	CC-BL-4G-001MS	10/12/12	MS	CC	Soil										x		
460-45896-6SD	CC-BL-4G-001SD	10/12/12	MSD	CC	Soil										x		
460-45896-7	CC-BL-4G-002	10/12/12	INV	CC	Soil										x		
460-45896-8	CC-BL-4C-001	10/12/12	INV	CC	Soil				x	x	x	x	x	x		x	x
460-45896-8LR	CC-BL-4C-001LR	10/12/12	MD	CC	Soil				x	x	x						

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-45896-8MS	CC-BL-4C-001MS	10/12/12	MS	CC	Soil				x	x	x	x	x	x		x	x
460-45896-8SD	CC-BL-4C-001SD	10/12/12	MSD	CC	Soil							x	x	x		x	x
460-45896-9	TB-10/12/12	10/12/12	TB	TB	Water										x		
460-46911-1	ECS-7+75-F	11/7/12	INV	ECS	Soil		x*										
460-46911-2	ECS-7+75-SN	11/7/12	INV	ECS	Soil		x*										
460-46911-3	ECS-7+75-SW	11/7/12	INV	ECS	Soil		x*										
460-46911-4	ECS-7+75-SE	11/7/12	INV	ECS	Soil		x*										
460-46911-5	ECS-7+75-SS	11/7/12	INV	ECS	Soil		x*										
460-46911-6	ECS-7+25-F	11/7/12	INV	ECS	Soil		x*										
460-46911-7	ECS-7+25-FX	11/7/12	FD	ECS	Soil		x*										
460-46911-8	ECS-7+25-SS	11/7/12	INV	ECS	Soil		x*										
460-46911-9	ECS-7+25-SE	11/7/12	INV	ECS	Soil		x*										
460-46911-10	ECS-7+25-SW	11/7/12	INV	ECS	Soil		x*										
460-46911-11	ECS-7+25-SN	11/7/12	INV	ECS	Soil		x*										
460-46911-12	ECS-4+50-F	11/9/12	INV	ECS	Soil		x*										
460-46911-13	ECS-4+50-SN	11/9/12	INV	ECS	Soil		x*										
460-46911-14	ECS-4+50-SS	11/9/12	INV	ECS	Soil		x*										
460-46911-15	ECS-4+50-SE	11/9/12	INV	ECS	Soil		x*										
460-46911-16	ECS-4+50-SW	11/9/12	INV	ECS	Soil		x*										
460-47389-1	CC-PSL-1g-001	11/19/12	INV	CC	Soil										x		
460-47389-2	CC-PSL-1g-002	11/19/12	INV	CC	Soil										x		
460-47389-3	CC-PSL-1c-001	11/19/12	INV	CC	Soil				x	x	x	x	x	x		x	x
460-47389-4	CC-PSL-2g-001	11/19/12	INV	CC	Soil										x		
460-47389-5	CC-PSL-2g-001x	11/19/12	FD	CC	Soil										x		
460-47389-6	CC-PSL-2g-002	11/19/12	INV	CC	Soil										x		
460-47389-7	CC-PSL-2c-001	11/19/12	INV	CC	Soil				x	x	x	x	x	x		x	x
460-47389-8	CC-PSL-2c-001x	11/19/12	FD	CC	Soil				x	x	x	x	x	x		x	x
460-47389-9	CC-PSL-3g-001	11/19/12	INV	CC	Soil										x		
460-47389-10	CC-PSL-3g-002	11/19/12	INV	CC	Soil										x		
460-47389-10MS	CC-PSL-3g-002MS	11/19/12	MS	CC	Soil										x		
460-47389-10SD	CC-PSL-3g-002SD	11/19/12	MSD	CC	Soil										x		
460-47389-11	CC-PSL-3c-001	11/19/12	INV	CC	Soil				x	x	x	x	x	x		x	x
460-47389-11LR	CC-PSL-3c-001LR	11/19/12	MD	CC	Soil				x	x	x						
460-47389-11MS	CC-PSL-3c-001MS	11/19/12	MS	CC	Soil				x	x	x	x	x	x		x	x
460-47389-11SD	CC-PSL-3c-001SD	11/19/12	MSD	CC	Soil							x	x	x		x	x
460-47389-12	TB-11/19/12	11/19/12	TB	TB	Water										x		
460-48738-1	ECS-1C-F	12/18/12	INV	ECS	Soil	x	x										
460-48738-2	ECS-2C-F	12/19/12	INV	ECS	Soil	x	x										
460-48738-2LR	ECS-2C-FLR	12/19/12	MD	ECS	Soil	x	x										
460-48738-2MS	ECS-2C-FMS	12/19/12	MS	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-48739-1	ECS-SSA29-F	12/18/12	INV	ECS	Soil	x		x	x								
460-48739-2	ECS-SSA29-SS	12/18/12	INV	ECS	Soil	x	x										
460-48739-3	ECS-SSA29-SW	12/18/12	INV	ECS	Soil	x	x										
460-48739-4	ECS-SSA29-SN	12/18/12	INV	ECS	Soil	x	x										
460-48739-5	ECS-SSA29-SE	12/18/12	INV	ECS	Soil	x	x										
460-48739-6	ECS-SSA29-SE-X	12/18/12	FD	ECS	Soil	x	x										

* For Total Lead only

BF - Backfill Sample

CC - Containment Cell Sample

ECS - Excavation Confirmation Sample

FD - Field Duplicate Sample

INV - Investigative Sample

MD – Matrix Duplicate Sample (unspiked)

MS - Matrix Spike Sample

MSD - Matrix Spike Duplicate Sample

TB - Trip Blank

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Pb: 1311/ 3010A/ 6010B for Lead in leachates of soil samples
- Total As and Pb: 3020B/ 6010B for Arsenic and Lead in soil samples
- Total TAL Metals: 3020B/ 6010B for 22 ICP-AES Target Analyte List (TAL) Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc) in soil samples
- Hg: 7471A for total Mercury in soil samples
- Total DER10 Metals: 3020B/ 6010B for 12 ICP-AES NYSDEC DER-10 Appendix 5 Metals (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, Selenium, Silver, and Zinc in soil samples
- Cr III/VI: 3060A/7196A for Trivalent Chromium and Hexavalent Chromium in soil samples
- PEST: 3541/ 3620B/ 8081A for 15 NYSDEC DER-10 Appendix 5 pesticides plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene in soil samples
- PCB: 3541/ 3665A/ 8081A for 7 Aroclors in soil samples
- HERB: 8151A for Silvex (2,4,5-TP) in soil samples
- VOC: 8260B for 30 NYSDEC DER-10 Appendix 5 volatile organic compounds (VOCs) in bulk soil samples and 5030B/ 8260B for 30 VOCs in aqueous trip blanks
- SVOC: 3541/ 8270C for 20 NYSDEC DER-10 Appendix 5 semivolatile organic compounds (SVOCs) plus Dibenzofuran and Hexachlorobenzene in soil samples
- CN: 9012A for Cyanide in soil samples

TABLE 2
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase I and II-A Remedial Design/ Remedial Action

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U	=	Blank contamination. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.
UJ	=	Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.
J	=	Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined
J-	=	Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.
J+	=	Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.
R	=	Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase I and II-A Remedial Design/ Remedial Action

QC DEFICIENCIES AND DATA QUALIFICATION ACTIONS

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
MATRIX DUPLICATE (MD) PRECISION																	
460-45896-8LR	CC-BL-4C-001_10/12/12LR	MD		3020B	6010B		10/16/12 08:16:30	10/17/12 16:53:39	NA	4	SELENIUM	J			20	Poor lab duplicate precision (30 RPD)	J/UJ to detects/NDs for CC samples digested in the same batch
460-47389-11LR	CC-PSL-3c-001_11/19/12LR	MD		3020B	6010B		11/29/12 18:16:21	11/29/12 23:56:17	NA	4	LEAD				20	Poor lab duplicate precision (21 RPD)	J/UJ to detects/NDs for CC samples digested in the same batch
460-48738-2LR	ECS-2C-F_12/19/12LR	MD	1311	3010A	6010B	12/21/12 15:33:00	12/24/12 09:21:10	12/24/12 14:20:20	NA	5	LEAD				20	Poor lab duplicate precision (25 RPD)	J/UJ to detects/NDs for ECS samples digested in the same batch
MATRIX SPIKE DUPLICATE (MSD) PRECISION																	
460-45384-21SD	BF-4005C-001-1-6'_10/03/12SD	MSD		3546	8081A		10/05/12 08:12:15	10/06/12 23:42:00	1C	1	P,P'-DDD	*	63	150	30	Poor MS/MSD precision (48 RPD)	J to detects for BF samples analyzed in the same batch (all ND)
460-45384-11SD	BF-4005G-002-1-6'_10/03/12SD	MSD		5035	8260B		10/04/12 18:36:19	10/09/12 10:42:00	NA	1	1,4-DIOXANE (P-DIOXANE)	*	69	131	30	Poor MS/MSD precision (39 RPD)	J to detects for BF samples analyzed in the same batch (all ND)
FIELD DUPLICATE (FD) PRECISION																	
460-45896-5	CC-BL-3C-001X_10/12/12	FD		3020B	6010B		10/16/12 08:16:30	10/17/12 17:15:34	NA	4	MANGANESE				35	Poor field duplicate precision (51 RPD), use higher result from original sample	J/UJ to detects/NDs for original and duplicate sample
460-45896-5	CC-BL-3C-001X_10/12/12	FD		3541	8270C		10/17/12 08:27:50	10/18/12 15:06:00	NA	1	NAPHTHALENE	J			35	Poor field duplicate precision (absolute difference > 2xRL), use higher value from original sample	J/UJ to detects/NDs for original and duplicate sample

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-46911-7	ECS-7+25-FX_11/07/12	FD		3020B	6010B		11/13/12 08:06:44	11/13/12 17:43:22	NA	4	LEAD				35	Poor field duplicate precision (110 RPD), use higher result from field duplicate	J/UJ to detects/NDs for original and duplicate sample
LABORATORY CONTROL SPIKE (LCS) ACCURACY																	
460132013/2A/3A	460132013/2A/3A	LCS/LCSD		METHOD	8151A		10/15/12 10:15:49	10/16/12 11:22:00/11:50:00	1C	1	SILVEX (2,4,5-TP)	U*	73	148	30	Laboratory control spike not recovered on primary column	None (PCP interference noted on primary column, recovery passes at 111% on secondary column)
460132123/2A	460132123/2A	LCS		3546	8081A		10/16/12 05:33:41	10/16/12 06:50:00	1C	1	METHOXYCHLOR	U*	42	150		Laboratory control spike not recovered on primary column	None (missed peak on primary column, recovery passes at 101% on secondary column, no peaks on sample chromatograms)
460132230/2A	460132230/2A	LCS		3541	8270C		10/16/12 15:06:56	10/17/12 14:41:00	NA	1	PYRENE		49	116		Low laboratory control spike recovery (49%)	J-/UJ to detects/NDs for samples digested in the same batch
460137271/3	460137271/3	LCS			8260B			11/28/12 09:11:00	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	*	77	117		High laboratory control spike recovery (140%)	J+ to detects for samples digested in the same batch (all ND)
460132207/3	460132207/3	LCS			8260B			10/16/12 12:10:00	NA	1	ACETONE	*	45	156		High laboratory control spike recovery (187%) - QC for TB only	none (analytes ND in this TB, samples results not affected)
460132207/3	460132207/3	LCS			8260B			10/16/12 12:10:00	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	*	65	114		High laboratory control spike recovery (129%) - QC for TB only	none (analytes ND in this TB, samples results not affected)
MATRIX SPIKE (MS) ACCURACY																	
460-45384-21MS	BF-4005C-001-1-6'_10/03/12MS	MS		3020B	6010B		10/05/12 08:08:08	10/05/12 23:24:54	NA	4	MANGANESE	4	75	125		Low matrix spike recovery (68%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-45896-8MS	CC-BL-4C-001_10/12/12MS	MS		3020B	6010B		10/16/12 08:16:30	10/17/12 17:04:41	NA	4	MANGANESE	4	75	125		Low matrix spike recovery (-139%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-47389-11MS	CC-PSL-3c-001_11/19/12MS	MS		3020B	6010B		11/29/12 18:16:21	11/30/12 00:07:18	NA	4	MANGANESE	4	75	125		High matrix spike recovery (226%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-45384-21MS/SD	BF-4005C-001-1-6'_10/03/12 MS/SD	MS/MSD		3546	8081A		10/05/12 08:12:15	10/06/12 23:28:00/23:42:00	1C	1	P,P'-DDD	E*	63	150		High average MS/MSD recovery (218.5%)	J+ to detects for BF samples digested in the same batch (all ND)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-45895-8MS/SD	CC-BL-1C-001_10/12/12 MS/SD	MS/MSD		METHOD	8151A		10/15/12 10:15:49	10/16/12 12:17:00/ 12:44:00	1C	1	SILVEX (2,4,5-TP)	U*	73	148	30	Matrix spike not recovered on primary column	None (PCP interference noted on primary column, recovery passes at 112% on secondary column)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	1,1,1-TRICHLOROETHANE	*	78	117		Low average MS/MSD recovery (75.5%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	1,1-DICHLOROETHANE	*	76	125		Low average MS/MSD recovery (72.5%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	1,2,4-TRIMETHYLBENZENE	*	81	121		Low average MS/MSD recovery (73%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	1,2-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (73.5%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	*	82	122		Low average MS/MSD recovery (72.5%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	1,3-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (73%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	1,4-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (72.5%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	BENZENE	*	77	117		Low average MS/MSD recovery (74%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	CARBON TETRACHLORIDE	*	79	118		Low average MS/MSD recovery (74.5%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	CHLOROBENZENE	*	80	120		Low average MS/MSD recovery (77%)	None (recovery within 70-130% data qualification limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	CIS-1,2-DICHLOROETHYLENE	*	80	120		Low average MS/MSD recovery (75.5%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	ETHYLBENZENE	*	81	121		Low average MS/MSD recovery (73%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	N-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (65.5%)	J-/UJ to detects/NDs for BF samples digested in the same batch
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	N-PROPYLBENZENE	*	81	121		Low average MS/MSD recovery (73.5%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	SEC-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (71%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	T-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (71%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	TERT-BUTYL METHYL ETHER	*	78	120		Low average MS/MSD recovery (76%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	TETRACHLORO-ETHYLENE(PCE)	*	80	120		Low average MS/MSD recovery (76%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	TOLUENE	*	75	115		Low average MS/MSD recovery (71%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	TRANS-1,2-DICHLOROETHENE	*	75	122		Low average MS/MSD recovery (73.5%)	None (recovery within 70-130% data qualification limits)
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	TRICHLORO-ETHYLENE (TCE)	*	79	119		Low average MS/MSD recovery (76%)	None (recovery within 70-130% data qualification limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	VINYL CHLORIDE	*	67	133		Low average MS/MSD recovery (58%)	J-/UJ to detects/NDs for BF samples digested in the same batch
460-45384-10MS/SD	BF-4005G-001-1-6'_10/03/12 MS/SD	MS/MSD		5035	8260B		10/04/12 18:27:21/ 18:29:36	10/08/12 12:27:00/ 12:48:00	NA	1	XYLENES, TOTAL	*	82	122		Low average MS/MSD recovery (75.5%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	1,1-DICHLOROETHANE	*	76	125		Low MS recovery (75%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	1,2,4-TRIMETHYLBENZENE	*	81	121		Low MS recovery (73%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	1,2-DICHLOROBENZENE	*	80	120		Low MS recovery (79%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	*	82	122		Low MS recovery (73%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	1,3-DICHLOROBENZENE	*	80	120		Low MS recovery (78%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	1,4-DICHLOROBENZENE	*	80	120		Low MS recovery (79%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	BENZENE	*	77	117		Low MS recovery (76%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	CHLOROBENZENE	*	80	120		Low MS recovery (79%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	CIS-1,2-DICHLORO-ETHYLENE	*	80	120		Low MS recovery (77%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	ETHYLBENZENE	*	81	121		Low MS recovery (73%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	N-BUTYLBENZENE	*	82	122		Low MS recovery (72%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	N-PROPYLBENZENE	*	81	121		Low MS recovery (72%)	None (recovery within 70-130% data qualification limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	SEC-BUTYLBENZENE	*	82	122		Low MS recovery (75%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	T-BUTYLBENZENE	*	82	122		Low MS recovery (73%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	TETRACHLORO-ETHYLENE(PCE)	*	80	120		Low MS recovery (79%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	TOLUENE	*	75	115		Low MS recovery (71%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	TRICHLORO-ETHYLENE (TCE)	*	79	119		Low MS recovery (76%)	None (recovery within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	VINYL CHLORIDE	*	67	133		Low MS recovery (61%)	None (average MS/MSD recovery (71%) within 70-130% data qualification limits)
460-45384-11MS	BF-4005G-002-1-6'_10/03/12MS	MS		5035	8260B		10/04/12 18:35:12	10/09/12 11:09:00	NA	1	XYLENES, TOTAL	*	82	122		Low MS recovery (76%)	None (recovery within 70-130% data qualification limits)
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/ MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	1,2,4-TRIMETHYLBENZENE	*	81	121		Low average MS/MSD recovery (73%)	None (recovery within 70-130% data qualification limits)
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/ MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	1,2-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (68.5%)	J-/UJ to detects/NDs for CC samples digested in the same batch
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/ MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	*	82	122		Low average MS/MSD recovery (77%)	None (recovery within 70-130% data qualification limits)
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/ MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	1,3-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (61%)	J-/UJ to detects/NDs for CC samples digested in the same batch
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/ MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	1,4-DICHLOROBENZENE	*	80	120		Low average MS/MSD recovery (61%)	J-/UJ to detects/NDs for CC samples digested in the same batch
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/ MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	CHLOROBENZENE	*	80	120		Low average MS/MSD recovery (76%)	None (recovery within 70-130% data qualification limits)
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/ MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	ETHYLBENZENE	*	81	121		Low average MS/MSD recovery (76.5%)	None (recovery within 70-130% data qualification limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	*	77	117		High average MS/MSD recovery (121%)	None (recovery within 70-130% data qualification limits)
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	N-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (60.5%)	J-/UJ to detects/NDs for CC samples digested in the same batch
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	N-PROPYLBENZENE	*	81	121		Low average MS/MSD recovery (72%)	None (recovery within 70-130% data qualification limits)
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	SEC-BUTYLBENZENE	*	82	122		Low average MS/MSD recovery (75%)	None (recovery within 70-130% data qualification limits)
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	TETRACHLORO-ETHYLENE(PCE)	*	80	120		Low average MS/MSD recovery (78.5%)	None (recovery within 70-130% data qualification limits)
460-45896-6MS/SD	CC-BL-4G-001_10/12/12 MS/SD	MS/MSD		5035	8260B		10/17/12 09:23:26/ 09:25:44	10/18/12 14:11:00/ 14:36:00	NA	1	XYLENES, TOTAL	*	82	122		Low average MS/MSD recovery (72%)	None (recovery within 70-130% data qualification limits)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	1,1,1-TRICHLOROETHANE	*	78	117		High average MS/MSD recovery (184.5%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	1,1-DICHLOROETHANE	*	76	125		High average MS/MSD recovery (194%)	J+ to detects for CC samples digested in the same batch
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	1,1-DICHLOROETHENE	*	71	126		High average MS/MSD recovery (192%)	J+ to detects for CC samples digested in the same batch
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	1,2,4-TRIMETHYLBENZENE	*	81	121		High average MS/MSD recovery (130%)	None (recovery within 70-130% data qualification limits)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	1,2-DICHLOROBENZENE	*	80	120		High average MS/MSD recovery (129%)	None (recovery within 70-130% data qualification limits)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	1,2-DICHLOROETHANE	*	76	118		High average MS/MSD recovery (172%)	J+ to detects for CC samples digested in the same batch (all ND)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	*	82	122		High average MS/MSD recovery (133.5%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10SD	CC-PSL-3g-002_11/19/12SD	MSD		5035	8260B		11/23/12 15:59:37	11/28/12 16:06:00	NA	1	1,3-DICHLOROBENZENE	*	80	120	30	High MSD recovery (124%)	None (recovery within 70-130% data qualification limits)
460-47389-10SD	CC-PSL-3g-002_11/19/12SD	MSD		5035	8260B		11/23/12 15:59:37	11/28/12 16:06:00	NA	1	1,4-DICHLOROBENZENE	*	80	120	30	High MSD recovery (122%)	None (recovery within 70-130% data qualification limits)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	1,4-DIOXANE (P-DIOXANE)	*	69	131		High average MS/MSD recovery (215.5%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	ACETONE	*	27	164		High average MS/MSD recovery (302%)	J+ to detects for CC samples digested in the same batch
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	BENZENE	*	77	117		High average MS/MSD recovery (167%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	CARBON TETRACHLORIDE	*	79	118		High average MS/MSD recovery (184%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	CHLOROBENZENE	*	80	120		High average MS/MSD recovery (144%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	CHLOROFORM	*	77	120		High average MS/MSD recovery (191%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	CIS-1,2-DICHLORO-ETHYLENE	*	80	120		High average MS/MSD recovery (182.5%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	ETHYLBENZENE	*	81	121		High average MS/MSD recovery (147.5%)	J+ to detects for CC samples digested in the same batch (all ND)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	*	77	117		High average MS/MSD recovery (232%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	METHYLENE CHLORIDE	*	74	137		High average MS/MSD recovery (210.5%)	J+ to detects for CC samples digested in the same batch
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	N-BUTYLBENZENE	*	82	122	30	High MSD recovery (123%)	None (recovery within 70-130% data qualification limits)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	N-PROPYLBENZENE	*	81	121		High average MS/MSD recovery (132%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	SEC-BUTYLBENZENE	*	82	122		High average MS/MSD recovery (137.5%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	T-BUTYLBENZENE	*	82	122		High average MS/MSD recovery (149.5%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	TERT-BUTYL METHYL ETHER	*	78	120		High average MS/MSD recovery (178%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	TETRACHLORO-ETHYLENE(PCE)	*	80	120		High average MS/MSD recovery (151.5%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	TOLUENE	*	75	115		High average MS/MSD recovery (151.5%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	TRANS-1,2-DICHLOROETHENE	*	75	122		High average MS/MSD recovery (172.5%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/16:06:00	NA	1	TRICHLORO-ETHYLENE (TCE)	*	79	119		High average MS/MSD recovery (168.5%)	J+ to detects for CC samples digested in the same batch (all ND)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	VINYL CHLORIDE	*	67	133		High average MS/MSD recovery (163.5%)	J+ to detects for CC samples digested in the same batch (all ND)
460-47389-10MS/SD	CC-PSL-3g-002_11/19/12 MS/SD	MS/MSD		5035	8260B		11/23/12 15:59:37	11/28/12 15:41:00/ 16:06:00	NA	1	XYLENES, TOTAL	*	82	122		High average MS/MSD recovery (141%)	J+ to detects for CC samples digested in the same batch (all ND)
460-45384-21SD	BF-4005C-001-1-6'_10/03/12SD	MSD		3541	8270C		10/05/12 09:19:37	10/13/12 21:20:00	NA	1	BENZO(A)PYRENE	*	36	89	30	High MSD recovery (94%)	None (recovery within 70-130% data qualification limits)
460-45896-8MS/SD	CC-BL-4C-001_10/12/12 MS/SD	MS/MSD		3541	8270C		10/16/12 15:06:56	10/17/12 16:04:00/ 16:25:00	NA	1	PENTACHLORO-PHENOL		19	113		Low average MS/MSD recovery (38%)	J-/UJ to detects/NDs for CC samples digested in the same batch
SURROGATE (SU) RECOVERY																	
460130663/2A	460130663/2A	LCS		3546	8081A		10/05/12 08:12:15	10/06/12 23:14:00	2C	1	DECACHLORO-BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	53	150		High surrogate recovery (157%)	None (no effect on environmental sample results)
460131033/3A	460131033/3A	LCSD		METHOD	8151A		10/08/12 10:17:35	10/09/12 10:38:00	1C	1	2,4-DICHLOROPHENYL-ACETIC ACID	*	54	150		High surrogate recovery (164%)	None (no effect on environmental sample results)
460-45384-21MS	BF-4005C-001-1-6'_10/03/12MS	MS		METHOD	8151A		10/08/12 10:17:35	10/09/12 11:05:00	1C	1	2,4-DICHLOROPHENYL-ACETIC ACID	*	54	150		High surrogate recovery (152%)	None (no effect on environmental sample results)
LABORATORY BLANK CONTAMINATION																	
460130595/1A	460130595/1A	PB		5035	8260B		10/04/12 18:10:34	10/08/12 13:31:00	NA	1	ACETONE	J				Preparation blank contamination (2.89 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples prepared in the same batch
460130595/1A	460130595/1A	PB		5035	8260B		10/04/12 18:10:34	10/08/12 13:31:00	NA	1	METHYLENE CHLORIDE	J				Preparation blank contamination (0.437 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples prepared in the same batch
460131041/5	460131041/5	MB			8260B			10/08/12 10:49:00	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.378 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch
460131153/5	460131153/5	MB			8260B			10/09/12 09:38:00	NA	1	ACETONE	J				Method blank contamination (2.96 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460131153/5	460131153/5	MB			8260B			10/09/12 09:38:00	NA	1	METHYLENE CHLORIDE					Method blank contamination (10.9 ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch
460132438/1A	460132438/1A	PB		5035	8260B		10/17/12 17:28:45	10/18/12 01:17:00	NA	1	ACETONE	J				Preparation blank contamination (2.31 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples prepared in the same batch
460132438/1A	460132438/1A	PB		5035	8260B		10/17/12 17:28:45	10/18/12 01:17:00	NA	1	METHYLENE CHLORIDE	J				Preparation blank contamination (0.453 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples prepared in the same batch
460132463/5	460132463/5	MB			8260B			10/17/12 21:32:00	NA	1	ACETONE	J				Method blank contamination (2.3 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch
460132463/5	460132463/5	MB			8260B			10/17/12 21:32:00	NA	1	METHYLENE CHLORIDE					Method blank contamination (1.13 ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch
460132504/6	460132504/6	MB			8260B			10/18/12 08:21:00	NA	1	ACETONE	J				Method blank contamination (2.27 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch
460132504/6	460132504/6	MB			8260B			10/18/12 08:21:00	NA	1	METHYLENE CHLORIDE					Method blank contamination (5.13 ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch
460132327/1A	460132327/1A	PB		5035	8260B		10/17/12 09:11:52	10/18/12 17:30:00	NA	1	METHYLENE CHLORIDE					Preparation blank contamination (1.6 ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples prepared in the same batch
460132646/5	460132646/5	MB			8260B			10/18/12 20:58:00	NA	1	ACETONE	J				Method blank contamination (1.71 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch
460132646/5	460132646/5	MB			8260B			10/18/12 20:58:00	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.293 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch
460137271/6	460137271/6	MB			8260B			11/28/12 11:52:00	NA	1	ACETONE	J				Method blank contamination (4.77 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460137271/6	460137271/6	MB			8260B			11/28/12 11:52:00	NA	1	METHYLENE CHLORIDE					Method blank contamination (1.51 ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples analyzed in the same batch
TRIP BLANK CONTAMINATION																	
460-45384-22	TRIPBLANK_10/03/12	TB			8260B			10/05/12 16:20:00	NA	1	CHLOROFORM	J				Trip blank contamination (0.17 J ug/l)	U at RL to Js, J+ to detects <2x RL or < 1x blank equivalent concentration for samples shipped in the same container (all ND)
460-45384-22	TRIPBLANK_10/03/12	TB			8260B			10/05/12 16:20:00	NA	1	METHYLENE CHLORIDE					Trip blank contamination (2 ug/l)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples shipped in the same container
460-45896-9	TB-10/12/12_10/12/12	TB			8260B			10/16/12 17:11:00	NA	1	CHLOROFORM	J				Trip blank contamination (0.21 J ug/l)	U at RL to Js, J+ to detects <2x RL or < 1x blank equivalent concentration for samples shipped in the same container (all ND)
460-45896-9	TB-10/12/12_10/12/12	TB			8260B			10/16/12 17:11:00	NA	1	METHYLENE CHLORIDE					Trip blank contamination (1.6 ug/l)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples shipped in the same container
460-47389-12	TB-11/19/12_11/19/12	TB			8260B			11/27/12 23:55:00	NA	1	CHLOROFORM	J				Trip blank contamination (0.26 J ug/l)	U at RL to Js, J+ to detects <2x RL or < 1x blank equivalent concentration for samples shipped in the same container (all ND)
460-47389-12	TB-11/19/12_11/19/12	TB			8260B			11/27/12 23:55:00	NA	1	METHYLENE CHLORIDE					Trip blank contamination (1.9 ug/l)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples shipped in the same container
INITIAL CALIBRATION (ICAL)																	
IC 460-125812/2-7	IC 460-125812/2-7	ICAL			8260B	MS9		08/27/12 20:51:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard	J to detects/R to NDs for samples quantitated with this ICAL

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
IC 460-131361/2-7	IC 460-131361/2-7	ICAL			8260B	MS12		10/10/12 04:19:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard	J to detects/UJ to NDs for samples quantitated with this ICAL (professional judgment - RRF is advisory, clear response observed in standard below the ACL of 0.1 ppm)
IC 460-137240/2-7	IC 460-137240/2-7	ICAL			8260B	MS12		11/28/12 01:25:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for each ICAL standard <0.005 advisory level (at 0.0042-0.0049), visible peak with area of 4374 counts in 50-ppb standard	J to detects/UJ to NDs for samples quantitated with this ICAL (professional judgment - RRF is advisory, clear response observed in standard below the ACL of 0.1 ppm)
CONTINUING CALIBRATION VERIFICATION (CCV)																	
CCVRT 460-130916/2	CCVRT 460-130916/2	CCV			8082			10/06/12 13:43:00	2C	1	PCB-1260 (AROCLOR 1260) - peak 6			15		Calibration drift primary column (%D= -18.8%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV
CCVRT 460-130916/28	CCVRT 460-130916/28	CCV			8082			10/06/13 20:50:00	2C	1	PCB-1260 (AROCLOR 1260) - peak 1			15		Calibration drift primary column (%D= -59.5%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV
CCVRT 460-130916/28	CCVRT 460-130916/28	CCV			8082			10/06/13 20:50:00	2C	1	PCB-1260 (AROCLOR 1260) - peak 6			15		Calibration drift primary column (%D= -16.4%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV
CCVRT 460-130916/28	CCVRT 460-130916/28	CCV			8082			10/06/13 20:50:00	1C	1	PCB-1260 (AROCLOR 1260) - peak 5			15		Calibration drift secondary column (%D= -16.1%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV
CCVRT 460-130916/28	CCVRT 460-130916/28	CCV			8082			10/06/13 20:50:00	1C	1	PCB-1260 (AROCLOR 1260) - peak 7			15		Calibration drift secondary column (%D= -24.5%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV
CCVIS 460-131041/1	CCVIS 460-131041/1	CCV			8260B			10/08/12 07:39:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-131041/1	CCVIS 460-131041/1	CCV			8260B			10/08/12 07:39:00	NA	1	METHYL ETHYL KETONE (2-BUTANONE)			20		Calibration drift (%D= +32.2%)	J+ to detects only since < +40% for samples analyzed this shift (all ND)
CCVIS 460-131153/2	CCVIS 460-131153/2	CCV			8260B			10/09/12 07:34:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-131153/2	CCVIS 460-131153/2	CCV			8260B			10/09/12 07:34:00	NA	1	METHYLENE CHLORIDE			20		Calibration drift (%D= +32.9%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-132463/2	CCVIS 460-132463/2	CCV			8260B			10/17/12 18:15:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-132463/2	CCVIS 460-132463/2	CCV			8260B			10/17/12 18:15:00	NA	1	ACETONE			20		Calibration drift (%D= +31%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-132463/2	CCVIS 460-132463/2	CCV			8260B			10/17/12 18:15:00	NA	1	METHYL ETHYL KETONE (2-BUTANONE)			20		Calibration drift (%D= +28.7%)	J+ to detects only since < +40% for samples analyzed this shift (all ND)
CCVIS 460-132463/2	CCVIS 460-132463/2	CCV			8260B			10/17/12 18:15:00	NA	1	METHYLENE CHLORIDE			20		Calibration drift (%D= +34.9%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-132463/2	CCVIS 460-132463/2	CCV			8260B			10/17/12 18:15:00	NA	1	TERT-BUTYL METHYL ETHER			20		Calibration drift (%D= +21.5%)	J+ to detects only since < +40% for samples analyzed this shift (all ND)
CCVIS 460-132504/2	CCVIS 460-132504/2	CCV			8260B			10/18/12 06:04:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-132504/2	CCVIS 460-132504/2	CCV			8260B			10/18/12 06:04:00	NA	1	METHYLENE CHLORIDE			20		Calibration drift (%D= +21.2%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-132646/2	CCVIS 460-132646/2	CCV			8260B			10/18/12 19:01:00	NA	1	1,4-DIOXANE (P-DIOXANE)					RRF for the CV standard < 0.005 advisory level	J to detects, UJ to NDs for samples analyzed this shift

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-137271/2	CCVIS 460-137271/2	CCV			8260B			11/28/12 08:36:00	NA	1	ACETONE			20		Calibration drift (%D= +33.9%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-137271/2	CCVIS 460-137271/2	CCV			8260B			11/28/12 08:36:00	NA	1	METHYL ETHYL KETONE (2-BUTANONE)			20		Calibration drift (%D= +25.9%)	J+ to detects only since < +40% for samples analyzed this shift (all ND)

CL – Control Limit

DF – Dilution Factor

LCL – Lower Control Limit

UCL – Upper Control Limit

TABLE 4
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase I and Phase II-A Remedial Design/ Remedial Action

QUALIFIED RESULTS FOR FIELD SAMPLES

Lab ID	Field ID_Date	Analyte	Lab Result [1]			DVQ	QC Issue
TCLP METALS							
460-43348-7	ECS-4A-F_08/09/12	1311 Lead	20.5	J	ug/l	J	Result is between MDL and RL
460-43348-8	ECS-5A-F_08/09/12	1311 Lead	23.5	J	ug/l	J	Result is between MDL and RL
460-43348-9	ECS-6A-F_08/09/12	1311 Lead	24.4	J	ug/l	J	Result is between MDL and RL
460-45377-7	ECS-Hill-7-F_10/03/12	1311 Lead	21.7	J	ug/l	J	Result is between MDL and RL
460-48738-1	ECS-1C-F_12/18/12	1311 Lead	68.7		ug/l	J	Poor lab duplicate precision (25 RPD)
460-48738-2	ECS-2C-F_12/19/12	1311 Lead	22.4	J	ug/l	J	Poor lab duplicate precision (25 RPD); Result is between MDL and RL
460-48739-1	ECS-SSA29-F_12/18/12	1311 Lead	25.0	U	ug/l	UJ	Poor lab duplicate precision (25 RPD)
460-48739-2	ECS-SSA29-SS_12/18/12	1311 Lead	61.1		ug/l	J	Poor lab duplicate precision (25 RPD)
460-48739-3	ECS-SSA29-SW_12/18/12	1311 Lead	121		ug/l	J	Poor lab duplicate precision (25 RPD)
460-48739-4	ECS-SSA29-SN_12/18/12	1311 Lead	25.9		ug/l	J	Poor lab duplicate precision (25 RPD)
460-48739-5	ECS-SSA29-SE_12/18/12	1311 Lead	90.0		ug/l	J	Poor lab duplicate precision (25 RPD)
460-48739-6	ECS-SSA29-SE-X_12/18/12	1311 Lead	66.3		ug/l	J	Poor lab duplicate precision (25 RPD)
TOTAL METALS							
460-45384-3	BF-4003C-001-1-7'_10/03/12	Barium	42.2	J	mg/kg	J	Result is between MDL and RL
460-45384-9	BF-4004C-001-1-7'_10/03/12	Barium	33.2	J	mg/kg	J	Result is between MDL and RL
460-45384-14	BF-4000C-001-1-7'_10/03/12	Barium	32.0	J	mg/kg	J	Result is between MDL and RL
460-45384-17	BF-4001C-001-1-7'_10/03/12	Barium	32.2	J	mg/kg	J	Result is between MDL and RL
460-45384-20	BF-4002C-001-1-6'_10/03/12	Barium	38.6	J	mg/kg	J	Result is between MDL and RL
460-45384-21	BF-4005C-001-1-6'_10/03/12	Barium	35.7	J	mg/kg	J	Result is between MDL and RL
460-47389-3	CC-PSL-1c-001_11/19/12	Barium	39.9	J	mg/kg	J	Result is between MDL and RL
460-47389-7	CC-PSL-2c-001_11/19/12	Barium	38.5	J	mg/kg	J	Result is between MDL and RL
460-47389-11	CC-PSL-3c-001_11/19/12	Barium	34.9	J	mg/kg	J	Result is between MDL and RL
460-45895-8	CC-BL-1C-001_10/12/12	Beryllium	0.20	J	mg/kg	J	Result is between MDL and RL
460-45895-9	CC-BL-1C-002_10/12/12	Beryllium	0.29	J	mg/kg	J	Result is between MDL and RL
460-45895-12	CC-BL-2C-001_10/12/12	Beryllium	0.17	J	mg/kg	J	Result is between MDL and RL
460-45896-4	CC-BL-3C-001_10/12/12	Beryllium	0.17	J	mg/kg	J	Result is between MDL and RL
460-45896-5	CC-BL-3C-001X_10/12/12	Beryllium	0.15	J	mg/kg	J	Result is between MDL and RL
460-45896-8	CC-BL-4C-001_10/12/12	Beryllium	0.20	J	mg/kg	J	Result is between MDL and RL
460-47389-3	CC-PSL-1c-001_11/19/12	Beryllium	0.15	J	mg/kg	J	Result is between MDL and RL
460-47389-8	CC-PSL-2c-001x_11/19/12	Beryllium	0.14	J	mg/kg	J	Result is between MDL and RL
460-47389-3	CC-PSL-1c-001_11/19/12	Cadmium	0.40	J	mg/kg	J	Result is between MDL and RL
460-47389-7	CC-PSL-2c-001_11/19/12	Cadmium	0.33	J	mg/kg	J	Result is between MDL and RL
460-47389-8	CC-PSL-2c-001x_11/19/12	Cadmium	0.34	J	mg/kg	J	Result is between MDL and RL
460-47389-11	CC-PSL-3c-001_11/19/12	Cadmium	0.27	J	mg/kg	J	Result is between MDL and RL
460-48739-1	ECS-SSA29-F_12/18/12	Calcium	274	J	mg/kg	J	Result is between MDL and RL
460-48739-1	ECS-SSA29-F_12/18/12	Cobalt	7.5	J	mg/kg	J	Result is between MDL and RL
460-45895-9	CC-BL-1C-002_10/12/12	Copper	5.3	J	mg/kg	J	Result is between MDL and RL

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45895-12	CC-BL-2C-001_10/12/12	Copper	5.0 J mg/kg	J	Result is between MDL and RL
460-45896-5	CC-BL-3C-001X_10/12/12	Copper	4.5 J mg/kg	J	Result is between MDL and RL
460-46911-6	ECS-7+25-F_11/07/12	Lead	11.2 mg/kg	J	Poor field duplicate precision (110 RPD), use higher result from field duplicate
460-46911-7	ECS-7+25-FX_11/07/12	Lead	38.1 mg/kg	J	Poor field duplicate precision (110 RPD), use higher result from field duplicate
460-47389-3	CC-PSL-1c-001_11/19/12	Lead	4.4 mg/kg	J	Poor lab duplicate precision (21 RPD)
460-47389-7	CC-PSL-2c-001_11/19/12	Lead	4.0 mg/kg	J	Poor lab duplicate precision (21 RPD)
460-47389-8	CC-PSL-2c-001x_11/19/12	Lead	4.3 mg/kg	J	Poor lab duplicate precision (21 RPD)
460-47389-11	CC-PSL-3c-001_11/19/12	Lead	3.8 mg/kg	J	Poor lab duplicate precision (21 RPD)
460-45896-4	CC-BL-3C-001_10/12/12	Manganese	372 mg/kg	J	Poor field duplicate precision (51 RPD), use higher result from original sample
460-45896-5	CC-BL-3C-001X_10/12/12	Manganese	221 mg/kg	J	Poor field duplicate precision (51 RPD), use higher result from original sample
460-45896-5	CC-BL-3C-001X_10/12/12	Nickel	7.1 J mg/kg	J	Result is between MDL and RL
460-47389-3	CC-PSL-1c-001_11/19/12	Nickel	8.3 J mg/kg	J	Result is between MDL and RL
460-47389-7	CC-PSL-2c-001_11/19/12	Nickel	6.8 J mg/kg	J	Result is between MDL and RL
460-47389-11	CC-PSL-3c-001_11/19/12	Nickel	6.7 J mg/kg	J	Result is between MDL and RL
460-48739-1	ECS-SSA29-F_12/18/12	Potassium	390 J mg/kg	J	Result is between MDL and RL
460-45895-8	CC-BL-1C-001_10/12/12	Selenium	2.1 U mg/kg	UJ	Poor lab duplicate precision (30 RPD)
460-45895-9	CC-BL-1C-002_10/12/12	Selenium	4.5 mg/kg	J	Poor lab duplicate precision (30 RPD)
460-45895-12	CC-BL-2C-001_10/12/12	Selenium	2.2 U mg/kg	UJ	Poor lab duplicate precision (30 RPD)
460-45896-4	CC-BL-3C-001_10/12/12	Selenium	2.2 mg/kg	J	Poor lab duplicate precision (30 RPD)
460-45896-5	CC-BL-3C-001X_10/12/12	Selenium	2.0 U mg/kg	UJ	Poor lab duplicate precision (30 RPD)
460-45896-8	CC-BL-4C-001_10/12/12	Selenium	2.1 mg/kg	J	Poor lab duplicate precision (30 RPD)
460-48739-1	ECS-SSA29-F_12/18/12	Selenium	1.6 J mg/kg	J	Result is between MDL and RL
460-45384-6	BF-4003C-001X-1-7'_10/03/12	Mercury	0.035 J mg/kg	J	Result is between MDL and RL
460-45384-20	BF-4002C-001-1-6'_10/03/12	Mercury	0.033 J mg/kg	J	Result is between MDL and RL
460-48739-1	ECS-SSA29-F_12/18/12	Mercury	0.030 J mg/kg	J	Result is between MDL and RL
PCB AROCLORS					
460-45384-3	BF-4003C-001-1-7'_10/03/12	PCB-1260 (Aroclor 1260)	76 U ug/kg	UJ	Calibration drift primary column (peak %D= -16.4%, -18.8%, -59.5%); Calibration drift secondary column (peak %D= -16.1%, -24.5%)
460-45384-6	BF-4003C-001X-1-7'_10/03/12	PCB-1260 (Aroclor 1260)	76 U ug/kg	UJ	Calibration drift primary column (peak %D= -16.4%, -18.8%, -59.5%); Calibration drift secondary column (peak %D= -16.1%, -24.5%)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45384-9	BF-4004C-001-1-7'_10/03/12	PCB-1260 (Aroclor 1260)	75 U ug/kg	UJ	Calibration drift primary column (peak %D= -16.4%, -18.8%, -59.5%); Calibration drift secondary column (peak %D= -16.1%, -24.5%)
460-45384-14	BF-4000C-001-1-7'_10/03/12	PCB-1260 (Aroclor 1260)	75 U ug/kg	UJ	Calibration drift primary column (peak %D= -16.4%, -18.8%, -59.5%); Calibration drift secondary column (peak %D= -16.1%, -24.5%)
460-45384-17	BF-4001C-001-1-7'_10/03/12	PCB-1260 (Aroclor 1260)	76 U ug/kg	UJ	Calibration drift primary column (peak %D= -16.4%, -18.8%, -59.5%); Calibration drift secondary column (peak %D= -16.1%, -24.5%)
460-45384-20	BF-4002C-001-1-6'_10/03/12	PCB-1260 (Aroclor 1260)	80 U ug/kg	UJ	Calibration drift primary column (peak %D= -16.4%, -18.8%, -59.5%); Calibration drift secondary column (peak %D= -16.1%, -24.5%)
460-45384-21	BF-4005C-001-1-6'_10/03/12	PCB-1260 (Aroclor 1260)	75 U ug/kg	UJ	Calibration drift primary column (peak %D= -16.4%, -18.8%, -59.5%); Calibration drift secondary column (peak %D= -16.1%, -24.5%)
VOLATILE ORGANIC COMPOUNDS (VOC)					
460-45895-10	CC-BL-2G-001_10/12/12	1,2-Dichlorobenzene	0.92 U ug/kg	UJ	Low average MS/MSD recovery (68.5%)
460-45895-11	CC-BL-2G-002_10/12/12	1,2-Dichlorobenzene	0.96 U ug/kg	UJ	Low average MS/MSD recovery (68.5%)
460-45896-1	CC-BL-3G-001_10/12/12	1,2-Dichlorobenzene	0.95 U ug/kg	UJ	Low average MS/MSD recovery (68.5%)
460-45896-2	CC-BL-3G-001X_10/12/12	1,2-Dichlorobenzene	0.93 U ug/kg	UJ	Low average MS/MSD recovery (68.5%)
460-45896-3	CC-BL-3G-002_10/12/12	1,2-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (68.5%)
460-45896-7	CC-BL-4G-002_10/12/12	1,2-Dichlorobenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (68.5%)
460-45895-1	CC-BL-1G-001_10/12/12	1,2-Dichloroethane	0.45 J ug/kg	J	Result is between MDL and RL
460-45895-2	CC-BL-1G-002_10/12/12	1,2-Dichloroethane	0.35 J ug/kg	J	Result is between MDL and RL
460-45895-4	CC-BL-1G-004_10/12/12	1,2-Dichloroethane	0.34 J ug/kg	J	Result is between MDL and RL
460-45895-5	CC-BL-1G-005_10/12/12	1,2-Dichloroethane	0.46 J ug/kg	J	Result is between MDL and RL
460-45895-6	CC-BL-1G-006_10/12/12	1,2-Dichloroethane	0.17 J ug/kg	J	Result is between MDL and RL
460-45895-10	CC-BL-2G-001_10/12/12	1,2-Dichloroethane	0.34 J ug/kg	J	Result is between MDL and RL
460-45895-11	CC-BL-2G-002_10/12/12	1,2-Dichloroethane	0.31 J ug/kg	J	Result is between MDL and RL
460-45895-10	CC-BL-2G-001_10/12/12	1,3-Dichlorobenzene	0.92 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45895-11	CC-BL-2G-002_10/12/12	1,3-Dichlorobenzene	0.96 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45896-1	CC-BL-3G-001_10/12/12	1,3-Dichlorobenzene	0.95 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45896-2	CC-BL-3G-001X_10/12/12	1,3-Dichlorobenzene	0.93 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45896-3	CC-BL-3G-002_10/12/12	1,3-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (61%)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45896-7	CC-BL-4G-002_10/12/12	1,3-Dichlorobenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45895-10	CC-BL-2G-001_10/12/12	1,4-Dichlorobenzene	0.92 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45895-11	CC-BL-2G-002_10/12/12	1,4-Dichlorobenzene	0.96 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45896-1	CC-BL-3G-001_10/12/12	1,4-Dichlorobenzene	0.95 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45896-2	CC-BL-3G-001X_10/12/12	1,4-Dichlorobenzene	0.93 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45896-3	CC-BL-3G-002_10/12/12	1,4-Dichlorobenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45896-7	CC-BL-4G-002_10/12/12	1,4-Dichlorobenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (61%)
460-45384-1	BF-4003G-001-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	56 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-2	BF-4003G-002-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	51 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-4	BF-4003G-001X-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	55 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-5	BF-4003G-002X-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	52 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-7	BF-4004G-001-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	47 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-8	BF-4004G-002-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	53 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45384-10	BF-4005G-001-1-6'_10/03/12	1,4-Dioxane (p-Dioxane)	50 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-11	BF-4005G-002-1-6'_10/03/12	1,4-Dioxane (p-Dioxane)	55 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-12	BF-4000G-001-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	49 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-13	BF-4000G-002-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	54 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-15	BF-4001G-001-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	55 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-16	BF-4001G-002-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	52 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-18	BF-4002G-001-1-6'_10/03/12	1,4-Dioxane (p-Dioxane)	51 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-19	BF-4002G-002-1-6'_10/03/12	1,4-Dioxane (p-Dioxane)	57 U ug/kg	R	RRF for each ICAL standard <0.005 advisory level (at 0.0029-0.0043), peak not visible on hardcopy chromatogram and area below 5000 counts for 100-ppb standard; RRF for the CV standard < 0.005 advisory level

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45895-1	CC-BL-1G-001_10/12/12	1,4-Dioxane (p-Dioxane)	52 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45895-2	CC-BL-1G-002_10/12/12	1,4-Dioxane (p-Dioxane)	45 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45895-3	CC-BL-1G-003_10/12/12	1,4-Dioxane (p-Dioxane)	44 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45895-4	CC-BL-1G-004_10/12/12	1,4-Dioxane (p-Dioxane)	47 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45895-5	CC-BL-1G-005_10/12/12	1,4-Dioxane (p-Dioxane)	49 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45895-6	CC-BL-1G-006_10/12/12	1,4-Dioxane (p-Dioxane)	46 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45895-7	CC-BL-1G-007_10/12/12	1,4-Dioxane (p-Dioxane)	61 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45895-10	CC-BL-2G-001_10/12/12	1,4-Dioxane (p-Dioxane)	46 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45895-11	CC-BL-2G-002_10/12/12	1,4-Dioxane (p-Dioxane)	48 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45896-1	CC-BL-3G-001_10/12/12	1,4-Dioxane (p-Dioxane)	47 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45896-2	CC-BL-3G-001X_10/12/12	1,4-Dioxane (p-Dioxane)	46 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45896-3	CC-BL-3G-002_10/12/12	1,4-Dioxane (p-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45896-6	CC-BL-4G-001_10/12/12	1,4-Dioxane (p-Dioxane)	57 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45896-7	CC-BL-4G-002_10/12/12	1,4-Dioxane (p-Dioxane)	58 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0034-0.0047), visible peak with area of 2725 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-47389-1	CC-PSL-1g-001_11/19/12	1,4-Dioxane (p-Dioxane)	49 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0042-0.0049), visible peak with area of 4374 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-47389-2	CC-PSL-1g-002_11/19/12	1,4-Dioxane (p-Dioxane)	45 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0042-0.0049), visible peak with area of 4374 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-47389-4	CC-PSL-2g-001_11/19/12	1,4-Dioxane (p-Dioxane)	46 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0042-0.0049), visible peak with area of 4374 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-47389-5	CC-PSL-2g-001x_11/19/12	1,4-Dioxane (p-Dioxane)	48 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0042-0.0049), visible peak with area of 4374 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-47389-6	CC-PSL-2g-002_11/19/12	1,4-Dioxane (p-Dioxane)	47 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0042-0.0049), visible peak with area of 4374 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-47389-9	CC-PSL-3g-001_11/19/12	1,4-Dioxane (p-Dioxane)	52 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0042-0.0049), visible peak with area of 4374 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-47389-10	CC-PSL-3g-002_11/19/12	1,4-Dioxane (p-Dioxane)	47 U ug/kg	UJ	RRF for each ICAL standard <0.005 advisory level (at 0.0042-0.0049), visible peak with area of 4374 counts in 50-ppb standard; RRF for the CV standard < 0.005 advisory level
460-45384-5	BF-4003G-002X-1-7'_10/03/12	Acetone	10 JB ug/kg	U	Preparation blank contamination (2.89 J ug/kg)
460-45384-7	BF-4004G-001-1-7'_10/03/12	Acetone	9.4 JB ug/kg	U	Preparation blank contamination (2.89 J ug/kg)
460-45384-8	BF-4004G-002-1-7'_10/03/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.89 J ug/kg)
460-45384-11	BF-4005G-002-1-6'_10/03/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.89 J ug/kg); Method blank contamination (2.96 J ug/kg)
460-45384-13	BF-4000G-002-1-7'_10/03/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.89 J ug/kg)
460-45384-15	BF-4001G-001-1-7'_10/03/12	Acetone	11 JB ug/kg	U	Preparation blank contamination (2.89 J ug/kg)
460-45384-16	BF-4001G-002-1-7'_10/03/12	Acetone	27 B ug/kg	J+	Preparation blank contamination (2.89 J ug/kg)
460-45895-1	CC-BL-1G-001_10/12/12	Acetone	28 B ug/kg	J+	Preparation blank contamination (2.31 J ug/kg); Method blank contamination (2.3 J ug/kg); Calibration drift (%D= +31%)
460-45895-2	CC-BL-1G-002_10/12/12	Acetone	9.0 B ug/kg	J+	Preparation blank contamination (2.31 J ug/kg); Method blank contamination (2.3 J ug/kg); Calibration drift (%D= +31%)
460-45895-3	CC-BL-1G-003_10/12/12	Acetone	8.9 JB ug/kg	U	Preparation blank contamination (2.31 J ug/kg); Method blank contamination (2.3 J ug/kg); Calibration drift (%D= +31%)
460-45895-4	CC-BL-1G-004_10/12/12	Acetone	11 B ug/kg	J+	Preparation blank contamination (2.31 J ug/kg); Method blank contamination (2.3 J ug/kg); Calibration drift (%D= +31%)
460-45895-5	CC-BL-1G-005_10/12/12	Acetone	12 B ug/kg	J+	Preparation blank contamination (2.31 J ug/kg); Method blank contamination (2.3 J ug/kg); Calibration drift (%D= +31%)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45895-6	CC-BL-1G-006_10/12/12	Acetone	9.2 JB ug/kg	U	Preparation blank contamination (2.31 J ug/kg); Method blank contamination (2.3 J ug/kg); Calibration drift (%D= +31%)
460-45895-7	CC-BL-1G-007_10/12/12	Acetone	12 JB ug/kg	U	Preparation blank contamination (2.31 J ug/kg); Method blank contamination (2.3 J ug/kg); Calibration drift (%D= +31%)
460-45895-10	CC-BL-2G-001_10/12/12	Acetone	10 B ug/kg	J+	Preparation blank contamination (2.31 J ug/kg); Method blank contamination (2.27 J ug/kg)
460-45895-11	CC-BL-2G-002_10/12/12	Acetone	9.6 JB ug/kg	U	Preparation blank contamination (2.31 J ug/kg); Method blank contamination (2.27 J ug/kg)
460-45896-1	CC-BL-3G-001_10/12/12	Acetone	9.5 JB ug/kg	U	Method blank contamination (2.27 J ug/kg)
460-45896-2	CC-BL-3G-001X_10/12/12	Acetone	9.3 JB ug/kg	U	Method blank contamination (2.27 J ug/kg)
460-45896-3	CC-BL-3G-002_10/12/12	Acetone	11 JB ug/kg	U	Method blank contamination (2.27 J ug/kg)
460-45896-6	CC-BL-4G-001_10/12/12	Acetone	11 JB ug/kg	U	Method blank contamination (1.71 J ug/kg)
460-45896-7	CC-BL-4G-002_10/12/12	Acetone	12 JB ug/kg	U	Method blank contamination (2.27 J ug/kg)
460-47389-1	CC-PSL-1g-001_11/19/12	Acetone	9.7 JB ug/kg	U	Method blank contamination (4.77 J ug/kg); Calibration drift (%D= +33.9%); High average MS/MSD recovery (302%)
460-47389-2	CC-PSL-1g-002_11/19/12	Acetone	9.1 JB ug/kg	U	Method blank contamination (4.77 J ug/kg); Calibration drift (%D= +33.9%); High average MS/MSD recovery (302%)
460-47389-4	CC-PSL-2g-001_11/19/12	Acetone	9.2 JB ug/kg	U	Method blank contamination (4.77 J ug/kg); Calibration drift (%D= +33.9%); High average MS/MSD recovery (302%)
460-47389-5	CC-PSL-2g-001x_11/19/12	Acetone	9.5 JB ug/kg	U	Method blank contamination (4.77 J ug/kg); Calibration drift (%D= +33.9%); High average MS/MSD recovery (302%)
460-47389-6	CC-PSL-2g-002_11/19/12	Acetone	9.4 JB ug/kg	U	Method blank contamination (4.77 J ug/kg); Calibration drift (%D= +33.9%); High average MS/MSD recovery (302%)
460-47389-9	CC-PSL-3g-001_11/19/12	Acetone	10 JB ug/kg	U	Method blank contamination (4.77 J ug/kg); Calibration drift (%D= +33.9%); High average MS/MSD recovery (302%)
460-47389-10	CC-PSL-3g-002_11/19/12	Acetone	9.3 JB ug/kg	U	Method blank contamination (4.77 J ug/kg); Calibration drift (%D= +33.9%); High average MS/MSD recovery (302%)
460-45384-1	BF-4003G-001-1-7'_10/03/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45384-2	BF-4003G-002-1-7'_10/03/12	Methylene Chloride	1.0 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-4	BF-4003G-001X-1-7'_10/03/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-5	BF-4003G-002X-1-7'_10/03/12	Methylene Chloride	1.0 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-7	BF-4004G-001-1-7'_10/03/12	Methylene Chloride	1.9 B ug/kg	J+	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-8	BF-4004G-002-1-7'_10/03/12	Methylene Chloride	2.7 B ug/kg	J+	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-10	BF-4005G-001-1-6'_10/03/12	Methylene Chloride	0.99 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-11	BF-4005G-002-1-6'_10/03/12	Methylene Chloride	1.1 B ug/kg	J+	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (10.9 ug/kg); Trip blank contamination (2 ug/l); Calibration drift (%D= +32.9%)
460-45384-12	BF-4000G-001-1-7'_10/03/12	Methylene Chloride	0.98 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-13	BF-4000G-002-1-7'_10/03/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-15	BF-4001G-001-1-7'_10/03/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-16	BF-4001G-002-1-7'_10/03/12	Methylene Chloride	1.0 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-18	BF-4002G-001-1-6'_10/03/12	Methylene Chloride	1.0 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45384-19	BF-4002G-002-1-6'_10/03/12	Methylene Chloride	1.1 JB ug/kg	U	Preparation blank contamination (0.437 J ug/kg); Method blank contamination (0.378 J ug/kg); Trip blank contamination (2 ug/l)
460-45895-1	CC-BL-1G-001_10/12/12	Methylene Chloride	24 B ug/kg	J+	Calibration drift (%D= +34.9%)
460-45895-2	CC-BL-1G-002_10/12/12	Methylene Chloride	16 B ug/kg	J+	Calibration drift (%D= +34.9%)
460-45895-3	CC-BL-1G-003_10/12/12	Methylene Chloride	12 B ug/kg	J+	Calibration drift (%D= +34.9%)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45895-4	CC-BL-1G-004_10/12/12	Methylene Chloride	26 B ug/kg	J+	Calibration drift (%D= +34.9%)
460-45895-5	CC-BL-1G-005_10/12/12	Methylene Chloride	17 B ug/kg	J+	Calibration drift (%D= +34.9%)
460-45895-6	CC-BL-1G-006_10/12/12	Methylene Chloride	15 B ug/kg	J+	Calibration drift (%D= +34.9%)
460-45895-7	CC-BL-1G-007_10/12/12	Methylene Chloride	1.9 B ug/kg	J+	Preparation blank contamination (0.453 J ug/kg); Method blank contamination (1.13 ug/kg); Trip blank contamination (1.6 ug/l); Calibration drift (%D= +34.9%)
460-45895-10	CC-BL-2G-001_10/12/12	Methylene Chloride	16 B ug/kg	J+	Calibration drift (%D= +21.2%)
460-45895-11	CC-BL-2G-002_10/12/12	Methylene Chloride	18 B ug/kg	J+	Calibration drift (%D= +21.2%)
460-45896-1	CC-BL-3G-001_10/12/12	Methylene Chloride	14 B ug/kg	J+	Calibration drift (%D= +21.2%)
460-45896-2	CC-BL-3G-001X_10/12/12	Methylene Chloride	13 B ug/kg	J+	Calibration drift (%D= +21.2%)
460-45896-3	CC-BL-3G-002_10/12/12	Methylene Chloride	7.6 B ug/kg	J+	Method blank contamination (5.13 ug/kg); Calibration drift (%D= +21.2%)
460-45896-6	CC-BL-4G-001_10/12/12	Methylene Chloride	1.8 B ug/kg	J+	Preparation blank contamination (1.6 ug/kg); Method blank contamination (0.293 J ug/kg); Trip blank contamination (1.6 ug/l)
460-45896-7	CC-BL-4G-002_10/12/12	Methylene Chloride	1.9 B ug/kg	J+	Preparation blank contamination (1.6 ug/kg); Method blank contamination (5.13 ug/kg); Trip blank contamination (1.6 ug/l); Calibration drift (%D= +21.2%)
460-47389-1	CC-PSL-1g-001_11/19/12	Methylene Chloride	0.97 JB ug/kg	U	Method blank contamination (1.51 ug/kg); Trip blank contamination (1.9 ug/l); High average MS/MSD recovery (210.5%)
460-47389-2	CC-PSL-1g-002_11/19/12	Methylene Chloride	2.1 B ug/kg	J+	Method blank contamination (1.51 ug/kg); Trip blank contamination (1.9 ug/l); High average MS/MSD recovery (210.5%)
460-47389-4	CC-PSL-2g-001_11/19/12	Methylene Chloride	4.1 B ug/kg	J+	High average MS/MSD recovery (210.5%)
460-47389-5	CC-PSL-2g-001x_11/19/12	Methylene Chloride	4.7 B ug/kg	J+	High average MS/MSD recovery (210.5%)
460-47389-6	CC-PSL-2g-002_11/19/12	Methylene Chloride	4.4 B ug/kg	J+	High average MS/MSD recovery (210.5%)
460-47389-9	CC-PSL-3g-001_11/19/12	Methylene Chloride	1.0 JB ug/kg	U	Method blank contamination (1.51 ug/kg); Trip blank contamination (1.9 ug/l); High average MS/MSD recovery (210.5%)
460-47389-10	CC-PSL-3g-002_11/19/12	Methylene Chloride	5.9 B ug/kg	J+	High average MS/MSD recovery (210.5%)
460-45384-1	BF-4003G-001-1-7'_10/03/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-2	BF-4003G-002-1-7'_10/03/12	n-Butylbenzene	1.0 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-4	BF-4003G-001X-1-7'_10/03/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-5	BF-4003G-002X-1-7'_10/03/12	n-Butylbenzene	1.0 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-7	BF-4004G-001-1-7'_10/03/12	n-Butylbenzene	0.94 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45384-8	BF-4004G-002-1-7'_10/03/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-10	BF-4005G-001-1-6'_10/03/12	n-Butylbenzene	0.99 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-12	BF-4000G-001-1-7'_10/03/12	n-Butylbenzene	0.98 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-13	BF-4000G-002-1-7'_10/03/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-15	BF-4001G-001-1-7'_10/03/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-16	BF-4001G-002-1-7'_10/03/12	n-Butylbenzene	1.0 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-18	BF-4002G-001-1-6'_10/03/12	n-Butylbenzene	1.0 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45384-19	BF-4002G-002-1-6'_10/03/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-45895-10	CC-BL-2G-001_10/12/12	n-Butylbenzene	0.92 U ug/kg	UJ	Low average MS/MSD recovery (60.5%)
460-45895-11	CC-BL-2G-002_10/12/12	n-Butylbenzene	0.96 U ug/kg	UJ	Low average MS/MSD recovery (60.5%)
460-45896-1	CC-BL-3G-001_10/12/12	n-Butylbenzene	0.95 U ug/kg	UJ	Low average MS/MSD recovery (60.5%)
460-45896-2	CC-BL-3G-001X_10/12/12	n-Butylbenzene	0.93 U ug/kg	UJ	Low average MS/MSD recovery (60.5%)
460-45896-3	CC-BL-3G-002_10/12/12	n-Butylbenzene	1.1 U ug/kg	UJ	Low average MS/MSD recovery (60.5%)
460-45896-7	CC-BL-4G-002_10/12/12	n-Butylbenzene	1.2 U ug/kg	UJ	Low average MS/MSD recovery (60.5%)
460-45895-1	CC-BL-1G-001_10/12/12	Toluene	0.32 J ug/kg	J	Result is between MDL and RL
460-45895-2	CC-BL-1G-002_10/12/12	Toluene	0.21 J ug/kg	J	Result is between MDL and RL
460-45895-4	CC-BL-1G-004_10/12/12	Toluene	0.22 J ug/kg	J	Result is between MDL and RL
460-45895-5	CC-BL-1G-005_10/12/12	Toluene	0.30 J ug/kg	J	Result is between MDL and RL
460-45895-10	CC-BL-2G-001_10/12/12	Toluene	0.26 J ug/kg	J	Result is between MDL and RL
460-45895-11	CC-BL-2G-002_10/12/12	Toluene	0.20 J ug/kg	J	Result is between MDL and RL
460-45384-1	BF-4003G-001-1-7'_10/03/12	Vinyl Chloride	1.1 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-2	BF-4003G-002-1-7'_10/03/12	Vinyl Chloride	1.0 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-4	BF-4003G-001X-1-7'_10/03/12	Vinyl Chloride	1.1 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-5	BF-4003G-002X-1-7'_10/03/12	Vinyl Chloride	1.0 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-7	BF-4004G-001-1-7'_10/03/12	Vinyl Chloride	0.94 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-8	BF-4004G-002-1-7'_10/03/12	Vinyl Chloride	1.1 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-10	BF-4005G-001-1-6'_10/03/12	Vinyl Chloride	0.99 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-12	BF-4000G-001-1-7'_10/03/12	Vinyl Chloride	0.98 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-13	BF-4000G-002-1-7'_10/03/12	Vinyl Chloride	1.1 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-15	BF-4001G-001-1-7'_10/03/12	Vinyl Chloride	1.1 U ug/kg	UJ	Low average MS/MSD recovery (58%)

Lab ID	Field ID_Date	Analyte	Lab Result [1]	DVQ	QC Issue
460-45384-16	BF-4001G-002-1-7'_10/03/12	Vinyl Chloride	1.0 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-18	BF-4002G-001-1-6'_10/03/12	Vinyl Chloride	1.0 U ug/kg	UJ	Low average MS/MSD recovery (58%)
460-45384-19	BF-4002G-002-1-6'_10/03/12	Vinyl Chloride	1.1 U ug/kg	UJ	Low average MS/MSD recovery (58%)
SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)					
460-45896-4	CC-BL-3C-001_10/12/12	Acenaphthene	57 J ug/kg	J	Result is between MDL and RL
460-45896-4	CC-BL-3C-001_10/12/12	Naphthalene	1000 ug/kg	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from original sample
460-45896-5	CC-BL-3C-001X_10/12/12	Naphthalene	110 J ug/kg	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from original sample; Result is between MDL and RL
460-45895-8	CC-BL-1C-001_10/12/12	Pentachlorophenol	1000 U ug/kg	UJ	Low average MS/MSD recovery (38%)
460-45896-8	CC-BL-4C-001_10/12/12	Pentachlorophenol	1000 U ug/kg	UJ	Low average MS/MSD recovery (38%)
460-45895-8	CC-BL-1C-001_10/12/12	Pyrene	340 U ug/kg	UJ	Low laboratory control spike recovery (49%)
460-45896-8	CC-BL-4C-001_10/12/12	Pyrene	340 U ug/kg	UJ	Low laboratory control spike recovery (49%)
CYANIDE					
460-45384-3	BF-4003C-001-1-7'_10/03/12	Cyanide	0.075 J mg/kg	J	Result is between MDL and RL
460-45384-6	BF-4003C-001X-1-7'_10/03/12	Cyanide	0.070 J mg/kg	J	Result is between MDL and RL
460-45384-9	BF-4004C-001-1-7'_10/03/12	Cyanide	0.067 J mg/kg	J	Result is between MDL and RL
460-45384-14	BF-4000C-001-1-7'_10/03/12	Cyanide	0.062 J mg/kg	J	Result is between MDL and RL
460-45384-17	BF-4001C-001-1-7'_10/03/12	Cyanide	0.064 J mg/kg	J	Result is between MDL and RL
460-45384-21	BF-4005C-001-1-6'_10/03/12	Cyanide	0.087 J mg/kg	J	Result is between MDL and RL
460-45895-8	CC-BL-1C-001_10/12/12	Cyanide	0.068 J mg/kg	J	Result is between MDL and RL
460-45895-9	CC-BL-1C-002_10/12/12	Cyanide	0.20 J mg/kg	J	Result is between MDL and RL
460-45896-4	CC-BL-3C-001_10/12/12	Cyanide	0.15 J mg/kg	J	Result is between MDL and RL
460-45896-5	CC-BL-3C-001X_10/12/12	Cyanide	0.29 J mg/kg	J	Result is between MDL and RL
460-45896-8	CC-BL-4C-001_10/12/12	Cyanide	0.083 J mg/kg	J	Result is between MDL and RL

1) Results in red have been elevated to the reporting limit per the NFG. The laboratory reported a detect between the MDL and RL for this analyte, but the result has been qualified (U flag) and raised to the reporting limit due to laboratory or field contamination.

TABLE 5
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase I and II-A Remedial Design/ Remedial Action

FIELD DUPLICATE RESULTS

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-45377-8	460-45377-9	ECS-Hill-8-F_10/03/12	1311 Lead	564		ug/l	572		ug/l	NA	NA	1.4	y
460-45377-8	460-45377-9	ECS-Hill-8-F_10/03/12	Arsenic	9.7		mg/kg	8.4		mg/kg	NA	NA	14	y
460-45377-8	460-45377-9	ECS-Hill-8-F_10/03/12	Lead	238		mg/kg	208		mg/kg	NA	NA	13	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	1,1,1-Trichloroethane	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	1,1-Dichloroethane	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	1,1-Dichloroethene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	1,2,4-Trimethylbenzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	1,2-Dichlorobenzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	1,2-Dichloroethane	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	1,3,5-Trimethylbenzene (Mesitylene)	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	1,3-Dichlorobenzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	1,4-Dichlorobenzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	56	U	ug/kg	55	U	ug/kg	1	112	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Acetone	11	U	ug/kg	11	U	ug/kg	0	22	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Benzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Carbon Tetrachloride	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Chlorobenzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Chloroform	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	cis-1,2-Dichloroethylene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Ethylbenzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Methyl Ethyl Ketone (2-Butanone)	11	U	ug/kg	11	U	ug/kg	0	22	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Methylene Chloride	0.38	JB	ug/kg	0.44	JB	ug/kg	0.06	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	n-Butylbenzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	n-Propylbenzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	sec-Butylbenzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	t-Butylbenzene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	tert-Butyl Methyl Ether	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Tetrachloroethylene(PCE)	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Toluene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	trans-1,2-Dichloroethene	1.1	U	ug/kg	1.1	U	ug/kg	0	2.2	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Trichloroethylene (TCE)	1.1 U ug/kg	1.1 U ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Vinyl Chloride	1.1 U ug/kg	1.1 U ug/kg	0	2.2	NA	y
460-45384-1	460-45384-4	BF-4003G-001-1-7'_10/03/12	Xylenes, Total	3.4 U ug/kg	3.3 U ug/kg	0.1	6.8	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	1,1,1-Trichloroethane	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	1,1-Dichloroethane	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	1,1-Dichloroethene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	1,2,4-Trimethylbenzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	1,2-Dichlorobenzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	1,2-Dichloroethane	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	1,3,5-Trimethylbenzene (Mesitylene)	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	1,3-Dichlorobenzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	1,4-Dichlorobenzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	1,4-Dioxane (p-Dioxane)	51 U ug/kg	52 U ug/kg	1	104	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Acetone	10 U ug/kg	2.3 JB ug/kg	7.7	20	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Benzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Carbon Tetrachloride	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Chlorobenzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Chloroform	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	cis-1,2-Dichloroethylene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Ethylbenzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Methyl Ethyl Ketone (2-Butanone)	10 U ug/kg	10 U ug/kg	0	20	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Methylene Chloride	0.4 JB ug/kg	0.31 JB ug/kg	0.09	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	n-Butylbenzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	n-Propylbenzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	sec-Butylbenzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	t-Butylbenzene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	tert-Butyl Methyl Ether	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Tetrachloroethylene(PCE)	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Toluene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	trans-1,2-Dichloroethene	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Trichloroethylene (TCE)	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Vinyl Chloride	1 U ug/kg	1 U ug/kg	0	2	NA	y
460-45384-2	460-45384-5	BF-4003G-002-1-7'_10/03/12	Xylenes, Total	3.1 U ug/kg	3.1 U ug/kg	0	6.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Arsenic	8.6 mg/kg	9.7 mg/kg	NA	NA	12	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Barium	42.2 J mg/kg	45.2 mg/kg	3	87.8	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Beryllium	0.69 mg/kg	0.71 mg/kg	0.02	0.88	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Cadmium	1.1 U mg/kg	1.1 U mg/kg	0	2.2	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Chromium, Total	21.3		mg/kg	21.4		mg/kg	NA	NA	0.5	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Copper	26.4		mg/kg	31.8		mg/kg	5.4	11	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Lead	20		mg/kg	21.1		mg/kg	NA	NA	5.4	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Manganese	540		mg/kg	639		mg/kg	NA	NA	17	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Nickel	31.4		mg/kg	29.9		mg/kg	1.5	17.6	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Selenium	2.2	U	mg/kg	2.2	U	mg/kg	0	4.4	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Silver	2.2	U	mg/kg	2.2	U	mg/kg	0	4.4	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Zinc	74.6		mg/kg	79.6		mg/kg	NA	NA	6.5	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Chromium III	21.3		mg/kg	21.4		mg/kg	NA	NA	0.5	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Chromium, Hexavalent	2.2	U	mg/kg	2.2	U	mg/kg	0	4.4	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Mercury	0.037		mg/kg	0.035	J	mg/kg	0.002	0.072	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Aldrin	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	alpha BHC (alpha Hexachlorocyclohexane)	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	alpha Endosulfan	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	beta BHC (beta Hexachlorocyclohexane)	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	beta Endosulfan	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Chlordane	76	U	ug/kg	75	U	ug/kg	1	152	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	delta BHC (delta Hexachlorocyclohexane)	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Dieldrin	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Endosulfan Sulfate	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Endrin	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Endrin Aldehyde	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Endrin Ketone	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	gamma BHC (Lindane)	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Heptachlor	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Heptachlor Epoxide	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Methoxychlor	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	p,p'-DDD	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	p,p'-DDE	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	p,p'-DDT	7.6	U	ug/kg	7.5	U	ug/kg	0.1	15.2	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Toxaphene	76	U	ug/kg	75	U	ug/kg	1	152	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	PCB-1016 (Aroclor 1016)	76	U	ug/kg	76	U	ug/kg	0	152	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	PCB-1221 (Aroclor 1221)	76	U	ug/kg	76	U	ug/kg	0	152	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	PCB-1232 (Aroclor 1232)	76	U	ug/kg	76	U	ug/kg	0	152	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	PCB-1242 (Aroclor 1242)	76	U	ug/kg	76	U	ug/kg	0	152	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	PCB-1248 (Aroclor 1248)	76 U ug/kg	76 U ug/kg	0	152	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	PCB-1254 (Aroclor 1254)	76 U ug/kg	76 U ug/kg	0	152	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	PCB-1260 (Aroclor 1260)	76 U ug/kg	76 U ug/kg	0	152	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Silvex (2,4,5-TP)	19 U ug/kg	19 U ug/kg	0	38	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	2-Methylphenol (o-Cresol)	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Acenaphthene	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Acenaphthylene	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Anthracene	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Benzo(a)Anthracene	37 U ug/kg	37 U ug/kg	0	74	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Benzo(a)Pyrene	37 U ug/kg	37 U ug/kg	0	74	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Benzo(b)Fluoranthene	37 U ug/kg	37 U ug/kg	0	74	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Benzo(g,h,i)Perylene	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Benzo(k)Fluoranthene	37 U ug/kg	37 U ug/kg	0	74	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Chrysene	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Cresols, m & p	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Dibenz(a,h)Anthracene	37 U ug/kg	37 U ug/kg	0	74	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Dibenzofuran	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Fluoranthene	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Fluorene	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Hexachlorobenzene	37 U ug/kg	37 U ug/kg	0	74	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Indeno(1,2,3-C,D)Pyrene	37 U ug/kg	37 U ug/kg	0	74	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Naphthalene	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Pentachlorophenol	1100 U ug/kg	1100 U ug/kg	0	2200	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Phenanthrene	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Phenol	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Pyrene	370 U ug/kg	370 U ug/kg	0	740	NA	y
460-45384-3	460-45384-6	BF-4003C-001-1-7'_10/03/12	Cyanide	0.075 J mg/kg	0.07 J mg/kg	0.005	1.14	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	1,1,1-Trichloroethane	0.95 U ug/kg	0.93 U ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	1,1-Dichloroethane	0.95 U ug/kg	0.93 U ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	1,1-Dichloroethene	0.95 U ug/kg	0.93 U ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	1,2,4-Trimethylbenzene	0.95 U ug/kg	0.93 U ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	1,2-Dichlorobenzene	0.95 U ug/kg	0.93 U ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	1,2-Dichloroethane	0.95 U ug/kg	0.93 U ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	1,3,5-Trimethylbenzene (Mesitylene)	0.95 U ug/kg	0.93 U ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	1,3-Dichlorobenzene	0.95 U ug/kg	0.93 U ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	1,4-Dichlorobenzene	0.95 U ug/kg	0.93 U ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	1,4-Dioxane (p-Dioxane)	47 U ug/kg	46 U ug/kg	1	94	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Acetone	4.2	JB	ug/kg	4.3	JB	ug/kg	0.1	19	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Benzene	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Carbon Tetrachloride	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Chlorobenzene	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Chloroform	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	cis-1,2-Dichloroethylene	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Ethylbenzene	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Methyl Ethyl Ketone (2-Butanone)	9.5	U	ug/kg	9.3	U	ug/kg	0.2	19	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Methylene Chloride	14	B	ug/kg	13	B	ug/kg	NA	NA	7.4	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	n-Butylbenzene	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	n-Propylbenzene	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	sec-Butylbenzene	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	t-Butylbenzene	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	tert-Butyl Methyl Ether	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Tetrachloroethylene(PCE)	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Toluene	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	trans-1,2-Dichloroethene	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Trichloroethylene (TCE)	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Vinyl Chloride	0.95	U	ug/kg	0.93	U	ug/kg	0.02	1.9	NA	y
460-45896-1	460-45896-2	CC-BL-3G-001_10/12/12	Xylenes, Total	2.8	U	ug/kg	2.8	U	ug/kg	0	5.6	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Arsenic	3.7		mg/kg	2.2		mg/kg	1.5	2	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Barium	69		mg/kg	52.9		mg/kg	16.1	83.2	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Beryllium	0.17	J	mg/kg	0.15	J	mg/kg	0.02	0.84	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Cadmium	1	U	mg/kg	1	U	mg/kg	0	2	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Chromium, Total	6.3		mg/kg	5		mg/kg	1.3	4.2	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Copper	6.8		mg/kg	4.5	J	mg/kg	2.3	10.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Lead	5.2		mg/kg	3.9		mg/kg	1.3	2	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Manganese	372		mg/kg	221		mg/kg	NA	NA	51	NO
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Nickel	10.6		mg/kg	7.1	J	mg/kg	3.5	16.6	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Selenium	2.2		mg/kg	2	U	mg/kg	0.2	4.2	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Silver	2.1	U	mg/kg	2	U	mg/kg	0.1	4.2	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Zinc	24		mg/kg	16.8		mg/kg	7.2	12.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Chromium III	6.3		mg/kg	5		mg/kg	1.3	4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Chromium, Hexavalent	2.1	U	mg/kg	2	U	mg/kg	0.1	4.2	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Mercury	0.035	U	mg/kg	0.034	U	mg/kg	0.001	0.07	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Aldrin	7.2	U	ug/kg	6.9	U	ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	alpha BHC (alpha Hexachlorocyclohexane)	7.2	U	ug/kg	6.9	U	ug/kg	0.3	14.4	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	alpha Endosulfan	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	beta BHC (beta Hexachlorocyclohexane)	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	beta Endosulfan	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Chlordane	72 U ug/kg	69 U ug/kg	3	144	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	delta BHC (delta Hexachlorocyclohexane)	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Dieldrin	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Endosulfan Sulfate	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Endrin	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Endrin Aldehyde	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Endrin Ketone	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	gamma BHC (Lindane)	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Heptachlor	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Heptachlor Epoxide	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Methoxychlor	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	p,p'-DDD	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	p,p'-DDE	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	p,p'-DDT	7.2 U ug/kg	6.9 U ug/kg	0.3	14.4	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Toxaphene	72 U ug/kg	69 U ug/kg	3	144	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	PCB-1016 (Aroclor 1016)	72 U ug/kg	69 U ug/kg	3	144	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	PCB-1221 (Aroclor 1221)	72 U ug/kg	69 U ug/kg	3	144	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	PCB-1232 (Aroclor 1232)	72 U ug/kg	69 U ug/kg	3	144	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	PCB-1242 (Aroclor 1242)	72 U ug/kg	69 U ug/kg	3	144	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	PCB-1248 (Aroclor 1248)	72 U ug/kg	69 U ug/kg	3	144	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	PCB-1254 (Aroclor 1254)	72 U ug/kg	69 U ug/kg	3	144	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	PCB-1260 (Aroclor 1260)	72 U ug/kg	69 U ug/kg	3	144	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Silvex (2,4,5-TP)	18 U ug/kg	17 U ug/kg	1	36	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	2-Methylphenol (o-Cresol)	360 U ug/kg	340 U ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Acenaphthene	57 J ug/kg	340 U ug/kg	283	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Acenaphthylene	360 U ug/kg	340 U ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Anthracene	360 U ug/kg	340 U ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Benzo(a)Anthracene	36 U ug/kg	34 U ug/kg	2	72	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Benzo(a)Pyrene	36 U ug/kg	34 U ug/kg	2	72	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Benzo(b)Fluoranthene	36 U ug/kg	34 U ug/kg	2	72	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Benzo(g,h,i)Perylene	360 U ug/kg	340 U ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Benzo(k)Fluoranthene	36 U ug/kg	34 U ug/kg	2	72	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Chrysene	360 U ug/kg	340 U ug/kg	20	720	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Cresols, m & p	360	U	ug/kg	340	U	ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Dibenz(a,h)Anthracene	36	U	ug/kg	34	U	ug/kg	2	72	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Dibenzofuran	360	U	ug/kg	340	U	ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Fluoranthene	360	U	ug/kg	340	U	ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Fluorene	360	U	ug/kg	340	U	ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Hexachlorobenzene	36	U	ug/kg	34	U	ug/kg	2	72	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Indeno(1,2,3-C,D)Pyrene	36	U	ug/kg	34	U	ug/kg	2	72	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Naphthalene	1000		ug/kg	110	J	ug/kg	890	720	NA	NO
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Pentachlorophenol	1100	U	ug/kg	1000	U	ug/kg	100	2200	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Phenanthrene	360	U	ug/kg	340	U	ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Phenol	360	U	ug/kg	340	U	ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Pyrene	360	U	ug/kg	340	U	ug/kg	20	720	NA	y
460-45896-4	460-45896-5	CC-BL-3C-001_10/12/12	Cyanide	0.15	J	mg/kg	0.29	J	mg/kg	0.14	1.08	NA	y
460-46911-6	460-46911-7	ECS-7+25-F_11/07/12	Lead	11.2		mg/kg	38.1		mg/kg	NA	NA	109	NO
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	1,1,1-Trichloroethane	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	1,1-Dichloroethane	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	1,1-Dichloroethene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	1,2,4-Trimethylbenzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	1,2-Dichlorobenzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	1,2-Dichloroethane	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	1,3,5-Trimethylbenzene (Mesitylene)	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	1,3-Dichlorobenzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	1,4-Dichlorobenzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	1,4-Dioxane (p-Dioxane)	46	U	ug/kg	48	U	ug/kg	2	96	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Acetone	2.4	JB	ug/kg	1.9	JB	ug/kg	0.5	19	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Benzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Carbon Tetrachloride	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Chlorobenzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Chloroform	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	cis-1,2-Dichloroethylene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Ethylbenzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Methyl Ethyl Ketone (2-Butanone)	9.2	U*	ug/kg	9.5	U*	ug/kg	0.3	19	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Methylene Chloride	4.1	B	ug/kg	4.7	B	ug/kg	0.6	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	n-Butylbenzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	n-Propylbenzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	sec-Butylbenzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	t-Butylbenzene	0.92	U	ug/kg	0.95	U	ug/kg	0.03	1.9	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	tert-Butyl Methyl Ether	0.92 U ug/kg	0.95 U ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Tetrachloroethylene(PCE)	0.92 U ug/kg	0.95 U ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Toluene	0.92 U ug/kg	0.95 U ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	trans-1,2-Dichloroethene	0.92 U ug/kg	0.95 U ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Trichloroethylene (TCE)	0.92 U ug/kg	0.95 U ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Vinyl Chloride	0.92 U ug/kg	0.95 U ug/kg	0.03	1.9	NA	y
460-47389-4	460-47389-5	CC-PSL-2g-001_11/19/12	Xylenes, Total	2.8 U ug/kg	2.9 U ug/kg	0.1	5.8	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Arsenic	2.6 mg/kg	3.6 mg/kg	1	1.98	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Barium	38.5 J mg/kg	46 mg/kg	7.5	79	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Beryllium	0.39 U mg/kg	0.14 J mg/kg	0.25	0.78	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Cadmium	0.33 J mg/kg	0.34 J mg/kg	0.01	1.98	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Chromium, Total	4.5 mg/kg	6.1 mg/kg	1.6	4	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Copper	6 mg/kg	5.7 mg/kg	0.3	9.8	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Lead	4 mg/kg	4.3 mg/kg	0.3	1.98	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Manganese	271 mg/kg	262 mg/kg	NA	NA	3.4	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Nickel	6.8 J mg/kg	8.4 mg/kg	1.6	15.8	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Selenium	2 U mg/kg	1.9 U mg/kg	0.1	4	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Silver	2 U mg/kg	1.9 U mg/kg	0.1	4	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Zinc	29.5 mg/kg	19.4 mg/kg	10.1	11.8	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Chromium III	4.5 mg/kg	6.1 mg/kg	1.6	4	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Chromium, Hexavalent	2.1 U mg/kg	2 U mg/kg	0.1	4.2	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Mercury	0.031 U mg/kg	0.03 U mg/kg	0.001	0.062	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Aldrin	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	alpha BHC (alpha Hexachlorocyclohexane)	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	alpha Endosulfan	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	beta BHC (beta Hexachlorocyclohexane)	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	beta Endosulfan	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Chlordane	68 U ug/kg	68 U ug/kg	0	136	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	delta BHC (delta Hexachlorocyclohexane)	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Dieldrin	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Endosulfan Sulfate	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Endrin	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Endrin Aldehyde	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Endrin Ketone	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	gamma BHC (Lindane)	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Heptachlor	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Heptachlor Epoxide	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Methoxychlor	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	p,p'-DDD	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	p,p'-DDE	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	p,p'-DDT	6.8 U ug/kg	6.8 U ug/kg	0	13.6	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Toxaphene	68 U ug/kg	68 U ug/kg	0	136	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	PCB-1016 (Aroclor 1016)	68 U ug/kg	68 U ug/kg	0	136	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	PCB-1221 (Aroclor 1221)	68 U ug/kg	68 U ug/kg	0	136	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	PCB-1232 (Aroclor 1232)	68 U ug/kg	68 U ug/kg	0	136	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	PCB-1242 (Aroclor 1242)	68 U ug/kg	68 U ug/kg	0	136	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	PCB-1248 (Aroclor 1248)	68 U ug/kg	68 U ug/kg	0	136	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	PCB-1254 (Aroclor 1254)	68 U ug/kg	68 U ug/kg	0	136	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	PCB-1260 (Aroclor 1260)	68 U ug/kg	68 U ug/kg	0	136	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Silvex (2,4,5-TP)	17 U ug/kg	17 U ug/kg	0	34	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	2-Methylphenol (o-Cresol)	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Acenaphthene	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Acenaphthylene	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Anthracene	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Benzo(a)Anthracene	33 U ug/kg	34 U ug/kg	1	68	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Benzo(a)Pyrene	33 U ug/kg	34 U ug/kg	1	68	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Benzo(b)Fluoranthene	33 U ug/kg	34 U ug/kg	1	68	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Benzo(g,h,i)Perylene	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Benzo(k)Fluoranthene	33 U ug/kg	34 U ug/kg	1	68	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Chrysene	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Cresols, m & p	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Dibenz(a,h)Anthracene	33 U ug/kg	34 U ug/kg	1	68	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Dibenzofuran	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Fluoranthene	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Fluorene	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Hexachlorobenzene	33 U ug/kg	34 U ug/kg	1	68	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Indeno(1,2,3-C,D)Pyrene	33 U ug/kg	34 U ug/kg	1	68	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Naphthalene	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Pentachlorophenol	1000 U ug/kg	1000 U ug/kg	0	2000	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Phenanthrene	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Phenol	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Pyrene	330 U ug/kg	340 U ug/kg	10	680	NA	y
460-47389-7	460-47389-8	CC-PSL-2c-001_11/19/12	Cyanide	0.1 U mg/kg	0.1 U mg/kg	0	0.2	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result		Field Duplicate Lab Result		Abs Diff	2xRL	RPD	Pass
460-48739-5	460-48739-6	ECS-SSA29-SE_12/18/12	1311 Lead	90	ug/l	66.3	ug/l	23.7	50	NA	y
460-48739-5	460-48739-6	ECS-SSA29-SE_12/18/12	Arsenic	5.2	mg/kg	4.5	mg/kg	0.7	2.4	NA	y
460-48739-5	460-48739-6	ECS-SSA29-SE_12/18/12	Lead	35.6	mg/kg	25.5	mg/kg	NA	NA	33	y

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact	Project Number/ Manager: E7976/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2A)	QC Level: IV
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see below
Reviewer: Taryn Scholz	Date Checked: 2/21/13
Parameters: TCLP Pb, Metals, CrIII/VI, Pesticide, PCB, Herbicide, VOC, SVOC, CN	Methods: 1311/6010B, 6010B/7470A/7471A, 7196A, 8081A, 8082, 8151A, 8260B, 8270C, 9012A

ITEM	YES	NO	N/A	(CRITERIA) COMMENT
Laboratory NELAP/ELAP accredited?	x			NYDOH (NELAP) #11452, NYDOH (ELAP) #11452
Signed Narrative included?	x			
Narrative issues noted by lab?	x			See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A WP Table 1 - all soils, no preserv required)
COCs properly executed and seals used?		x		see Comment no. 1
Samples received within 2 days?		x		(DER10 - recommended) 460-45895-1, 460-45896-1, 460-46911-1 sx 1-11 rec'd day 3
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'quantitation_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' (SQL), J-values reported NOTE: For metals in soils, MDL 0.47 & MQL = 0.5 ppm for Arsenic so SDL=SQL for some. Also, interpreted_qualifiers field does not include all QC flags (i.e., * and 4)
Target analyte list complete?	x			(P1 WP Table 3, P2A WP Table 2 and/or DER-10 App 5 plus CLP TAL) see Comment no. 2
RLs acceptable?		x		(ASP Exh C Part III and/or DER-10 App 5) see Comment no. 3
No elevated RLs for NDs?	x			Note: 4x std dilution for total metals in soil, 5x std dilution for TCLP
Prep/Analysis method references included and approved?				(P1 WP Table 2, P2A WP Table 1, and/or ASP Exh D) see Comment no. 4
If analytical cleanup used, method ref included and approved?	x			(ASP Exh D) see Comment no. 4A
Sample matrix included?	x			
Soils on dry weight basis?	x*			
Correct and consistent units?	x			Organics in ug/L (TBs) and ug/kg for rest; Inorganics in mg/kg or ug/L (TCLP)
Holding time to analysis not expired?	x**			(Workplan Table 2, SW846 for those not in table per ASP Exh I, which gives only aq HTs)
Holding time to preparation not expired?	x**			same as above
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory	x			
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)	x			Total samples = 39 confirmation + 18 BF + 27 BF grab = 84; Total FD = 10
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible	x			MS/LR used for metals (ICP, Hg, Cr VI - %R not reported for calc Cr III); 84 total samples, 8 LR/MS or MS/SD with at least 1 per 20 for
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 2273/2287=99.4%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-43348-1, 460-45377-1, 460-45384-1, 460-45895-1, 460-45896-1, 460-46911-1, 460-47389-1, 460-48738-1, 460-48739-1

*For the 7196A analyses, Cr III is shown as not dry-weight corrected. However, Cr III is calculated from the results for Cr VI and Total Cr, which are dry-weight corrected, and thus the Cr III is not directly dry-weight corrected but is on a dry-weight basis.

** The holding time was calculated using dates only with regard to the time of day since all holding times are greater than 24 hours. Also, note that Cr III is a calculated result and the holding time check does not apply for this analyte.

1. Issues for custody records:
Seals were not used on the shipping coolers but seals were used on the samples themselves. Also, the laboratory sample custodian noted that the coolers and the samples did not appear to have been compromised or tampered with.
The sampler did not enter one of the trip blanks (lab sample ID 460-45384-22) on the custody record. This trip blank was logged in for VOC analysis upon receipt at the laboratory per Entact.
The sampler did not enter the time relinquished on the custody record for laboratory job number 460-45896-1. The date relinquished and release signature are present.
The laboratory sample custodian did not sign or enter the date/time relinquished on page 2 of the custody record for laboratory job number 460-47389-1. The release signature and the date/time is entered on page 1. Note that the only sample on page 2 is a trip blank.
2. Analyte List:
P1 WP Table 3, P2A WP Table 2, and DER10 App5 list m-cresol, o-cresol, and p-cresol separately. The laboratory reported m,p-cresol and o-cresol as it is not possible to separate m-cresol and p-cresol using method 8270C. P1 WP Table 3, which only lists RLs for the DER-10 metals and not the 23 TAL metals, also mistakenly lists Antimony. This metal does not appear in DER10 Appendix 5 and was not reported by the laboratory for the P1 backfill samples.
For all BF and CC samples (and the associated QC), the laboratory reported technical Chlordane rather than Chlordane (alpha) as listed in the workplan and DER10 Appendix 5.
For all BF and CC samples (and the associated QC), the laboratory inadvertently reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of just the DER-10 analytes as requested. FYI - These extra analytes are all ND in the samples.
Note: The analyte names in the hardcopy report differ from those in the EDD for some analytes.
3. The MQL (Unadj) for several DER-10 analytes is above the CRQL, but in each case, it is below the Allowable Constituent Level in DER10 App 5 except for Pentachlorophenol. The actual lab RL is above the CRQL and the ACL in DER10 App5 for this analyte. The MDL is < 1/8 the ACL and J-values are reported, so NDs for undiluted samples may show conformance. Additionally, the MQL (Unadj) for the TAL metal Iron is above the CRQL. There are no action levels for this analyte.
4. VOCs in soil collected in 4-oz jars using bulk technique and analyzed using a low-level DI water extraction (on day 1 to day 5) with heated purge-n-trap per workplan rather than using closed system purge-n-trap or methanol extraction as indicated by preparation method (5035) referenced by the laboratory.
4A. Per laboratory, Florisil cleanup (SW3620B) used for Pesticide analyses and sulfuric acid cleanup (SW3665A) used for PCB analyses (not indicated in package or EDD). No cleanup used for SVOC or Herbicides.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	TCLP Metals	All analyses	Diluted 5x before analysis as standard practice	noted in QA report narrative
		Total Metals	All analyses	Diluted 2-4x before analysis as standard practice	noted in QA report narrative
		Total Metals	All samples	Required 4x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
EN336	460-43348-1	TCLP Metals	1-9	Insufficient sample to leach 100-g, fluid volume adjusted to maintain 20:1	noted in QA report narrative
EN337	460-45377-1	NA	NA	no issues noted	NA
EN338	460-45384-1	Total Metals	130661/21	MS %R low for Mn	none required (QC check inconclusive)
		Pesticides	130663/LCS	SU %R high for DCB on 1° col, TCMX passes, data qualified and reported	none required (sample results not affected)
		Pesticides	130663/21	MS/D %R out for DDD, LCS passes	Associated samples flagged per NFG
		Pesticides	130663/21	MSD RPD out for DDD, non-homog sample suspected	Associated samples flagged per NFG
		Pesticides	131076/CCV-24	CCV %R out for End Sulf on 2nd column, 1° column passes, data qualified and reported	NA (passes with rounding)
		Pesticides	131076/CCV-44	CCV %R hi for Endr Ald on 1° col, samples all ND, data reported	NA (passes with rounding)
		Herbicides	131195/CCVRT-1	CCVRT %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		Herbicides	131195/CCV-10	Closing CCV %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		Herbicides	LCSD, 21 MS	SU %R hi, samples did not contain any TAs so no re-extraction/re-analysis	none required (sample results not affected)
		VOCs	130595/LB3-1A	Blank contains Acetone/MeCl2 >MDL but <RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	131041/MB-5	Blank contains MeCl2 >MDL but <RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	131153/MB-5	Blank contains Acetone/MeCl2 >RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	130595/10	MS/D %R out for many, LCS passes	Associated samples flagged per NFG
		VOCs	131153/NA (11)	MS %R out for many, LCS passes	Associated samples flagged per NFG
		VOCs	131153/NA (11)	MSD RPD out for 1,4Dioxane, LCS passes	Associated samples flagged per NFG
		SVOCs	130676/NA (21)	MSD %R out for B(a)p, LCS passes	Associated samples flagged per NFG
EN339	460-45895-1	Pesticides	132123/LCS	LCS %R low for Methoxychlor	Associated samples flagged per NFG
		Herbicides	132149/CCV-6	Closing CCV %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		Herbicides	132191/CCVRT-1	CCVRT %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		Herbicides	132191/CCV-14	Closing CCV %R hi for PCP, samples all ND, data reported	NA (this CCV does not apply since PCP not a 8151 target analyte)
		Herbicides	132191/CCV-13	Closing CCV %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		Herbicides	132191/LCS/D	LCS/D - Silvex not detected on 1° col due to interference of PCP, 2nd col passes, data qualified and reported	none required since interference noted and second column passes
		Herbicides	132191/8	MS/D - Silvex not detected on 1° col due to interference of PCP, 2nd col passes, data qualified and reported	none required since interference noted and second column passes
		Herbicides	NA	'4' qualifier indicates conc in unspiked sample > 4x spiking amount	NA
		VOCs	132438/LB3-1A	Blank contains Acetone/MeCl2 >MDL but <RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	132463/MB-5	Blank contains Acetone/MeCl2 >RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	132504/MB-6	Blank contains Acetone/MeCl2 >RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	1-6	Peak at 12.484 min is column bleed and therefore not reported as TIC	noted in QA report narrative
		VOCs	10,11	Peaks at 12.484 and 14.031 min is column bleed and therefore not reported as TIC	noted in QA report narrative
EN340	460-45896-1	Total Metals	132504/8	MS %R low for Mn	none required (QC check inconclusive)
		Herbicides	132506/CCVRT-1	CCVRT %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		Herbicides	132506/CCV-11	Closing CCV %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		Herbicides	132508/CCVRT-1	CCVRT %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		Herbicides	132508/CCV-9	Closing CCV %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		VOCs	132327/LB3-1A	Blank contains MeCl2 >RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	132504/MB-6	Blank contains Acetone/MeCl2 >RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	132646/MB-5	Blank contains Acetone/MeCl2 >MDL but <RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	132504/6	MS/D %R low for many, hi for 2-Butanone	Associated samples flagged per NFG
		VOCs	1-2	Peak at 12.484 min is column bleed and therefore not reported as TIC	noted in QA report narrative
		VOCs	NA	'4' qualifier indicates conc in unspiked sample > 4x spiking amount	NA
		VOCs	132207 (TB only)	LCS %R out for Acetone/2-Butanone, MS/D passes	none (analytes ND in this TB, samples results not affected)
EN341	460-46911-1	NA	NA	no issues noted	NA
EN342	460-47389-1	VOCs	all	bulk soils in jars, not 5035	noted in QA report narrative

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
		Total Metals	137271/11	MS %R high for Mn	none required (QC check inconclusive)
		Herbicides	136893/CCVRT-1	CCVRT %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		Herbicides	136893/CCV-12	Closing CCV %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		Herbicides	136899/CCVRT-1	CCVRT %R hi for SU, samples all ND, data reported	none required (sample results not affected)
		VOCs	2,4,5,6	Peak at 12.484 min is column bleed and therefore not reported as TIC	noted in QA report narrative
		VOCs	137271/MB-6	Blank contains MeCl2 >RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	137271/MB-6	Blank contains Acetone >MDL but <RL, samples >MDL but <RL B-flagged	Associated samples flagged per NFG
		VOCs	137271/LCS	LCS %R high for 2-Butanone, samples all ND, data reported	Associated samples flagged per NFG
		VOCs	137271/NA (10)	MS/D %R out for many, LCS passes exc for 2-Butanone	Associated samples flagged per NFG
EN343	460-48738-1	NA	NA	no issues noted	NA
EN344	460-48739-1	NA	NA	no issues noted	NA

Data Validation Checklist: Metals/Wet Chem

Client Name: Entact	Project Number/ Manager: E7976/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2A)	QC Level: IV
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 2/21/13
Parameters: TCLP Pb, Metals, CrIII/VI, CN	Methods: 1311/6010B, 6010B/7471A, 7196A, 9012A

	%PERFORMED/ ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			With the exception of Cr III, which is a calculated value
100	%R criteria met?	x			method (lab but within 50-200%)
	Matrix spike data included in lab package?	x			
100	%R criteria met?		x		method (75-125%) see Table 3
	Sample duplicate data included in lab package?	x			
100	RPD criteria met?		x		method (20% if >10xMDL) see Table 3
100	Field dup RPD criteria met? (individual, mean, and overall)		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either <5RL) see Table 3
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)			x	CL per ASP Exh E - not reported
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	Intensities within limits? (min 30-120% of calib std)			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

*No QC reported for Chromium III, which is calculated from the Total Chromium and Chromium VI result.

TOTAL METALS VS LEACHED - all leach results < max possible

Data Validation Checklist: Leachates

Client Name: Entact			Project Number/ Manager: E7976/ Jenny Self		
Site Name: Revere Smelting and Refining (Phase 2A)			QC Level: IV		
Laboratory: TestAmerica (Edison, NJ)			Laboratory Job No: see DURC		
Reviewer: Taryn Scholz			Date Checked: 2/21/13		
Parameters: TCLP Pb			Methods: 1311/6010B		
%PERFORMED/ ITEM		**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)		x		see Comment no. 1
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			see Comment no. 2
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

TCLP Batches: 8/13 16:30; 10/5 18:30; 12/21 15:31

1. 460-43348-1: not enough sample for 1-9, approx 50-g used with 1000 mls extraction fluid ->no flags since 20/1 ratio maintained

460-43377-1: not enough sample for 1-9, approx 35-g used with 700 mls extraction fluid ->no flags since 20/1 ratio maintained

2. 460-48738-1: the TCLP batch worksheet has an incorrect batch end date. The correct date is shown on the TCLP batch worksheet for the samples in 460-48739-1, which were leached in the same batch (140868).

Data Validation Checklist: GC

Client Name: Entact	Project Number/ Manager: E7976/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2A)	QC Level: IV
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 2/21/13
Parameters: Pesticide, PCB, Herbicide	Methods: 8081A, 8082, 8151A

%PERFORMED/ ITEM			YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)		x			
100	Criteria met for field blanks? (<MDL)				x	
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			With the exception of multi-component pesticides Chlordane (technical) andToxaphene; only two multi-component Aroclors (1016 and 1260) spiked per method recommendations
	%R criteria met?			x		method (lab but within 50-200%) see Table 3
100	RPD criteria met?		x			
	Matrix spike data included in lab package?		x			
	%R criteria met?			x		method (lab but within 50-200%) see Table 3
100	RPD criteria met?			x		method (lab but within 40%) see Table 3
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?			x		method (lab but within 10-200%) see Table 3
100	Field dup RPD criteria met? (individual, mean, and overall)		x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Initial calibration documentation included in lab package?		x			7-8 peaks used for all multi-comp Pest/PCB
	All target analytes included?		x			
100	%RSD criteria met? (max 20% or min r/COD 0.99)		x			
100	DDT/Endrin %breakdown max 15%?		x			
	Calibration verification data included in lab package?		x			
100	%R criteria met? (max +/-15%)			x		see Comment no. 1 and Table 3
100	Dual column/detector confirmation data incl in lab package?		x			
100	%Difference criteria met? (<40%)		x			see Comment no. 2
10	Analyte qualitative ID criteria met?		x			
10	Analyte quantitation/RLs correct?		x			
10	QC parameters calculated correctly?		x			
	Surrogate	**Control Limits**				
PEST/	Decachlorobiphenyl	53-150/30-150				
PCB	Tetrachloro-m-xylene	40-150				
HERB	2,4-DCPA	54-150				

COMMENTS

1. For 8082, the validator did not delineate cases where one of the 7-8 peaks for an Aroclor has a high %D on just one column since all of the samples are ND. This occurred for the following CCV: 130916/2, 130916/28, 132218/22, 132286/2, 132286/17, 136954/17

1.For 8151, the validator did not delineate cases where the surrogate has a high %D on one column (DB-5) since surrogate recoveries for each sample are evaluated separately and the sample results are not affected by high CCV %D for the surrogate. This occurred for the following CCV: 131195/1, 131195/10, 132149/6, 132191/1, 132191/13, 132506/1, 132506/11, 132508/1, 132508/9, 136893/1, 136893/12, 136899/1

2. For 460-47389-1, Form X for 8151 Herb shows 0.0 RPD for the BS/BD/MS/SD rather than the calculated value. The validator calculated the RPD and found is passes in each case.

Data Validation Checklist: GC/MS

Client Name: Entact				Project Number/ Manager: E7976/ Jenny Self		
Site Name: Revere Smelting and Refining (Phase 2A)				QC Level: IV		
Laboratory: TestAmerica (Edison, NJ)				Laboratory Job No: see DURC		
Reviewer: Taryn Scholz				Date Checked: 2/21/13		
Parameters: VOC, SVOC				Methods: 8260B, 8270C		
	%PERFORMED/ ITEM		**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)			x		see Table 3
100	Criteria met for field blanks? (<MDL)			x		see Table 3
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?			x		m,p-Cresol not spiked
100	%R criteria met?			x		method (lab but within 50-200%) see Table 3
100	RPD criteria met?		x			method (lab but within 40%)
	Matrix spike data included in lab package?		x			
100	%R criteria met?			x		method (lab but within 50-200%) see Table 3
100	RPD criteria met?			x		method (lab but within 40%) see Table 3
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?		x			method (lab but within 10-200% extr, 20-200% purg)
100	Field dup RPD criteria met? (individual, mean, and overall)			x		20% aq, 35% solid (+/-2RL aq, +/-3RL sol if either <5RL) see Table 3
	Instrument Tune (12-hr) for GC/MS included in lab package?		x			
100	Instrument Tune method criteria met?		x			
	Initial calibration documentation included in lab package?		x			
	All target analytes included at min 5 levels w low≤ RL?		x			
	RRF met SPCCs/14Dioxane(advisory)/PoorPerf/TAs (*/0.005/0.01/0.05)?			x		*11DCA 0.1, CB 0.3; SVOC 0.05, see Table 3
100	%RSD criteria met for CCCs/TAs? (30% max for CCC, 15% max (mean) for TAs or curve min r 0.99)		x			
	Calibration verification data included in lab package?		x			
	RRF met SPCCs/14Dioxane(advisory)/PoorPerf/TAs (*/0.005/0.01/0.05)?			x		*11DCA 0.1, CB 0.3; SVOC 0.05, see Table 3
100	%D criteria met for CCC/TAs? (20% max)			x		see Table 3
100	Internal standard data included in lab package?		x			
100	Areas within limits (within -50/+100% of last calib check)?		x			for CCV and samples
100	RTs within limits (<30 sec diff from last calib check)?		x			
10	Analyte qualitative ID criteria met?		x			
10	Analyte quantitation/RLs correct?		x			
10	QC parameters calculated correctly?		x			
	Surrogate	**Control Limits**				
VOC	1,2-Dichloroethane-d4	70-130				
	Toluene-d8	70-130				
	Bromofluorobenzene	70-130				
SVOC	2,4,6-Tribromophenol	10-120				
	Terphenyl-d14	16-151				
	2-Fluorobiphenyl	40-109				
	Nitrobenzene-d5	38-105				
	2-Fluorophenol	37-125				
	Phenol-d5	41-118				

COMMENTS

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-A Remedial Design/ Remedial Action
Post-Stabilization Verification Samples
for Phase I Staging Pile and CAMU Material

December 2012 to April 2013

Prepared by:

Quality Assurance Associates (*QAA, L.L.C.*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

May 9, 2013

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 3

3.0 DATA VALIDATION RESULTS 4

3.1 PRECISION 4
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 4
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 4
3.1.3 Field Duplicate (FD) Precision 4
3.2 ACCURACY 4
3.2.1 Laboratory Control Spike (LCS) Accuracy 4
3.2.2 Matrix Spike (MS) Accuracy 4
3.2.3 Serial Dilution (SD) %Difference 5
3.3 REPRESENTATIVENESS 5
3.3.1 Chain-of-Custody and Analysis Requests 5
3.3.2 Sample Preservation and Holding Time 5
3.3.3 Laboratory and Method Selection 5
3.3.4 Blanks (Laboratory and Field) 5
3.3.5 Analytical Procedures 6
3.4 COMPLETENESS 6
3.4.1 Laboratory Deliverables Completeness 6
3.4.2 EDD Correctness 6
3.4.3 Analytical Completeness 7
3.5 COMPARABILITY 7

LIST OF TABLES

Table 1 – Samples and Tests Selected for Validation
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – Qualified Results for Validated Samples
Table 4 – Field Duplicate Results for Validated Samples

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The data include 19 investigative soil samples plus a field duplicate sample as shown in Table 1. The samples comprise 10% of the Phase II-A post-stabilization verification (PSV) samples. A total of 191 PSV samples were collected in December 2012 to April 2013 by ENTACT from the stabilized material stockpiles and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals to ensure that the stabilized material meets the appropriate criteria for disposal in the on-site containment cell. Per the *Phase II-A Remedial Design/ Remedial Action Workplan* (August 2012), hereinafter called the Workplan, the PSV data are considered Level 2 and require minimal data review. Per ENTACT's request, QAA performed a full validation of the selected samples and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010). QAA completed the validation using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Data Review* (October 2004), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplans.

PARCC EVALUATION

Section 4.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The validator assessed precision using the laboratory and field duplicates. For the PSV samples selected for validation, the laboratory prepared one unspiked matrix duplicate (MD) using a sample from the site with each analytical batch and the RPDs are at or below the limit, which indicates good precision for the analytical technique on the given sample matrix. Additionally, the sampler collected one field duplicate with the 19 investigative samples and the RPDs are within the limits, which indicates good precision for the sampling and analytical technique on the given matrix.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The validator assessed accuracy using the laboratory spikes and matrix spikes. For the PSV samples selected for validation, the laboratory prepared a laboratory control spike (LCS) using reagent water with each analytical batch and reported the recovery for every analyte. The LCS recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. Additionally, the laboratory prepared one matrix spike (MS) plus one serial dilution (SD) using a sample from the site with each analytical batch. The MS recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, and the SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy of metals results that are substantially above the reporting limit.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative

parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, PSV samples were collected as required in the approved sampling and analysis plan. Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory blanks, and analytical instrument setup (i.e., calibration, interference correction, etc.) For the PSV samples selected for validation, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank with each analytical batch and the blanks show no contamination, which indicates the samples were not affected by laboratory procedures. Additionally, proper analytical procedures were used and calibration results met the method requirements.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. For the PSV samples selected for validation, all analyses produced valid analytical measurements, which gives a completeness of 100%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD for the samples selected for validation and found all necessary analytical documentation is present.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The PSV analytical results are classified as Level 2 data with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated. Note that results are reported in µg/L for all field samples.

DATA USABILITY

Table 3 lists all qualified results for the PSV samples selected for validation. No QC deficiencies were noted and the reviewer did not apply any data quality flags except to results between the MDL and RL (i.e., laboratory J-values). These results should be considered estimates and the actual value is not expected to exceed the sample MDL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include hardcopy data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). For the samples selected for validation, the laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD), and
- Field Duplicates (FD).

Additionally, the validator examined the raw data for one of the two sample batches (randomly selected by the validator) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are 80-120% for laboratory accuracy and 75-125% for matrix accuracy for metals analyses.
- Laboratory Precision – the control limit (20 RPD) as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. A data rejection limit of 30% was used for these inorganic analyses. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

No LCSD were analyzed (or required) with the samples selected for validation.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

For the PSV samples selected for validation, the laboratory analyzed an MD for every analytical batch (maximum 20 samples) and reported RPDs for MD prepared using a sample from the site. Two of the 19 soil samples (as designated by the sampler on the custody record) were used to prepare an MD, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. All MD RPDs are at or below the control limit.

3.1.3 FIELD DUPLICATE (FD) PRECISION

For the PSV samples selected for validation, the samplers collected one FD with the 19 investigative samples, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Results for the field duplicates are summarized in Table 5. All FD results are within the field precision criteria.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD) and matrix spikes (MS/MSD) plus serial dilutions (SD). LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

For the PSV samples selected for validation, the laboratory analyzed a LCS for every analytical batch (maximum 20 samples) as required and reported recoveries for all analytes. All LCS recoveries are within the control limits.

3.2.2 MATRIX SPIKE (MS) ACCURACY

For the PSV samples selected for validation, the laboratory analyzed an MS for every analytical batch (maximum 20 samples) and reported recoveries for MS prepared using a sample from the site. Two of the 19 soil samples (as designated by the sampler on the custody record) were used to prepare an MS, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. All MS recoveries are within the control limits.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all metals detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The PSV samples selected for validation were hand-delivered to the laboratory or delivered by an overnight, commercial carrier with properly executed chain-of-custody records and custody seals, which confirms that sample integrity was maintained. Additionally, the information on the custody record is complete, no issues were noted during sample log-in at the laboratory, and all field samples were analyzed for the tests requested on the chain-of-custody.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

The PSV samples selected for validation were properly preserved and analyzed within the holding times listed in Table 1 of the Workplan and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 4.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 4.7.2 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 1 of the Workplan were used for the sample analyses. The analyte list includes TCLP Antimony, TCLP Arsenic, TCLP Cadmium, and TCLP Lead as requested and the nominal reporting limits are below the levels of concern (i.e., the treatment goals) for each analyte.

(Note: The laboratory dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank and leachate blank for every analytical batch (maximum 20 samples) plus a calibration blank for every 10 metals analyses as required per the analytical methodology. Field rinsate blanks were

not collected as only dedicated and/or disposable sampling equipment was used. No analytes were detected in the laboratory blanks.

3.3.5 ANALYTICAL PROCEDURES

For the samples selected for validation, the analytical procedures (initial calibration, continuing calibration verification, and interference correction), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method, except as follows:

- For the 13 samples in work order 460-52914-1, approximately 35-g of sample was used for the TCLP procedure because insufficient sample was provided to use 100-g as specified in the method. In each case, the volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of fluid to sample weight, and thus the validator determined that no data qualification is necessary.

Additionally, no issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes two analytical batches and the validator re-calculated sample results and QC check parameters for one batch and made the following observation from the review of the raw data:

- TCLP Metals batch 152760 – The laboratory reports the RPD for matrix duplicates (MD) as NC (not calculable) if either result is less than the reporting limit and the serial dilution (SD) %difference as NC (not calculable) if the undiluted result is less than 50x MDL since the checks are waived below these levels.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

For the PSV samples selected for validation, the NYSDEC Category B data packages and EDD contain all necessary information except as follows:

- For laboratory work order 460-52914-1, the data package does not include a separate certification page. Similar certification language is included on the signed front cover for this Level 2 data and thus no further action was taken.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	Sample(s)	EDD Field(s)	Action
460-50311-1 460-52914-1	all QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.

3.4.3 ANALYTICAL COMPLETENESS

For the samples selected for validation, the validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which an analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which an analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J-flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results are reported in µg/L and are classified as Level 2 data for TCLP metals with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-A Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

SAMPLES AND TESTS SELECTED FOR VALIDATION

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Metals
460-50311-1	PSV-24R	2/4/13	INV	PSV	Soil	x
460-50311-2	PSV-36	2/4/13	INV	PSV	Soil	x
460-50311-2LR	PSV-36LR	2/4/13	MD	PSV	Soil	x
460-50311-2MS	PSV-36MS	2/4/13	MS	PSV	Soil	x
460-50311-3	PSV-37	2/4/13	INV	PSV	Soil	x
460-50311-4	PSV-38	2/4/13	INV	PSV	Soil	x
460-50311-5	PSV-39	2/4/13	INV	PSV	Soil	x
460-50311-6	PSV-40	2/4/13	INV	PSV	Soil	x
460-50311-7	PSV-41	2/4/13	INV	PSV	Soil	x
460-52914-1	PSV-92	3/24/13	INV	PSV	Soil	x
460-52914-2	PSV-93	3/24/13	INV	PSV	Soil	x
460-52914-2LR	PSV-93LR	3/24/13	MD	PSV	Soil	x
460-52914-2MS	PSV-93MS	3/24/13	MS	PSV	Soil	x
460-52914-3	PSV-94	3/24/13	INV	PSV	Soil	x
460-52914-4	PSV-95	3/24/13	INV	PSV	Soil	x
460-52914-5	PSV-95-X	3/24/13	FD	PSV	Soil	x
460-52914-6	PSV-96	3/24/13	INV	PSV	Soil	x
460-52914-7	PSV-97	3/24/13	INV	PSV	Soil	x
460-52914-8	PSV-98	3/24/13	INV	PSV	Soil	x
460-52914-9	PSV-99	3/24/13	INV	PSV	Soil	x
460-52914-10	PSV-100	3/24/13	INV	PSV	Soil	x
460-52914-11	PSV-101	3/24/13	INV	PSV	Soil	x
460-52914-12	PSV-102	3/24/13	INV	PSV	Soil	x
460-52914-13	PSV-103	3/24/13	INV	PSV	Soil	x

FD - Field Duplicate Sample

INV - Investigative Sample

MD – Matrix Duplicate Sample (unspiked)

MS - Matrix Spike Sample

PSV – Post-Stabilization Verification Sample

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Metals: 1311/ 3010A/ 6010B for Antimony, Arsenic, Cadmium, and Lead in leachates of soil samples

TABLE 2
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-A Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Blank contamination. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-A Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

QUALIFIED RESULTS FOR VALIDATED SAMPLES

Lab ID	Field ID_Date	Analyte	Lab Result	DVQ	QC Issue
460-50311-1	PSV-24R_02/04/13	1311 Lead	23.6 J µg/l	J	Result is between MDL and RL
460-50311-6	PSV-40_02/04/13	1311 Arsenic	22.0 J µg/l	J	Result is between MDL and RL
460-52914-9	PSV-99_03/24/13	1311 Arsenic	24.7 J µg/l	J	Result is between MDL and RL

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
II-A Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

FIELD DUPLICATE RESULTS FOR VALIDATED SAMPLES

Original Sample Lab ID	Field Duplicate Lab ID	Field ID_Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-52914-4	460-52914-5	PSV-95_03/24/13	1311 Antimony	605		µg/l	615		µg/l	NA	NA	1.6	y
460-52914-4	460-52914-5	PSV-95_03/24/13	1311 Arsenic	143		µg/l	179		µg/l	NA	NA	22	y
460-52914-4	460-52914-5	PSV-95_03/24/13	1311 Cadmium	25	U	µg/l	25	U	µg/l	0	50	NA	y
460-52914-4	460-52914-5	PSV-95_03/24/13	1311 Lead	29		µg/l	25	U	µg/l	4	50	NA	y

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact			Project Number/ Manager: E7976/ Jenny Self	
Site Name: Revere Smelting and Refining (Phase 2A PSV)			QC Level: II	
Laboratory: TestAmerica (Edison, NJ)			Laboratory Job No: 600-50311-1, 600-52914-1 (10%, selected by Entact)	
Reviewer: Taryn Scholz			Date Checked: 4/19/13	
Parameters: TCLP Metals			Methods: 1311/6010B	
ITEM	**YES**		**N/A**	**(CRITERIA) COMMENT**
Laboratory NELAP/ELAP accredited?	x			NYDOH (NELAP) #11452, NYDOH (ELAP) #11452
Signed Narrative included?	x			see Comment no. 1
Narrative issues noted by lab?		x		see NarrativeComments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(WP Table 1 - all soils, no preserv required)
COCs properly executed and seals used?	x			
Samples received within 2 days?	x			(DER10 - recommended)
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'quantitation_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' (SQL), J-values reported
Target analyte list complete?	x			(WP Table 2)
RLs acceptable?	x			(ASP Exh C Part III and/or WP criteria)
No elevated RLs for NDs?	x			Note: 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(WP Table 1 and/or ASP Exh D)
If analytical cleanup used, method ref included and approved?			x	(ASP Exh D)
Sample matrix included?	x			Note: Used WL for leachates rather than SO as previously
Soils on dry weight basis?			x	
Correct and consistent units?	x			ug/L (TCLP)
Holding time to analysis not expired?	x			(WP Table 1)
Holding time to preparation not expired?			x	
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory			NA	
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)	x			Total samples = 19 PSV; Total FD = 1
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible	x			MS/LR used for metals; 20 total samples, 2 LR/MS
Completeness criteria met?	x			(Workplan Section 4.3.3 - 100%) 88/88=100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target

COMMENTS

1. Work order 460-52914-1 does not include the signed certification page. Similar language on the signed front cover for this Level II set so no further action

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	TCLP Metals	All analyses	Diluted 5x before analysis as standard practice	noted in QA report narrative
EN346	460-52914-1	TCLP Metals	1-13	Insufficient sample to leach 100-g, fluid volume adjusted to maintain 20:1	noted in QA report narrative

Data Validation Checklist: Metals/Wet Chem

Client Name: Entact	Project Number/ Manager: E7976/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2A PVS)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 600-50311-1, 600-52914-1 (10%, selected by Entact)
Reviewer: Taryn Scholz	Date Checked: 4/19/13
Parameters: TCLP Metals	Methods: 1311/6010B

%PERFORMED	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			
100	%R criteria met?	x			method (lab 80-120%)
	Matrix spike data included in lab package?	x			
100	%R criteria met?	x			method (75-125%)
	Sample duplicate data included in lab package?	x			
100	RPD criteria met?	x			method (20% if >10xMDL)
100	Field dup RPD criteria met? (individual, mean, and overall)	x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)			x	CL per ASP Exh E - not reported
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	Intensities within limits? (min 30-120% of calib std)			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

TOTAL METALS VS LEACHED - NA

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2A PVS)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 600-50311-1, 600-52914-1 (10%, selected by Entact)
Reviewer: Taryn Scholz	Date Checked: 4/19/13
Parameters: TCLP Metals	Methods: 1311/6010B

	%PERFORMED/ ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)		x		see Comment no. 1
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

TCLP Batches: 2/5 16:45; 3/25 17:00

1. 460-52914-1: not enough sample for 1-13, approx 35-g used with 700 mls extraction fluid ->no flags since 20/1 ratio maintained

DATA USABILITY SUMMARY REPORT

REVERE SMELTING AND REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action

May 2013 to September 2013

Prepared by:

Quality Assurance Associates (*QAA, L.L.C.*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

December 20, 2013

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 4

3.0 DATA VALIDATION RESULTS 6

3.1 PRECISION 6
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 6
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 6
3.1.3 Field Duplicate (FD) Precision 6
3.2 ACCURACY 7
3.2.1 Laboratory Control Spike (LCS) Accuracy 7
3.2.2 Matrix Spike (MS) Accuracy 7
3.2.3 Serial Dilution (SD) %Difference 8
3.2.4 Surrogate (SU) Recovery 8
3.3 REPRESENTATIVENESS 8
3.3.1 Chain-of-Custody and Analysis Requests 8
3.3.2 Sample Preservation and Holding Time 9
3.3.3 Laboratory and Method Selection 9
3.3.4 Blanks (Laboratory and Field) 10
3.3.5 Analytical Procedures 10
3.4 COMPLETENESS 11
3.4.1 Laboratory Deliverables Completeness 11
3.4.2 EDD Correctness 11
3.4.3 Analytical Completeness 11
3.5 COMPARABILITY 12

LIST OF TABLES

Table 1 – Samples Collected and Tests Performed
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – QC Deficiencies and Data Qualification Actions
Table 4 – Qualified Results for Field Samples
Table 5 – Field Duplicate Results

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting and Refining Site Operable Unit 1 in Middletown, New York. The independent data review was completed in accord with the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 145 investigative soil samples plus the associated field QC samples, which were collected by ENTACT in May through October 2013 with the intended use of verifying that remediation goals have been achieved in excavated grids and confirming that backfill materials are suitable for use on-site. A complete listing of the samples collected and tests performed is shown in Table 1. QAA performed a full validation of the data and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) as specified in Section 5.9 of the Workplan. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Data Review* (October 2004) and *National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The Workplan stipulates that the precision control limits will be dictated by the analytical method and the limits are 20-30 RPD, depending upon the test. The validator assessed precision using the laboratory and field duplicates. The laboratory prepared laboratory control spike duplicates (LCSD) using reagent water or sand for the Herbicides and VOC tests plus at least one unspiked matrix duplicate (MD) or matrix spike duplicate (MSD) using a sample from the site for each test except Pesticides, PCBs, VOCs, and Cyanide for the backfill samples. All LCS/LCSD RPDs are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. The RPDs for the matrix duplicates are within the limits, which indicates good precision for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the duplicate. Of the 2,338 total results for field samples (investigative samples and field duplicates), only eight results (all of which are for metals) are qualified as estimated (J) based on laboratory duplicate precision. Additionally, the sampler collected eight field duplicates with the 145 investigative samples and the RPDs are within the limits, which indicates good precision for the sampling and analytical technique on the given matrix, or the validator qualified the results for the original and duplicate sample. Four of the 104 pairs of results are qualified as estimated (J) based on field duplicate precision.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The Workplan stipulates that the accuracy control limits will be dictated by the analytical method. For most tests, the analytical method stipulates that the laboratory calculate in-house performance criteria. In order to better assess data usability, limits of 50-200% were employed where the laboratory limit for a spiked analyte falls outside these values. The validator assessed accuracy using the laboratory spikes and matrix spikes. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with each analytical batch and reported the recovery for every target compound except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB

Aroclors, and Chromium III (which is a calculated rather than measured result). The laboratory also prepared a laboratory control spike duplicate (LCSD) with each Herbicides and VOC analytical batch. All LCS/LCSD recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects, with minor exceptions. Two results for Antimony are qualified as estimated (J- or UJ) due to low laboratory spike recovery. Additionally, the laboratory prepared several matrix spikes (MS) and matrix spike duplicates (MSD) plus several serial dilutions (SD) for the metals analyses using a sample from the site. All SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy of metals results that are substantially above the reporting limit. The MS/MSD recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the MS/MSD. Of the 2,338 total results for field samples, 12 results are qualified as estimated based on matrix spike recovery. The qualification includes the expected direction of bias where known (i.e., J+ for high MS/MSD recovery and J- for low MS/MSD recovery). Additionally, the laboratory utilized one or more surrogate spikes for each organic analysis. The surrogate recoveries are within the laboratory limits for all field samples, with minor exceptions. Six detects for Pesticides are qualified as estimated (J+) due to high surrogate recovery.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, investigative samples were collected as required in the approved sampling and analysis plans with the exception of deviations that were approved by NYSDEC. All other planned samples were collected in addition to a number of unplanned samples (e.g., additional confirmation samples were collected due to unanticipated excavations, additional floor samples were collected based on the grid floor square footage, etc.). Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory and field QC blanks, and analytical instrument setup (i.e., tuning, calibration, interference correction, etc.) For all samples, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank with each analytical batch and the sampler collected three trip blanks with the VOC samples. The laboratory and field QC blanks show no contamination, which indicates the samples were not affected by laboratory or field procedures, or the validator qualified the samples associated with the blank that have a concentration similar to that in the blank. Eight detects for Acetone, six detects for TCLP Lead, and six detects for Methylene Chloride are qualified due to laboratory and/or trip blank contamination. Per the NFG, the validator qualified detects above the reporting limit with a J+ flag while detects below the reporting limit (i.e., laboratory J-values) were qualified with a U flag. Results with a U flag should be considered not detected at the reporting limit, and thus the validator replaced the concentration reported by the laboratory with the reporting limit. Proper analytical procedures were used and calibration results met the method requirements or the validator qualified the affected samples. Twenty-five (25) results (for Acetone, Heptachlor, PCB-1260 (Aroclor 1260), Dibenz(a,h)anthracene, and Vinyl Chloride) are qualified due to calibration drift. Additionally, the non-detect for 1,4-Dioxane in sample BF-SER-RAMP D-DD-5g-002 is qualified as rejected (R) due to low internal standard recovery. This is the only rejected result for the data set.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. All analyses of field samples

produced valid analytical measurements, with the exception of one non-detect result for 1,4-Dioxane. With 2,338 total results for field samples, this gives a completeness of 99.96%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics for all field samples.

DATA USABILITY

The non-detect for 1,4-Dioxane in BF-SER-RAMP D-DD-5g-002 is qualified as rejected (R) and thus is not suitable for use. The absence or presence of this analyte cannot be confirmed in the sample due to low internal standard response. All other results for the samples are acceptable for use with the qualifications shown in Table 4. Results that are qualified with a UJ should be considered not present above the reporting limit; however the reporting limit is an estimated value. Results that are qualified with a J- (biased low) can be used for determining the presence of the analyte and as an indication that the concentration of the analyte exceeds a given criterion. However, the concentration reported for detects may be low. Results that are qualified with a J+ (biased high) can be used for determining the presence of the analyte and as an indication that the concentration of the analyte is less than a given criterion. However, the concentration reported for detects may be high. Similarly, results that are qualified with a J (estimated) may be either low or high. For results qualified with a U (potentially contaminated), the analyte should be considered not detected at the reporting limit. For results qualified due to field duplicate precision, the higher result (i.e., from either the original or duplicate sample) should be used for project decisions. This gives a conservative approach relative to protection of the environment. (For field duplicate pairs that pass the precision criteria, the value should be selected based on accepted convention for the site and/or agency requirements, e.g., select the value reported for the original sample, the average of the two values, etc.) For results qualified solely because the concentration is between the MDL and RL, the actual value is not expected to exceed the sample RL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include pdf data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Instrument Tuning and Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD),
- Field Duplicates (FD),
- Dual Column Confirmation,
- Surrogates (SU), and
- Internal Standards (IS).

Additionally, the validator examined the raw data for 10% of the sample batches (randomly selected by the validator across the various analysis dates and tests) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are typically the laboratory-derived recovery control limits based on historical performance (but not less than 50% lower limit or greater than 200% upper limit)
- Laboratory Precision – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which range from 20-30 RPD
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 30% for inorganics, 20% for purgeable organics (VOC), and 10% for extractable organics were used. The data

validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

The laboratory analyzed an LCSD and reported RPDs for all target compounds for each Herbicides and VOC batch (maximum 20 samples). All RPDs are at or below the control limit.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every inorganics analytical batch (maximum 20 samples) and an MSD for every organics analytical batch (maximum 20 samples) and reported RPDs for MD and MSD prepared using a sample from the site. Five excavation confirmation soil samples (as designated by the sampler on the custody record) were used to prepare an MD or MSD for TCLP Metals and/or Total Metals. With a total of 145 investigative soil samples, this does not meet the Workplan requirement of one per 20 or fewer samples per sample matrix. Additionally, no soil samples were designated by the sampler for MSD for the backfill samples. The laboratory selected a backfill sample for batch QC for one or more MSD for Total Metals, Herbicides, SVOCs, and Chromium (VI). No MSD were prepared using a backfill sample for Pesticides, PCBs, VOCs, or Cyanide.

Some MD and MSD RPDs are above the control limit and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that, for cases where either result for the duplicate pair is non-detect, the check does not apply and the laboratory reported the RPD as NC (not calculable) in the pdf report and as 0 in the EDD. Additionally, the validator considered samples of the same media (i.e., backfill or excavation confirmation) to be of similar matrix (e.g., if deficiencies were noted for a MD or MSD prepared using a backfill sample, all backfill samples in the same analytical batch were qualified).

3.1.3 FIELD DUPLICATE (FD) PRECISION

The samplers collected eight FD with the 145 investigative samples, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Six FD were collected with the excavation confirmation samples and analyzed for TCLP Metals and/or Total Metals, one FD was collected with the backfill grab samples and analyzed for VOCs, and one FD was collected with the backfill composite samples and analyzed for the remaining DER-10 tests. Results for the field duplicates are summarized in Table 5.

Four pairs of results are outside the field precision criteria and the validator qualified the data as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4

lists all qualified results for the field samples. Note that the remaining 100 pairs of FD results meet the criteria, which indicates good overall precision, and thus the validator only qualified the original and duplicate sample for the four FD deficiencies.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD), matrix spikes (MS/MSD), serial dilutions (SD), and surrogate (SU) spikes. LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit. Surrogates are added to each sample before preparation and analysis and provide an indication of accuracy for each individual sample analysis.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS and/or LCSD for every analytical batch (maximum 20 samples) as required and reported recoveries for all target compounds except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result).

Some LCS recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator did not qualify the data for cases where the LCS or LCSD recovery is outside the control limits (i.e., the laboratory-derived recovery control limits based on historical performance or 50-200%, whichever is more stringent) but within 70-130% since this is considered within the inherent method error and suitable for the intended use.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS for every inorganics analytical batch (maximum 20 samples) and an MS/MSD for every organics analytical batch (maximum 20 samples) and reported recoveries for MS and MSD prepared using a sample from the site. Five excavation confirmation soil samples (as designated by the sampler on the custody record) were used to prepare an MS for TCLP Metals and/or Total Metals. With a total of 145 investigative soil samples, this does not meet the Workplan requirement of one per 20 or fewer samples per sample matrix. Additionally, no soil samples were designated by the sampler for MS/MSD for the backfill samples. The laboratory selected a backfill sample for batch QC for one or more MS/MSD for Total Metals, Herbicides, SVOCs, and Chromium (VI). No MS/MSD were prepared using a backfill sample for Pesticides, PCBs, VOCs, or Cyanide.

Some MS and MSD recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that if an analyte was detected in the unspiked parent sample at a concentration well above (greater than four times) the concentration of spike added to the sample, thereby rendering the recoveries inconclusive, the check was waived and the validator did not qualify the data. For cases where the MS or MSD recovery is outside the control limits but greater than the data rejection limit (30% for inorganics, 20% for purgeable organics (VOC), and 10% for extractable organics) and the average MS/MSD recovery is in control, the

validator did not qualify the data. The validator also did not qualify the data for cases where the MS or MSD recovery is outside the control limits (i.e., the laboratory-derived recovery control limits based on historical performance or 50-200%, whichever is more stringent) but within 70-130% since this is considered within the inherent method error and suitable for the intended use. Additionally, the validator considered samples of the same media (i.e., backfill or excavation confirmation) to be of similar matrix (e.g., if deficiencies were noted for a MS/MSD prepared using a backfill sample, all backfill samples in the same analytical batch were qualified).

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all target compounds detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.2.4 SURROGATE (SU) RECOVERY

The laboratory spiked each organic sample with one or more surrogates before preparation and analysis.

Some surrogate recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

All samples were delivered to the laboratory by the sampler or an overnight, commercial carrier with properly executed chain-of-custody records, which confirms that sample integrity was maintained. The validator noted the following regarding the custody records and sample log-in at the laboratory:

- All samples were received within two days of collection as recommended in DER-10 except those in laboratory job numbers 460-59430-1, which were received three days after collection in good condition.
- For job no. 460-55575-1, 460-55575-2, and 460-59818-1, the laboratory sample receipt check form indicates a custody seal was not present, but in each case, the number of the custody seal appears on the custody record as entered by the laboratory upon receipt.
- For job no. 460-55575-1, 460-55958-1,460-58750-1, 460-59430-1, 460-59467-1, and 460-59818-1, the sample IDs for some samples were updated from that on the custody record per Entact's request as delineated in the laboratory case narratives.

All samples were analyzed for the tests requested on the chain-of-custody except as follows:

- For work order work order 460-55575-1, TAL metals analysis was added for sample ECS-104-F per Entact's request and the results are reported in work order 460-55575-2.
- For job no. 460-60831-1, a trip blank is listed on the custody record but was not received and thus it was not logged in or analyzed.

- For the four backfill composite samples in laboratory job no. 460-58750-12, the laboratory reported an original result 7/1/13 prep date) and re-extracted/re-analyzed result (7/3/13 prep date) for Chromium (VI). The samples were re-extracted/ re-analyzed due to deficiencies for the MS/MSD, which was prepared using a sample from another site and thus does not reflect on data quality for the backfill samples. The validator did not find any QC deficiencies for either set of results and all results are non-detect. In the EDD, the laboratory reported the original set with a reportable_result of Yes and the second set with a reportable_result of No. The validator confirmed this selection and made no changes.
- For the two backfill composite samples in laboratory job no. 460-60831-3, the laboratory reported an original result (8/12/13 prep date) and re-extracted/re-analyzed result (8/13/13 prep date) for Chromium (VI). The samples were re-extracted/ re-analyzed due to deficiencies for the MS/MSD, which was prepared using a sample from the site and thus the original results are qualified due to low MS recovery. The validator did not find any QC deficiencies requiring qualification for the second set of results and all results are non-detect. In the EDD, the laboratory reported the original set with a reportable_result of Yes and the second set with a reportable_result of No. The validator determined that the QC is better for the second set of results and thus changed the reportable_result to No for the original set and to Yes for the second set.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

All samples were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan, and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. (In some cases, the method update number used by the laboratory may differ from that in the Workplan. For example, method 8081A was used rather than 8081B for the Pesticides for all backfill samples except those in job no. 460-63880-1.)

For the backfill samples, the target analyte list includes all DER-10 analytes and the nominal reporting limits (i.e., without dry-weight correction or sample dilution and based on the standard sample weight and final volume) are at or below the levels of concern (i.e., the Allowable Constituent Levels (ACLs) for imported fill or soil from Appendix 5 of the DER-10), except as follows:

- DER-10 Appendix 5 lists m-Cresol(s), o-Cresol(s), and p-Cresol(s). The laboratory reported m & p-Cresols and o-Cresol as it is not possible to separate m-Cresol and p-Cresol using method 8270C.
- DER-10 Appendix 5 lists Chlordane (alpha). The laboratory reported technical Chlordane, which is a commercial mixture that contains alpha-Chlordane and gamma-Chlordane along with other related compounds.
- The laboratory inadvertently reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) for the backfill samples instead of the DER-10 analytes as requested.
- The nominal reporting limit for Pentachlorophenol of 1 mg/kg is slightly above the ACL of 0.8 mg/kg. Note however that the laboratory reported any confirmed detects above the method detection limit (MDL) but below the reporting limit (i.e., J-values) and the laboratory's MDL for Pentachlorophenol is well below the ACL at 0.099 mg/kg.

For the excavation confirmation samples, the target analyte list includes total Arsenic, total Lead, and/or TCLP Lead as requested and all Contract Laboratory Program (CLP) metals for the TAL metals. The nominal reporting limits are below the levels of concern (i.e., the remedial goals) for total Arsenic, total Lead, and TCLP Lead. There are no established levels of concern for TAL metals. The nominal reporting limits comply with the requirements in the ASP for TAL metals with the exception of Iron, which has a nominal reporting limit of 30 mg/kg for the soil samples that is above the ASP reporting limit of 20 mg/kg.

(Note: The laboratory dilutes all total metals samples 2-4x before analysis as standard practice. All Revere samples were diluted 4x and thus nominal reporting limits were determined at this dilution rate. The laboratory also dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank (and leachate blank for TCLP) for every analytical batch (maximum 20 samples) and a calibration blank for every 10 metals analyses as required per the analytical methodology. Additionally, a trip blank was included with three of the six shipments of VOC samples, which does not meet the Workplan requirement of one for every cooler of VOC samples. A trip blank was not included with the backfill samples in job no. 460-56528-1, 460-60831-1, and 460-63880-1, and thus potential contamination with VOCs during shipment could not be evaluated for these samples. (Methylene Chloride was detected in one of the three trip blanks collected with the other samples.) Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used.

Some detects are reported in the laboratory and trip blanks, primarily at concentrations between the MDL and RL (i.e., laboratory J-values) and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator calculated a blank equivalent concentration taking into account the sample weight, moisture content, and dilution factor for each sample when determining if the contamination in the blank is near that in the sample, and thus if data quality is affected for that sample. When comparing aqueous blank concentrations (e.g., for trip blanks) to solid samples, the validator assumed that all contamination found in the aqueous blank aliquot analyzed is potentially present in the solid sample aliquot analyzed.

3.3.5 ANALYTICAL PROCEDURES

The analytical procedures (instrument tuning and initial calibration, continuing calibration verification, dual column confirmation, and internal standards), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method with some exceptions. The validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator did not delineate cases where the surrogate has a continuing calibration verification (CCV) %difference above the control limit for the organic analyses, since surrogate recoveries for each sample are evaluated separately.

Additionally, the validator noted the following regarding the analytical procedures:

- For sample 460-60768-1, the TCLP batch worksheet indicates fluid no. 2 was used though the sample pH is <5 after the addition of HCl. The laboratory confirmed that fluid no. 1 was used as confirmed by the fluid pH of 4.92.

No issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes 98 analytical batches and the validator re-calculated sample results and QC check parameters for 10 batches and made the following observations from the review of the raw data:

- The laboratory used dual column confirmation for all GC analyses (including Pesticides, PCBs, and Herbicides). For surrogates and spiked analytes, the laboratory reports the results from both columns (only in the pdf report and not the EDD for work order 460-56528-1). For target analytes in field samples, the laboratory reports the result from the column with the higher concentration (unless chromatographic performance is better on one column and it is therefore used for all analyses), provided that the RPD between the two columns is less than 40%. If the RPD is greater than 40%, the column with the lower concentration is reported with a note in the narrative and the result is reported with a P flag. The RPD exceeded 40% in four cases for this data set but data qualification was not required as detailed in Table 3.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The Level 4 data packages and EDD contain all necessary information or the laboratory submitted a revision upon request as detailed in the case narratives.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	Sample(s)	EDD Field(s)	Action
All	all field and QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.
460-56528-1 460-58750-1 460-60019-1 460-60831-1 460-60942-1 460-63880-1	all backfill composite samples (*c-001 and *c-002)	composite_yn	The validator changed the entry from N to Y based on the custody record.

3.4.3 ANALYTICAL COMPLETENESS

The validator rejected one non-detect result for 1,4-Dioxane due to low internal standard response. With 2,338 total results for field samples (investigative samples and field duplicates), this gives a completeness of 99.96%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which a target analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which a target analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size and include dry-weight correction for all soil samples as required per Section 5.7.1 of the Workplan. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results for the investigative samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics. (For the 7196A analyses, Trivalent Chromium is shown as not dry-weight corrected. Trivalent Chromium is calculated from the results for Hexavalent Chromium and total Chromium, which are dry-weight corrected, and thus the Trivalent Chromium is not directly dry-weight corrected but is on a dry-weight basis.)

The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action

SAMPLES COLLECTED AND TESTS PERFORMED

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-55575-1	ECS-14B-F	5/7/13	INV	ECS	Soil	x											
460-55575-2	ECS-15B-F	5/7/13	INV	ECS	Soil	x											
460-55575-3	ECS-16-F	5/7/13	INV	ECS	Soil	x											
460-55575-4	ECS-17B-F	5/7/13	INV	ECS	Soil	x											
460-55575-5	ECS-122-F	5/7/13	INV	ECS	Soil	x											
460-55575-6	ECS-123-F	5/7/13	INV	ECS	Soil	x											
460-55575-7	ECS-103-F	5/7/13	INV	ECS	Soil	x											
460-55575-8	ECS-103-F-X	5/7/13	FD	ECS	Soil	x											
460-55575-9	ECS-104-F	5/7/13	INV	ECS	Soil	x		x	x								
460-55575-10	ECS-107-F	5/7/13	INV	ECS	Soil	x											
460-55576-1	DS-14-SN	5/7/13	INV	ECS	Soil	x											
460-55576-2	DS-123-SW	5/7/13	INV	ECS	Soil	x											
460-55576-3	DS-122-SW	5/7/13	INV	ECS	Soil	x											
460-55576-4	DS-16-SW	5/7/13	INV	ECS	Soil	x											
460-55576-4MS	DS-16-SWMS	5/7/13	MS	ECS	Soil	x											
460-55576-4LR	DS-16-SWLR	5/7/13	MD	ECS	Soil	x											
460-55958-1	ECS-14B-F-R	5/13/13	INV	ECS	Soil	x											
460-55958-2	ECS-122-F-R	5/13/13	INV	ECS	Soil	x											
460-55958-3	ECS-103-F-R	5/13/13	INV	ECS	Soil	x											
460-55958-4	ECS-104-F-R	5/13/13	INV	ECS	Soil	x											
460-56076-1	ECS-18B-F	5/14/13	INV	ECS	Soil	x											
460-56528-1	BF-SER-RAMPD-DD-1g-001	5/21/13	INV	BF	Soil										x		
460-56528-2	BF-SER-RAMPD-DD-1g-002	5/21/13	INV	BF	Soil										x		
460-56528-3	BF-SER-RAMPD-DD-1g-003	5/21/13	INV	BF	Soil										x		
460-56528-4	BF-SER-RAMPD-DD-1g-004	5/21/13	INV	BF	Soil										x		
460-56528-5	BF-SER-RAMPD-DD-1g-005	5/21/13	INV	BF	Soil										x		
460-56528-6	BF-SER-RAMPD-DD-1g-006	5/21/13	INV	BF	Soil										x		

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-56528-7	BF-SER-RAMPD-DD-1g-007	5/21/13	INV	BF	Soil										x		
460-56528-8	BF-SER-RAMPD-DD-1c-001	5/21/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-56528-8MS	BF-SER-RAMPD-DD-1c-001MS	5/21/13	MS	BF	Soil				x					x			
460-56528-8LR	BF-SER-RAMPD-DD-1c-001LR	5/21/13	MD	BF	Soil				x								
460-56528-8SD	BF-SER-RAMPD-DD-1c-001SD	5/21/13	MSD	BF	Soil									x			
460-56528-9	BF-SER-RAMPD-DD-1c-002	5/21/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-56528-9MS	BF-SER-RAMPD-DD-1c-002MS	5/21/13	MS	BF	Soil						x						
460-56528-9LR	BF-SER-RAMPD-DD-1c-002LR	5/21/13	MD	BF	Soil						x						
460-57026-1	ECS-44-F	5/30/13	INV	ECS	Soil	x	x										
460-57026-1MSMS	ECS-44-FMS	5/30/13	MS	ECS	Soil	x	x										
460-57026-1LRLR	ECS-44-FLR	5/30/13	MD	ECS	Soil	x	x										
460-57026-2	ECS-45-F	5/30/13	INV	ECS	Soil	x	x										
460-57026-3	ECS-46-F	5/30/13	INV	ECS	Soil	x	x										
460-57026-4	ECS-48-F	5/30/13	INV	ECS	Soil	x	x										
460-57026-5	ECS-49-F	5/30/13	INV	ECS	Soil	x	x										
460-57129-1	ECS-52-F	5/31/13	INV	ECS	Soil	x	x										
460-57129-1MS	ECS-52-FMS	5/31/13	MS	ECS	Soil	x											
460-57129-1LR	ECS-52-FLR	5/31/13	MD	ECS	Soil	x											
460-57129-2	ECS-53-F	5/31/13	INV	ECS	Soil	x	x										
460-57129-3	ECS-54-F	5/31/13	INV	ECS	Soil	x	x										
460-57129-4	ECS-55-F	5/31/13	INV	ECS	Soil	x	x										
460-57129-5	ECS-59-F	5/31/13	INV	ECS	Soil	x		x	x								
460-57129-6	ECS-60-F	5/31/13	INV	ECS	Soil	x	x										
460-57129-7	ECS-61-F	5/31/13	INV	ECS	Soil	x	x										
460-57129-7MS	ECS-61-FMS	5/31/13	MS	ECS	Soil			x									
460-57129-7LR	ECS-61-FLR	5/31/13	MD	ECS	Soil			x									
460-57129-8	ECS-61-F-X	5/31/13	FD	ECS	Soil	x	x										
460-57258-1	ECS-47-F	6/4/13	INV	ECS	Soil	x	x										
460-57258-2	ECS-58-F	6/4/13	INV	ECS	Soil	x	x										
460-57258-3	ECS-65-F	6/4/13	INV	ECS	Soil	x											
460-57258-4	ECS-66-F	6/4/13	INV	ECS	Soil	x											

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-57258-5	ECS-67-F	6/4/13	INV	ECS	Soil	x	x										
460-57258-6	ECS-68-F	6/4/13	INV	ECS	Soil	x	x										
460-57258-7	ECS-114-F	6/4/13	INV	ECS	Soil	x											
460-57258-7MS	ECS-114-FMS	6/4/13	MS	ECS	Soil	x											
460-57258-7LR	ECS-114-FLR	6/4/13	MD	ECS	Soil	x											
460-57258-8	ECS-113-F	6/4/13	INV	ECS	Soil	x											
460-57341-1	ECS-112-F	6/5/13	INV	ECS	Soil	x											
460-57341-2	ECS-110-F	6/5/13	INV	ECS	Soil	x											
460-57341-3	ECS-111-F	6/5/13	INV	ECS	Soil	x											
460-57341-4	ECS-109-F	6/5/13	INV	ECS	Soil	x											
460-57341-5	ECS-108-F	6/5/13	INV	ECS	Soil	x											
460-57472-1	ECS-64-F	6/6/13	INV	ECS	Soil	x											
460-57472-2	ECS-105-F	6/6/13	INV	ECS	Soil	x											
460-57911-1	ECS-48-F-R	6/13/13	INV	ECS	Soil	x	x										
460-57911-2	ECS-52-F-R	6/13/13	INV	ECS	Soil	x	x										
460-57911-3	ECS-60-F-R	6/13/13	INV	ECS	Soil	x	x										
460-58360-1	ECS-71-F	6/21/13	INV	ECS	Soil	x											
460-58360-2	ECS-74-F	6/21/13	INV	ECS	Soil	x											
460-58360-3	ECS-75-F	6/21/13	INV	ECS	Soil	x	x										
460-58502-1	ECS-72-F	6/25/13	INV	ECS	Soil	x											
460-58502-2	ECS-73-F	6/25/13	INV	ECS	Soil	x											
460-58750-1	BF-SER-RAMP D-DD-2g-001	6/28/13	INV	BF	Soil										x		
460-58750-2	BF-SER-RAMP D-DD-2g-002	6/28/13	INV	BF	Soil										x		
460-58750-3	BF-SER-RAMP D-DD-2c-001	6/28/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-58750-3	BF-SER-RAMP D-DD-2c-001	6/28/13	INV RE	BF	Soil						x						
460-58750-3MS	BF-SER-RAMP D-DD-2c-001MS	6/28/13	MS	BF	Soil									x			
460-58750-3SD	BF-SER-RAMP D-DD-2c-001SD	6/28/13	MSD	BF	Soil									x			
460-58750-4	BF-SER-RAMP D-DD-3g-001	6/28/13	INV	BF	Soil										x		
460-58750-5	BF-SER-RAMP D-DD-3g-002	6/28/13	INV	BF	Soil										x		
460-58750-6	BF-SER-RAMP D-DD-3c-001	6/28/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-58750-6	BF-SER-RAMP D-DD-3c-001	6/28/13	INV RE	BF	Soil						x						

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-58750-6MS	BF-SER-RAMP D-DD-3c-001MS	6/28/13	MS	BF	Soil				x								
460-58750-6LR	BF-SER-RAMP D-DD-3c-001LR	6/28/13	MD	BF	Soil				x								
460-58750-7	BF-SER-RAMP D-DD-4g-001	6/28/13	INV	BF	Soil										x		
460-58750-8	BF-SER-RAMP D-DD-4g-002	6/28/13	INV	BF	Soil										x		
460-58750-9	BF-SER-RAMP D-DD-4c-001	6/28/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-58750-9	BF-SER-RAMP D-DD-4c-001	6/28/13	INV RE	BF	Soil						x						
460-58750-10	BF-SER-RAMP D-DD-5g-001	6/28/13	INV	BF	Soil										x		
460-58750-11	BF-SER-RAMP D-DD-5g-002	6/28/13	INV	BF	Soil										x		
460-58750-12	BF-SERV-RAMP D-DD-5c-001	6/28/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-58750-12	BF-SERV-RAMP D-DD-5c-001	6/28/13	INV RE	BF	Soil						x						
460-58750-13	TB-6/28/13	6/28/13	TB	TB	Water										x		
460-59430-1	ECS-106-F	7/12/13	INV	ECS	Soil	x											
460-59430-2	ECS-125-F	7/12/13	INV	ECS	Soil	x											
460-59430-3	ECS-102-F	7/12/13	INV	ECS	Soil	x											
460-59430-4	ECS-97-F	7/12/13	INV	ECS	Soil	x											
460-59430-5	ECS-123-F-EFA	7/12/13	INV	ECS	Soil	x		x	x								
460-59430-5MS	ECS-123-F-EFAMS	7/12/13	MS	ECS	Soil				x								
460-59430-5LR	ECS-123-F-EFALR	7/12/13	MD	ECS	Soil				x								
460-59467-1	ECS-81-F	7/15/13	INV	ECS	Soil	x											
460-59467-2	ECS-81-F-X	7/15/13	FD	ECS	Soil	x											
460-59467-3	ECS-82-F	7/15/13	INV	ECS	Soil	x											
460-59467-4	ECS-88-F	7/15/13	INV	ECS	Soil	x											
460-59467-5	ECS-121-F	7/15/13	INV	ECS	Soil	x											
460-59467-6	ECS-122-F-EFA	7/15/13	INV	ECS	Soil	x											
460-59818-1	ECS-55-F-R	7/20/13	INV	ECS	Soil	x	x										
460-59818-1MS	ECS-55-F-RMS	7/20/13	MS	ECS	Soil	x	x										
460-59818-1LR	ECS-55-F-RLR	7/20/13	MD	ECS	Soil	x	x										
460-59818-2	ECS-93-F	7/20/13	INV	ECS	Soil	x											
460-59818-3	ECS-97-F-R	7/20/13	INV	ECS	Soil	x											
460-60019-1	BF-SER-RAMPD-DD-6g-001	7/24/13	INV	BF	Soil										x		

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-60019-2	BF-SER-RAMPD-DD-6g-002	7/24/13	INV	BF	Soil										x		
460-60019-3	BF-SER-RAMPD-DD-6c-001	7/24/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-60019-3MS	BF-SER-RAMPD-DD-6c-001MS	7/24/13	MS	BF	Soil									x		x	
460-60019-3SD	BF-SER-RAMPD-DD-6c-001SD	7/24/13	MSD	BF	Soil									x		x	
460-60019-4	BF-SER-RAMPD-DD-7g-001	7/24/13	INV	BF	Soil										x		
460-60019-5	BF-SER-RAMPD-DD-7g-002	7/24/13	INV	BF	Soil										x		
460-60019-6	BF-SER-RAMPD-DD-7c-001	7/24/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-60019-6MS	BF-SER-RAMPD-DD-7c-001MS	7/24/13	MS	BF	Soil					x							
460-60019-6LR	BF-SER-RAMPD-DD-7c-001LR	7/24/13	MD	BF	Soil					x							
460-60019-7	TB-7/24/13	7/24/13	TB	TB	Water										x		
460-60394-4	ECS-79-F	7/31/13	INV	ECS	Soil	x											
460-60394-5	ECS-80-F	7/31/13	INV	ECS	Soil	x											
460-60394-6	ECS-86-F	7/31/13	INV	ECS	Soil	x											
460-60394-7	ECS-87-F	7/31/13	INV	ECS	Soil	x											
460-60394-8	ECS-92-F	7/31/13	INV	ECS	Soil	x											
460-60768-1	ECS-86-F-R	8/6/13	INV	ECS	Soil	x											
460-60831-1	BF-SER-RAMPD-DD-8g-001	8/7/13	INV	BF	Soil										x		
460-60831-2	BF-SER-RAMPD-DD-8g-002	8/7/13	INV	BF	Soil										x		
460-60831-3	BF-SER-RAMPD-DD-8c-001	8/7/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-60831-3	BF-SER-RAMPD-DD-8c-001	8/7/13	INV RE	BF	Soil						x						
460-60831-3MS	BF-SER-RAMPD-DD-8c-001MS	8/7/13	MS	BF	Soil									x			
460-60831-3SD	BF-SER-RAMPD-DD-8c-001SD	8/7/13	MSD	BF	Soil									x			
460-60831-4	BF-SER-RAMPD-DD-9g-001	8/7/13	INV	BF	Soil										x		
460-60831-5	BF-SER-RAMPD-DD-9g-002	8/7/13	INV	BF	Soil										x		

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-60831-6	BF-SER-RAMPD-DD-9c-001	8/7/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-60831-6	BF-SER-RAMPD-DD-9c-001	8/7/13	INV RE	BF	Soil						x						
460-60831-6MS	BF-SER-RAMPD-DD-9c-001MS	8/7/13	MS	BF	Soil				x	x	x					x	
460-60831-6MS	BF-SER-RAMPD-DD-9c-001MS	8/7/13	MS RE	BF	Soil						x						
460-60831-6LR	BF-SER-RAMPD-DD-9c-001LR	8/7/13	MD	BF	Soil				x	x	x						
460-60831-6LR	BF-SER-RAMPD-DD-9c-001LR	8/7/13	MD RE	BF	Soil						x						
460-60831-6SD	BF-SER-RAMPD-DD-9c-001SD	8/7/13	MSD	BF	Soil											x	
460-60942-1	BF-SER-RAMPD-DD-10g-001	8/8/13	INV	BF	Soil										x		
460-60942-2	BF-SER-RAMPD-DD-10g-002	8/8/13	INV	BF	Soil										x		
460-60942-3	BF-SER-RAMPD-DD-10c-001	8/8/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-60942-3LR	BF-SER-RAMPD-DD-10c-001LR	8/8/13	MD	BF	Soil				x	x							
460-60942-3MS	BF-SER-RAMPD-DD-10c-001MS	8/8/13	MS	BF	Soil				x	x						x	
460-60942-3SD	BF-SER-RAMPD-DD-10c-001SD	8/8/13	MSD	BF	Soil											x	
460-60942-4	BF-SER-RAMPD-DD-11g-001	8/8/13	INV	BF	Soil										x		
460-60942-5	BF-SER-RAMPD-DD-11g-002	8/8/13	INV	BF	Soil										x		
460-60942-6	BF-SER-RAMPD-DD-11c-001	8/8/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-60942-7	BF-SER-RAMPD-DD-11g-001x	8/8/13	FD	BF	Soil										x		
460-60942-8	BF-SER-RAMPD-DD-11c-001x	8/8/13	FD	BF	Soil				x	x	x	x	x	x		x	x
460-60942-8MS	BF-SER-RAMPD-DD-11c-001xMS	8/8/13	MS	BF	Soil						x						
460-60942-8LR	BF-SER-RAMPD-DD-11c-001xLR	8/8/13	MD	BF	Soil						x						

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-60942-9	BF-SER-RAMPD-DD-12g-001	8/8/13	INV	BF	Soil										x		
460-60942-10	BF-SER-RAMPD-DD-12g-002	8/8/13	INV	BF	Soil										x		
460-60942-11	BF-SER-RAMPD-DD-12c-001	8/8/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-60942-11MS	BF-SER-RAMPD-DD-12c-001MS	8/8/13	MS	BF	Soil									x			
460-60942-11SD	BF-SER-RAMPD-DD-12c-001SD	8/8/13	MSD	BF	Soil									x			
460-60942-12	TB-8/8/13	8/8/13	TB	TB	Water										x		
460-61374-1	ECS-70-F	8/15/13	INV	ECS	Soil	x		x	x								
460-61374-1MS	ECS-70-FMS	8/15/13	MS	ECS	Soil				x								
460-61374-1LR	ECS-70-FLR	8/15/13	MD	ECS	Soil				x								
460-61374-2	ECS-78-F	8/15/13	INV	ECS	Soil	x											
460-61374-2MS	ECS-78-FMS	8/15/13	MS	ECS	Soil	x											
460-61374-2LR	ECS-78-FLR	8/15/13	MD	ECS	Soil	x											
460-61374-3	ECS-91-F	8/15/13	INV	ECS	Soil	x											
460-61374-4	ECS-85-F	8/15/13	INV	ECS	Soil	x											
460-61374-5	ECS-91-F-X	8/15/13	FD	ECS	Soil	x											
460-61488-1	ECS-101-F	8/16/13	INV	ECS	Soil	x											
460-61488-2	ECS-96-F	8/16/13	INV	ECS	Soil	x											
460-61488-3	ECS-99-F	8/16/13	INV	ECS	Soil	x											
460-61488-4	ECS-98-F	8/16/13	INV	ECS	Soil	x											
460-61488-5	ECS-100-F	8/16/13	INV	ECS	Soil	x											
460-62377-1	ECS-96-F-R	9/4/13	INV	ECS	Soil	x											
460-62377-2	ECS-95-F	9/4/13	INV	ECS	Soil	x											
460-62377-3	ECS-94-F	9/4/13	INV	ECS	Soil	x											
460-62377-4	ECS-90-F	9/4/13	INV	ECS	Soil	x											
460-62377-5	ECS-84-F	9/4/13	INV	ECS	Soil	x											
460-62377-6	ECS-95-F-X	9/4/13	FD	ECS	Soil	x											
460-62755-1	ECS-83-F	9/10/13	INV	ECS	Soil	x											
460-62755-2	ECS-89-F	9/10/13	INV	ECS	Soil	x											
460-62905-1	ECS-76-F	9/12/13	INV	ECS	Soil	x											
460-63151-1	ECS-77-F	9/17/13	INV	ECS	Soil	x											
460-63151-2	ECS-63-F	9/17/13	INV	ECS	Soil	x											
460-63302-1	ECS-69-F	9/19/13	INV	ECS	Soil	x											
460-63302-1MS	ECS-69-FMS	9/19/13	MS	ECS	Soil	x											
460-63302-1LR	ECS-69-FLR	9/19/13	MD	ECS	Soil	x											
460-63302-2	ECS-62-F	9/19/13	INV	ECS	Soil	x											
460-63302-3	ECS-62-F-X	9/19/13	FD	ECS	Soil	x											

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-63399-1	ECS-56-F	9/20/13	INV	ECS	Soil	x		x	x								
460-63399-2	ECS-50-F	9/20/13	INV	ECS	Soil	x	x										
460-63399-3	ECS-57-F	9/20/13	INV	ECS	Soil	x											
460-63399-4	ECS-51-F	9/20/13	INV	ECS	Soil	x											
460-63880-1	BF-SER-RAMPD-DD-13g-001	9/30/13	INV	BF	Soil										x		
460-63880-2	BF-SER-RAMPD-DD-13g-002	9/30/13	INV	BF	Soil										x		
460-63880-3	BF-SER-RAMPD-DD-13c-001	9/30/13	INV	BF	Soil				x	x	x	x	x	x		x	x
460-63880-3MS	BF-SER-RAMPD-DD-13c-001MS	9/30/13	MS	BF	Soil				x					x			
460-63880-3LR	BF-SER-RAMPD-DD-13c-001LR	9/30/13	MD	BF	Soil				x								
460-63880-3SD	BF-SER-RAMPD-DD-13c-001SD	9/30/13	MSD	BF	Soil									x			
460-63880-4	BF-SER-RAMPD-DD-14g-001	9/30/13	INV	BF	Soil										x		
460-63880-5	BF-SER-RAMPD-DD-14g-002	9/30/13	INV	BF	Soil										x		
460-63880-6	BF-SER-RAMPD-DD-14c-001	9/30/13	INV	BF	Soil				x	x	x	x	x	x		x	x

BF - Backfill Sample

ECS - Excavation Confirmation Sample

FD - Field Duplicate Sample

INV - Investigative Sample

MD – Matrix Duplicate Sample (unspiked)

MS - Matrix Spike Sample

MSD - Matrix Spike Duplicate Sample

RE - Reextracted/Reanalyzed Sample

TB - Trip Blank

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Pb: 1311/ 3010A/ 6010B for Lead in leachates of soil samples
- Total As and Pb: 3050B/ 6010B for Arsenic and Lead in soil samples
- Total TAL Metals: 3050B/ 6010B for 22 ICP-AES Target Analyte List (TAL) Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc) in soil samples
- Hg: 7471A (7471B for job no. 460-63880-1) for total Mercury in soil samples

- Total DER10 Metals: 3050B/ 6010B (6010C for job no. 460-63880-1) for 12 ICP-AES NYSDEC DER-10 Appendix 5 Metals (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, Selenium, Silver, and Zinc in soil samples
- Cr III/VI: 3060A/7196A for Trivalent Chromium and Hexavalent Chromium in soil samples
- PEST: 3546/ 3620B/ 8081A (8081B for job no. 460-63880-1) for 15 NYSDEC DER-10 Appendix 5 pesticides plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene in soil samples
- PCB: 3546/ 3665A/ 8082 (8082A for job no. 460-63880-1) for 7 Aroclors in soil samples
- HERB: 8151A for Silvex (2,4,5-TP) in soil samples
- VOC: 5035/8260B (8260C for job no. 460-63880-1) for 30 NYSDEC DER-10 Appendix 5 volatile organic compounds (VOCs) in soil samples and 5030B/ 8260B for 30 VOCs in aqueous trip blanks
- SVOC: 3541/ 8270C (8270D for job no. 460-63880-1) for 20 NYSDEC DER-10 Appendix 5 semivolatile organic compounds (SVOCs) plus Dibenzofuran and Hexachlorobenzene in soil samples
- CN: 9012A (9012B for job no. 460-63880-1) for Cyanide in soil samples

TABLE 2
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U	=	Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.
UJ	=	Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.
J	=	Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined
J-	=	Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.
J+	=	Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.
R	=	Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action

QC DEFICIENCIES AND DATA QUALIFICATION ACTIONS

Lab ID	Sample Code	Type	Method			Date and Time			GC	D	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col	F		Qual	LCL	UCL	CL		
LABORATORY DUPLICATE (LCSD) PRECISION																	
460168702	460168702/3A	BD		METHOD	8151A		07/02/13 11:44:00	07/03/13 14:20:00	1C	1	SILVEX (2,4,5-TP)				30	RPD reported as NaN rather than calculated value	none (manually calculated RPD (4.3%) within criteria)
460168702	460168702/3A	BD		METHOD	8151A		07/02/13 11:44:00	07/03/13 14:20:00	2C	1	SILVEX (2,4,5-TP)				30	RPD reported as NaN rather than calculated value	none (manually calculated RPD (2.1%) within criteria)
MATRIX DUPLICATE (MD) PRECISION																	
460-57129-7LR	ECS-61-F-20130531LR	LR		SW3020B	6010B		06/03/13 11:55:00	06/04/13 12:30:00	NA	4	ARSENIC				20	Poor lab duplicate precision (42 RPD)	J/UJ to detects/NDs for ECS samples digested in the same batch
MATRIX SPIKE DUPLICATE (MSD) PRECISION																	
460-60831-3SD	BF-SER-RAMPD-DD-8c-001-20130807SD	SD		METHOD	8151A		08/08/13 23:20:00	08/12/13 11:14:00	2C	1	SILVEX (2,4,5-TP)				30	Poor MS/MSD precision (42 RPD)	J to detects for BF samples analyzed in the same batch (none)
FIELD DUPLICATE (FD) PRECISION																	
460-55575-8	ECS-103-F-X-20130507	N	1311	SW3010A	6010B	05/07/2013 18:00:00	05/08/13 10:10:20	05/08/13 15:30:06	NA	5	LEAD				35	Poor field duplicate precision (150 RPD), use higher result from original sample	J/UJ to detects/NDs for original and duplicate sample
460-57129-8	ECS-61-F-X-20130531	N	1311	SW3010A	6010B	06/17/2013 18:30:00	06/19/13 08:14:00	06/19/13 15:11:00	NA	5	LEAD				35	Poor field duplicate precision (absolute difference > 2xRL), use higher value from duplicate sample	J/UJ to detects/NDs for original and duplicate sample
460-57129-8	ECS-61-F-X-20130531	N		SW3020B	6010B		06/03/13 11:55:00	06/04/13 13:34:00	NA	4	LEAD				35	Poor field duplicate precision (75 RPD), use higher result from duplicate sample	J/UJ to detects/NDs for original and duplicate sample

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-62377-6	ECS-95-F-X-20130904	N	1311	SW3010A	6010B	09/05/2013 17:00:00	09/06/13 08:30:00	09/06/13 23:29:00	NA	5	LEAD				35	Poor field duplicate precision (120 RPD), use higher result from original sample	J/UJ to detects/NDs for original and duplicate sample
LABORATORY CONTROL SPIKE (LCS) ACCURACY																	
460163850/2A4	460163850/2A4	BS		SW3020B	6010B		06/03/13 11:55:00	06/04/13 12:41:00	NA	4	ANTIMONY		20.8	252.5		LCS recovery (37.9%) within lab limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch
4601827252A4	4601827252A4	BS		SW3020B	6010B		09/23/13 14:34:00	09/24/13 09:37:00	NA	4	ANTIMONY		20.8	252.5		LCS recovery (46.1%) within lab limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch
4601731772A	4601731772A	BS		METHOD	8151A		07/29/13 11:08:00	07/30/13 08:17:00	1C	1	SILVEX (2,4,5-TP)		79	148		Low LCS recovery (72%) on primary column	None (recovery within 70-130% data qualification limits)
4601731773A	4601731773A	BD		METHOD	8151A		07/29/13 11:08:00	07/30/13 08:39:00	1C	1	SILVEX (2,4,5-TP)		79	148	30	Low LCSD recovery (75%) on primary column	None (recovery within 70-130% data qualification limits)
460163462/4	460163462/4	BS			8260B			05/31/13 08:33:00	NA	1	1,2-DICHLOROETHANE		76	118		High LCS recovery (124%)	None (recovery within 70-130% data qualification limits)
460163462/7	460163462/7	BD			8260B			05/31/13 10:33:00	NA	1	1,2-DICHLOROETHANE		76	118	30	High LCSD recovery (119%)	None (recovery within 70-130% data qualification limits)
4601757404	4601757404	BS			8260B			08/12/13 15:31:00	NA	1	1,1,1-TRICHLOROETHANE		78	117		High LCS recovery (120%)	None (recovery within 70-130% data qualification limits)
MATRIX SPIKE (MS) ACCURACY																	
460-55576-4MS	DS-16-SW-20130507MS	MS	1311	SW3010A	6010B	05/07/2013 18:00:00	05/09/13 08:35:57	05/09/13 14:59:10	NA	100	LEAD		75	125		Low MS recovery (-466%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-57026-1MSMS	ECS-44-F-20130530MS	MS		SW3020B	6010B		05/31/13 18:50:00	06/02/13 17:52:00	NA	4	LEAD	N	75	125		High MS recovery (335%)	J+ to detects for ECS samples digested in the same batch
460-57129-7MS	ECS-61-F-20130531MS	MS		SW3020B	6010B		06/03/13 11:55:00	06/04/13 12:55:00	NA	4	ALUMINUM		75	125		High MS recovery (443%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-57129-7MS	ECS-61-F-20130531MS	MS		SW3020B	6010B		06/03/13 11:55:00	06/04/13 12:55:00	NA	4	ANTIMONY	N	75	125		Low MS recovery (37%)	J-/UJ to detects/NDs for ECS samples digested in the same batch
460-57129-7MS	ECS-61-F-20130531MS	MS		SW3020B	6010B		06/03/13 11:55:00	06/04/13 12:55:00	NA	4	IRON		75	125		Low MS recovery (-1342%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-57129-7MS	ECS-61-F-20130531MS	MS		SW3020B	6010B		06/03/13 11:55:00	06/04/13 12:55:00	NA	4	MANGANESE		75	125		Low MS recovery (27%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-60019-6MS	BF-SER-RAMPD-DD-7c-001-20130724MS	MS		SW3020B	6010B		07/26/13 08:07:00	07/26/13 22:29:00	NA	4	MANGANESE		75	125		High MS recovery (160%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-60942-3MS	BF-SER-RAMPD-DD-10c-001-20130808MS	MS		SW3020B	6010B		08/12/13 05:45:00	08/12/13 09:42:00	NA	4	MANGANESE		75	125		High MS recovery (167%)	None (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-60831-6MS	BF-SER-RAMPD-DD-9c-001-20130807MS	MS		SW3060A	7196A		08/12/13 10:35:00	08/13/13 08:23:00	NA	50	CHROMIUM, HEXAVALENT	N	75	125		Low insoluble MS recovery (57%)	J-/UJ to detects/NDs for BF samples digested in the same batch
460-60831-6MS	BF-SER-RAMPD-DD-9c-001-20130807MS	MS		SW3060A	7196A		08/12/13 10:35:00	08/13/13 08:23:00	NA	1	CHROMIUM, HEXAVALENT	N	75	125		Low soluble MS recovery (69%), PDS passes at 90%	J-/UJ to detects/NDs for BF samples digested in the same batch
460-60831-6MS	BF-SER-RAMPD-DD-9c-001-20130807MS	MS RE		SW3060A	7196A		08/13/13 09:05:00	08/13/13 11:34:00	NA	50	CHROMIUM, HEXAVALENT	N	75	125		Low insoluble MS recovery (70%)	None (recovery within 70-130% data qualification limits)
460-60831-6MS	BF-SER-RAMPD-DD-9c-001-20130807MS	MS RE		SW3060A	7196A		08/13/13 09:05:00	08/13/13 11:34:00	NA	1	CHROMIUM, HEXAVALENT	N	75	125		Low soluble MS recovery (72%), PDS passes at 89%	None (recovery within 70-130% data qualification limits)
460-58750-3SD	BF-SER-RAMPD-DD-2c-001-20130628SD	SD		METHOD	8151A		07/02/13 11:44:00	07/03/13 12:11:00	1C	1	SILVEX (2,4,5-TP)		79	148	30	High MSD recovery (76%) on primary column	None (recovery within 70-130% data qualification limits)
460-60019-3MS	BF-SER-RAMPD-DD-6c-001-20130724MS	MS		METHOD	8151A		07/29/13 11:08:00	07/30/13 10:27:00	1C	1	SILVEX (2,4,5-TP)		79	148		Low MS recovery (65%) on primary column	J-/UJ to detects/NDs for BF samples digested in the same batch
460-60019-3SD	BF-SER-RAMPD-DD-6c-001-20130724SD	SD		METHOD	8151A		07/29/13 11:08:00	07/30/13 10:48:00	1C	1	SILVEX (2,4,5-TP)		79	148	30	Low MSD recovery (61%) on primary column	J-/UJ to detects/NDs for ECS samples digested in the same batch
460-60019-3SD	BF-SER-RAMPD-DD-6c-001-20130724SD	SD		METHOD	8151A		07/29/13 11:08:00	07/30/13 10:48:00	2C	1	SILVEX (2,4,5-TP)		79	148	30	Low MSD recovery (76%) on secondary column	None (recovery within 70-130% data qualification limits)
460-63880-3MS	BF-SER-RAMPD-DD-13c-001-20130930MS	MS		METHOD	8151A		10/01/13 11:14:00	10/02/13 15:02:00	1C	1	SILVEX (2,4,5-TP)	P	79	148		Low MS recovery (73%) on primary column	None (recovery within 70-130% data qualification limits)
460-63880-3SD	BF-SER-RAMPD-DD-13c-001-20130930SD	SD		METHOD	8151A		10/01/13 11:14:00	10/02/13 16:26:00	1C	1	SILVEX (2,4,5-TP)	P	79	148	30	Low MSD recovery (69%) on primary column	None (average MS/MSD recovery (71%) within 70-130% data qualification limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-60019-3MS	BF-SER-RAMPD-DD-6c-001-20130724MS	MS		SW3541	8270C		07/27/13 09:09:00	07/31/13 16:25:00	NA	1	BENZO(G,H,I) PERYLENE		43	106		High MS recovery (111%)	None (recovery within 70-130% data qualification limits)
460-60019-3SD	BF-SER-RAMPD-DD-6c-001-20130724SD	SD		SW3541	8270C		07/27/13 09:09:00	07/31/13 16:47:00	NA	1	BENZO(G,H,I) PERYLENE		43	106	30	High MSD recovery (115%)	None (recovery within 70-130% data qualification limits)
460-60019-3MS	BF-SER-RAMPD-DD-6c-001-20130724MS	MS		SW3541	8270C		07/27/13 09:09:00	07/31/13 16:25:00	NA	1	DIBENZ(A,H) ANTHRACENE		43	107		High MS recovery (116%)	None (recovery within 70-130% data qualification limits)
460-60019-3SD	BF-SER-RAMPD-DD-6c-001-20130724SD	SD		SW3541	8270C		07/27/13 09:09:00	07/31/13 16:47:00	NA	1	DIBENZ(A,H) ANTHRACENE		43	107	30	High MSD recovery (119%)	None (recovery within 70-130% data qualification limits)
460-60019-3MS	BF-SER-RAMPD-DD-6c-001-20130724MS	MS		SW3541	8270C		07/27/13 09:09:00	07/31/13 16:25:00	NA	1	INDENO(1,2,3-C,D) PYRENE		43	109		High MS recovery (131%)	J+ to detects for BF samples digested in the same batch (none)
460-60019-3SD	BF-SER-RAMPD-DD-6c-001-20130724SD	SD		SW3541	8270C		07/27/13 09:09:00	07/31/13 16:47:00	NA	1	INDENO(1,2,3-C,D) PYRENE		43	109	30	High MSD recovery (135%)	J+ to detects for BF samples digested in the same batch (none)
460-60019-3SD	BF-SER-RAMPD-DD-6c-001-20130724SD	SD		SW3541	8270C		07/27/13 09:09:00	07/31/13 16:47:00	NA	1	PENTACHLORO-PHENOL		19	113	30	MSD recovery (46%) within lab limits but <50%	J-/UJ to detects/NDs for BF samples digested in the same batch
460-60831-6MS	BF-SER-RAMPD-DD-9c-001-20130807MS	MS		SW3541	8270C		08/09/13 08:55:00	08/14/13 22:36:00	NA	1	BENZO(A)PYRENE		36	89		High MS recovery (99%)	None (recovery within 70-130% data qualification limits)
460-60831-6SD	BF-SER-RAMPD-DD-9c-001-20130807SD	SD		SW3541	8270C		08/09/13 08:55:00	08/14/13 22:58:00	NA	1	BENZO(A)PYRENE		36	89	30	High MSD recovery (92%)	None (recovery within 70-130% data qualification limits)
460-60831-6MS	BF-SER-RAMPD-DD-9c-001-20130807MS	MS		SW3541	8270C		08/09/13 08:55:00	08/14/13 22:36:00	NA	1	BENZO(G,H,I) PERYLENE		43	106		High MS recovery (114%)	None (recovery within 70-130% data qualification limits)
460-60831-6SD	BF-SER-RAMPD-DD-9c-001-20130807SD	SD		SW3541	8270C		08/09/13 08:55:00	08/14/13 22:58:00	NA	1	BENZO(G,H,I) PERYLENE		43	106	30	High MSD recovery (111%)	None (recovery within 70-130% data qualification limits)
460-60831-6MS	BF-SER-RAMPD-DD-9c-001-20130807MS	MS		SW3541	8270C		08/09/13 08:55:00	08/14/13 22:36:00	NA	1	CRESOLS, M & P		47	103		High MS recovery (107%)	None (recovery within 70-130% data qualification limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-60831-6SD	BF-SER-RAMPD-DD-9c-001-20130807SD	SD		SW3541	8270C		08/09/13 08:55:00	08/14/13 22:58:00	NA	1	CRESOLS, M & P		47	103	30	High MSD recovery (105%)	None (recovery within 70-130% data qualification limits)
460-60831-6MS	BF-SER-RAMPD-DD-9c-001-20130807MS	MS		SW3541	8270C		08/09/13 08:55:00	08/14/13 22:36:00	NA	1	NAPHTHALENE		53	94		High MS recovery (96%)	None (recovery within 70-130% data qualification limits)
460-60831-6SD	BF-SER-RAMPD-DD-9c-001-20130807SD	SD		SW3541	8270C		08/09/13 08:55:00	08/14/13 22:58:00	NA	1	PENTACHLORO-PHENOL		19	113	30	MSD recovery (43%) within lab limits but <50%	None (average MS/MSD recovery (70%) within 70-130% data qualification limits)
SURROGATE (SU) RECOVERY																	
460-58750-12	BF-SERV-RAMPD-DD-5c-001-20130628	N		SW3546	8081A		07/01/13 04:30:00	07/03/13 15:36:00	1C	1	2,4,5,6-TETRACHLORO-META-XYLENE		37	150		High SU recovery (194%) on secondary column	J+ to detects for all analytes in this sample
460-58750-9	BF-SER-RAMPD-DD-4c-001-20130628	N		SW3546	8081A		07/01/13 04:30:00	07/03/13 15:22:00	1C	1	2,4,5,6-TETRACHLORO-META-XYLENE		37	150		High SU recovery (152%) on secondary column	J+ to detects for all analytes in this sample
460-60831-3	BF-SER-RAMPD-DD-8c-001-20130807	N		SW3546	8081A		08/09/13 03:59:00	08/09/13 15:43:00	1C	1	2,4,5,6-TETRACHLORO-META-XYLENE		37	150		High SU recovery (156%) on secondary column	J+ to detects for all analytes in this sample (none)
460-60831-3	BF-SER-RAMPD-DD-8c-001-20130807	N		SW3546	8081A		08/09/13 03:59:00	08/09/13 15:43:00	1C	1	DECACHLORO-BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)		60	150		High SU recovery (152%) on secondary column	J+ to detects for all analytes in this sample (none)
460-60942-8	BF-SER-RAMPD-DD-11c-001x-20130808	N		SW3546	8081A		08/13/13 05:22:00	08/13/13 13:31:00	1C	1	2,4,5,6-TETRACHLORO-META-XYLENE		37	150		High SU recovery (154%) on secondary column	J+ to detects for all analytes in this sample (none)
460-60942-8	BF-SER-RAMPD-DD-11c-001x-20130808	N		SW3546	8081A		08/13/13 05:22:00	08/13/13 13:31:00	1C	1	DECACHLORO-BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)		60	150		High SU recovery (153%) on secondary column	J+ to detects for all analytes in this sample (none)
4601757772A	4601757772A	BS		METHOD	8151A		08/12/13 22:17:00	08/14/13 11:27:00	1C	1	2,4-DICHLOROPHENYL-ACETIC ACID		53	150		High SU recovery (267%) on primary column	None (no effect on environmental sample results)
4601757773A	4601757773A	BD		METHOD	8151A		08/12/13 22:17:00	08/14/13 11:48:00	1C	1	2,4-DICHLOROPHENYL-ACETIC ACID		53	150		High SU recovery (253%) on primary column	None (no effect on environmental sample results)
460-60942-3	BF-SER-RAMPD-DD-10c-001-20130808	N		METHOD	8151A		08/12/13 22:17:00	08/14/13 13:04:00	1C	1	2,4-DICHLOROPHENYL-ACETIC ACID		53	150		High SU recovery (151%) on primary column	J+ to detects for all analytes in this sample (none)
460-60942-3	BF-SER-RAMPD-DD-10c-001-20130808	N		METHOD	8151A		08/12/13 22:17:00	08/14/13 13:04:00	2C	1	2,4-DICHLOROPHENYL-ACETIC ACID		53	150		High SU recovery (151%) on secondary column	J+ to detects for all analytes in this sample (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460184228 1A	4601842281A	LB		SW3546	8081B		10/02/13 08:18:00	10/03/13 11:34:00	2C	1	2,4,5,6-TETRACHLORO-META-XYLENE		37	150		Low SU recovery (52.1%) on secondary column	None (no effect on environmental sample results)
460184228 1A	4601842281A	LB		SW3546	8081B		10/02/13 08:18:00	10/03/13 11:34:00	2C	1	DECACHLORO-BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)		60	150		Low SU recovery (54.5%) on secondary column	None (no effect on environmental sample results)
LABORATORY BLANK CONTAMINATION																	
460170864/1C5	460170864/1C5	LB	1311	SW3010A	6010B	07/16/2013 14:16:00	07/17/13 10:44:00	07/17/13 15:16:00	NA	5	LEAD	J				Leachate blank contamination (24.14 J ug/l)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples leached in the same batch
460163462/10	460163462/10	LB			8260B			05/31/13 11:55:00	NA	1	ACETONE	J				Method blank contamination (8.23 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples shipped in the same container
460163462/10	460163462/10	LB			8260B			05/31/13 11:55:00	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.303 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples shipped in the same container (all ND)
4601737167	4601737167	LB			8260B			07/31/13 20:07:00	NA	1	ACETONE	J				Method blank contamination (2.44 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples shipped in the same container
4601852876	4601852876	LB			8260C			10/08/13 08:24:00	NA	1	ACETONE	J				Method blank contamination (2.02 J ug/kg)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples shipped in the same container (all ND)
TRIP BLANK CONTAMINATION																	
460-60942-12	TB-8/8/13-20130808	TB			8260B			08/16/13 10:28:00	NA	1	METHYLENE CHLORIDE					Trip blank contamination (2 ug/l)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples shipped in the same container
INITIAL CALIBRATION (ICAL)																	
IC 460-184822/3,4,6-9	IC 460-184822/3,4,6-9	ICAL			8260C			10/04/13 18:50:00	NA	1	ACETONE				15	Poor calibration fit (20 %RSD)	None (%RSD below 40% data qualification limit for this poor performer)
IC 460-184822/3,4,6-9	IC 460-184822/3,4,6-9	ICAL			8260C			10/04/13 18:50:00	NA	1	VINYL CHLORIDE				15	Poor calibration fit (16 %RSD)	None (%RSD below 40% data qualification limit for this poor performer)
CONTINUING CALIBRATION VERIFICATION (CCV)																	

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCV 460-163246/22	CCV 460-163246/22	CCV 2			8081A			05/30/13 11:28:00	1C	1	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	*		15		Calibration drift secondary column (%D= +18.2%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-163364/22	CCV 460-163364/22	CCV 2			8081A			05/30/13 11:28:00	1C	1	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	*		15		Calibration drift secondary column (%D= +18.2%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-169054/11	CCV 460-169054/11	CCV 2			8081A			07/03/13 08:18:00	1C	1	HEPTACHLOR	*		15		Calibration drift secondary column (%D= -16.4%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-169054/38	CCV 460-169054/38	CCV 1			8081A			07/03/13 16:07:00	2C	1	ALDRIN	*		15		Calibration drift primary column (%D= +20.5%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-169054/38	CCV 460-169054/38	CCV 1			8081A			07/03/13 16:07:00	2C	1	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	*		15		Calibration drift primary column (%D= +22.8%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-169054/38	CCV 460-169054/38	CCV 1			8081A			07/03/13 16:07:00	2C	1	ALPHA ENDOSULFAN	*		15		Calibration drift primary column (%D= +16.9%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-169054/38	CCV 460-169054/38	CCV 1			8081A			07/03/13 16:07:00	2C	1	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	*		15		Calibration drift primary column (%D= +32.1%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-168572/23	CCV 460-168572/23	CCV 2			8082			07/01/13 15:46:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 4	*		15		Calibration drift secondary column (%D= -30.5%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-168572/49	CCV 460-168572/49	CCV 2			8082			07/02/13 00:03:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 4	*		15		Calibration drift secondary column (%D= -41.5%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-172693/2	CCV 460-172693/2	CCV 2			8082			07/26/13 07:51:00	2C	1	PCB-1016 (AROCLOR 1016) - Peak 1	*		15		Calibration drift secondary column (%D= -15.9%)	None (only LB,BS on this shift, no effect on sample TA results)
CCV 460-172694/2	CCV 460-172694/2	CCV 2			8082			07/26/13 07:55:00	2C	1	PCB-1260 (AROCLOR 1260) - Peak 5	*		15		Calibration drift secondary column (%D= +16.4%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCV 460-172693/14	CCV 460-172693/14	CCV 1			8082			07/26/13 12:14:00	1C	1	PCB-1016 (AROCLOR 1016) - Peak 5	*		15		Calibration drift primary column (%D= +16.8%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-172693/14	CCV 460-172693/14	CCV 1			8082			07/26/13 12:14:00	1C	1	PCB-1260 (AROCLOR 1260) - Peak 3	*		15		Calibration drift primary column (%D= +16.6%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-176200/42	CCV 460-176200/42	CCV 2			8082			08/15/13 00:36:00	1C	1	PCB-1016 (AROCLOR 1016) - Peak 4	*		15		Calibration drift secondary column (%D= +17%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-176200/42	CCV 460-176200/42	CCV 2			8082			08/15/13 00:36:00	1C	1	PCB-1260 (AROCLOR 1260) - Peak 3	*		15		Calibration drift secondary column (%D= +18.5%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-163462/3	CCVIS 460-163462/3	CCV			8260B			05/31/13 07:55:00	NA	1	1,2-DICHLOROETHANE			20		Calibration drift (%D= +26.4%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-163462/3	CCVIS 460-163462/3	CCV			8260B			05/31/13 07:55:00	NA	1	ACETONE			20		Calibration drift (%D= +26.2%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-163462/3	CCVIS 460-163462/3	CCV			8260B			05/31/13 07:55:00	NA	1	CARBON TETRACHLORIDE			20		Calibration drift (%D= +25.3%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-169743/3	CCVIS 460-169743/3	CCV			8260B			07/09/13 21:36:00	NA	1	1,2,4-TRIMETHYLBENZENE			20		Calibration drift (%D= +20.5%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-169743/3	CCVIS 460-169743/3	CCV			8260B			07/09/13 21:36:00	NA	1	O-XYLENE (1,2-DIMETHYLBENZENE)			20		Calibration drift (%D= +22%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-175740/2	CCVIS 460-175740/2	CCV			8260B			08/12/13 13:55:00	NA	1	ACETONE			20		Calibration drift (%D= -23.4%)	J- to detects, UJ to NDs samples analyzed this shift
CCVIS 460-175740/2	CCVIS 460-175740/2	CCV			8260B			08/12/13 13:55:00	NA	1	CARBON TETRACHLORIDE			20		Calibration drift (%D= +26.3%)	J+ to detects only since < +40% for samples analyzed this shift (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-175585/3	CCVIS 460-175585/3	CCV			8260B			08/12/13 05:59:00	NA	1	ACETONE			20		Calibration drift (%D= +21.6%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-185287/2	CCVIS 460-185287/2	CCV			8260C			10/08/13 05:45:00	NA	1	VINYL CHLORIDE	*		20		Calibration drift (%D= -21.9%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-176210/2	CCVIS 460-176210/2	CCV			8270C			08/14/13 15:38:00	NA	1	DIBENZ(A,H) ANTHRACENE	*		20		Calibration drift (%D= -22.5%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
INTERNAL STANDARD RESPONSE																	
460-58750-11	BF-SER-RAMPD-DD-5g-002-20130628	N		SW5035	8260B		06/29/13 14:48:00	07/10/13 07:00:00	NA	1	1,4-DIOXANE-D8		50	200		Low internal standard response (26.6%)	R to the ND for the analyte quantitated with this IS (1,4-Dioxane) in this sample
DUAL COLUMN CONFIRMATION																	
460-58750-12	BF-SERV-RAMPD-DD-5c-001-20130628	N		SW3546	8081A		07/01/13 04:30:00	07/03/13 15:36:00	2C	1	2,4,5,6-TETRACHLORO-META-XYLENE	P			40	Poor precision for secondary column result (46 RPD), laboratory reported the lower value	None (no effect on sample TA results)
460-60831-3MS	BF-SER-RAMPD-DD-8c-001-20130807MS	MS		METHOD	8151A		08/08/13 23:20:00	08/12/13 10:52:00	1C	1	SILVEX (2,4,5-TP)	P			40	Poor precision for secondary column result (43 RPD), laboratory reported the lower value	None (no effect on sample TA results)
460-63880-3MS	BF-SER-RAMPD-DD-13c-001-20130930MS	MS		METHOD	8151A		10/01/13 11:14:00	10/02/13 15:02:00	1C	1	SILVEX (2,4,5-TP)	P			40	Poor precision for secondary column result (45 RPD), laboratory reported the lower value	None (no effect on sample TA results)
460-63880-3SD	BF-SER-RAMPD-DD-13c-001-20130930SD	SD		METHOD	8151A		10/01/13 11:14:00	10/02/13 16:26:00	1C	1	SILVEX (2,4,5-TP)	P			40	Poor precision for secondary column result (50 RPD), laboratory reported the lower value	None (no effect on sample TA results)

CL – Control Limit

DF – Dilution Factor

LCL – Lower Control Limit

UCL – Upper Control Limit

TABLE 4
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase Phase II-B Remedial Design/ Remedial Action

QUALIFIED RESULTS FOR FIELD SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
TCLP METALS							
460-55575-7	ECS-103-F-20130507	1311 LEAD	10200		ug/l	J	Poor field duplicate precision (150 RPD), use higher result from original sample
460-55575-8	ECS-103-F-X-20130507	1311 LEAD	1590		ug/l	J	Poor field duplicate precision (150 RPD), use higher result from original sample
460-57129-7	ECS-61-F-20130531	1311 LEAD	62.9		ug/l	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from duplicate sample
460-57129-8	ECS-61-F-X-20130531	1311 LEAD	243		ug/l	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from duplicate sample
460-59430-1	ECS-106-F-20130712	1311 LEAD	229	B	ug/l	J+	Leachate blank contamination (24.14 J ug/l)
460-59430-2	ECS-125-F-20130712	1311 LEAD	103	B	ug/l	J+	Leachate blank contamination (24.14 J ug/l)
460-59430-3	ECS-102-F-20130712	1311 LEAD	25.1	B	ug/l	J+	Leachate blank contamination (24.14 J ug/l)
460-59467-3	ECS-82-F-20130715	1311 LEAD	52.6	B	ug/l	J+	Leachate blank contamination (24.14 J ug/l)
460-59467-4	ECS-88-F-20130715	1311 LEAD	83.0	B	ug/l	J+	Leachate blank contamination (24.14 J ug/l)
460-59467-6	ECS-122-F-EFA-20130715	1311 LEAD	110	B	ug/l	J+	Leachate blank contamination (24.14 J ug/l)
460-62377-2	ECS-95-F-20130904	1311 LEAD	1350		ug/l	J	Poor field duplicate precision (120 RPD), use higher result from original sample
460-62377-6	ECS-95-F-X-20130904	1311 LEAD	353		ug/l	J	Poor field duplicate precision (120 RPD), use higher result from original sample
TOTAL METALS							
460-55575-9	ECS-104-F-20130507	CADMIUM	0.68	J	mg/kg	J	Result between MDL and RL
460-55575-9	ECS-104-F-20130507	POTASSIUM	614	J	mg/kg	J	Result between MDL and RL
460-57026-1	ECS-44-F-20130530	LEAD	126		mg/kg	J+	High MS recovery (335%)
460-57026-2	ECS-45-F-20130530	LEAD	141		mg/kg	J+	High MS recovery (335%)
460-57026-3	ECS-46-F-20130530	LEAD	40.2		mg/kg	J+	High MS recovery (335%)
460-57026-4	ECS-48-F-20130530	LEAD	1160		mg/kg	J+	High MS recovery (335%)
460-57026-5	ECS-49-F-20130530	LEAD	19.3		mg/kg	J+	High MS recovery (335%)
460-57129-1	ECS-52-F-20130531	ARSENIC	23.3		mg/kg	J	Poor lab duplicate precision (42 RPD)
460-57129-2	ECS-53-F-20130531	ARSENIC	6.3		mg/kg	J	Poor lab duplicate precision (42 RPD)
460-57129-3	ECS-54-F-20130531	ARSENIC	5.0		mg/kg	J	Poor lab duplicate precision (42 RPD)
460-57129-4	ECS-55-F-20130531	ARSENIC	16.0		mg/kg	J	Poor lab duplicate precision (42 RPD)
460-57129-5	ECS-59-F-20130531	ANTIMONY	3.8		mg/kg	J-	LCS recovery (37.9%) within lab limits but <50%; Low MS recovery (37%)
460-57129-5	ECS-59-F-20130531	ARSENIC	11.9		mg/kg	J	Poor lab duplicate precision (42 RPD)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-57129-5	ECS-59-F-20130531	CADMIUM	0.56 J mg/kg	J	Result between MDL and RL
460-57129-5	ECS-59-F-20130531	POTASSIUM	1030 J mg/kg	J	Result between MDL and RL
460-57129-6	ECS-60-F-20130531	ARSENIC	5.8 mg/kg	J	Poor lab duplicate precision (42 RPD)
460-57129-7	ECS-61-F-20130531	ARSENIC	5.7 mg/kg	J	Poor lab duplicate precision (42 RPD)
460-57129-7	ECS-61-F-20130531	LEAD	18.0 mg/kg	J	Poor field duplicate precision (75 RPD), use higher result from duplicate sample
460-57129-8	ECS-61-F-X-20130531	ARSENIC	6.5 mg/kg	J	Poor lab duplicate precision (42 RPD)
460-57129-8	ECS-61-F-X-20130531	LEAD	39.6 mg/kg	J	Poor field duplicate precision (75 RPD), use higher result from duplicate sample
460-58750-6	BF-SER-RAMP D-DD-3c-001-20130628	BERYLLIUM	0.41 J mg/kg	J	Result between MDL and RL
460-59430-5	ECS-123-F-EFA-20130712	BARIUM	39.4 J mg/kg	J	Result between MDL and RL
460-59430-5	ECS-123-F-EFA-20130712	CALCIUM	611 J mg/kg	J	Result between MDL and RL
460-60019-3	BF-SER-RAMPD-DD-6c-001-20130724	BARIUM	38.2 J mg/kg	J	Result between MDL and RL
460-60019-3	BF-SER-RAMPD-DD-6c-001-20130724	BERYLLIUM	0.40 J mg/kg	J	Result between MDL and RL
460-60019-6	BF-SER-RAMPD-DD-7c-001-20130724	BARIUM	41.9 J mg/kg	J	Result between MDL and RL
460-60831-3	BF-SER-RAMPD-DD-8c-001-20130807	BERYLLIUM	0.43 J mg/kg	J	Result between MDL and RL
460-60942-3	BF-SER-RAMPD-DD-10c-001-20130808	BERYLLIUM	0.40 J mg/kg	J	Result between MDL and RL
460-60942-6	BF-SER-RAMPD-DD-11c-001-20130808	CADMIUM	0.20 J mg/kg	J	Result between MDL and RL
460-60942-6	BF-SER-RAMPD-DD-11c-001-20130808	SILVER	0.27 J mg/kg	J	Result between MDL and RL
460-60942-8	BF-SER-RAMPD-DD-11c-001x-20130808	CADMIUM	0.19 J mg/kg	J	Result between MDL and RL
460-60942-8	BF-SER-RAMPD-DD-11c-001x-20130808	SILVER	0.25 J mg/kg	J	Result between MDL and RL
460-60942-11	BF-SER-RAMPD-DD-12c-001-20130808	CADMIUM	0.17 J mg/kg	J	Result between MDL and RL
460-61374-1	ECS-70-F-20130815	CALCIUM	557 J mg/kg	J	Result between MDL and RL
460-61374-1	ECS-70-F-20130815	POTASSIUM	915 J mg/kg	J	Result between MDL and RL
460-61374-1	ECS-70-F-20130815	SELENIUM	2.0 J mg/kg	J	Result between MDL and RL
460-63399-1	ECS-56-F-20130920	ANTIMONY	1.9 U mg/kg	UJ	LCS recovery (46.1%) within lab limits but <50%
460-63399-1	ECS-56-F-20130920	CALCIUM	643 J mg/kg	J	Result between MDL and RL
460-63399-1	ECS-56-F-20130920	POTASSIUM	761 J mg/kg	J	Result between MDL and RL
CHROMIUM VI					
460-60831-3	BF-SER-RAMPD-DD-8c-001-20130807	CHROMIUM, HEXAVALENT	2.3 U mg/kg	UJ	Low insoluble MS recovery (57%)
460-60831-6	BF-SER-RAMPD-DD-9c-001-20130807	CHROMIUM, HEXAVALENT	2.1 U mg/kg	UJ	Low soluble MS recovery (69%), PDS passes at 90%
PESTICIDES					
460-58750-3	BF-SER-RAMP D-DD-2c-001-20130628	HEPTACHLOR	7.5 U ug/kg	UJ	Calibration drift secondary column (%D= -16.4%)
460-58750-6	BF-SER-RAMP D-DD-3c-001-20130628	HEPTACHLOR	7.5 U ug/kg	UJ	Calibration drift secondary column (%D= -16.4%)
460-58750-9	BF-SER-RAMP D-DD-4c-001-20130628	HEPTACHLOR	7.6 U ug/kg	UJ	Calibration drift secondary column (%D= -16.4%)
460-58750-9	BF-SER-RAMP D-DD-4c-001-20130628	P,P'-DDD	200 ug/kg	J+	High SU recovery (152%) on secondary column

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-58750-9	BF-SER-RAMP D-DD-4c-001-20130628	P,P'-DDE	39		ug/kg	J+	High SU recovery (152%) on secondary column
460-58750-9	BF-SER-RAMP D-DD-4c-001-20130628	P,P'-DDT	48		ug/kg	J+	High SU recovery (152%) on secondary column
460-58750-12	BF-SERV-RAMP D-DD-5c-001-20130628	P,P'-DDD	320		ug/kg	J+	High SU recovery (194%) on secondary column
460-58750-12	BF-SERV-RAMP D-DD-5c-001-20130628	P,P'-DDE	44		ug/kg	J+	High SU recovery (194%) on secondary column
460-58750-12	BF-SERV-RAMP D-DD-5c-001-20130628	HEPTACHLOR	7.5	U	ug/kg	UJ	Calibration drift secondary column (%D= -16.4%)
460-58750-12	BF-SERV-RAMP D-DD-5c-001-20130628	P,P'-DDT	77		ug/kg	J+	High SU recovery (194%) on secondary column
PCB AROCLORS							
460-58750-3	BF-SER-RAMP D-DD-2c-001-20130628	PCB-1260 (AROCLOR 1260)	75	U	ug/kg	UJ	Calibration drift secondary column (%D= -30.5%), Calibration drift secondary column (%D= -41.5%)
460-58750-6	BF-SER-RAMP D-DD-3c-001-20130628	PCB-1260 (AROCLOR 1260)	75	U	ug/kg	UJ	Calibration drift secondary column (%D= -30.5%), Calibration drift secondary column (%D= -41.5%)
460-58750-9	BF-SER-RAMP D-DD-4c-001-20130628	PCB-1260 (AROCLOR 1260)	76	U	ug/kg	UJ	Calibration drift secondary column (%D= -30.5%), Calibration drift secondary column (%D= -41.5%)
460-58750-12	BF-SERV-RAMP D-DD-5c-001-20130628	PCB-1260 (AROCLOR 1260)	75	U	ug/kg	UJ	Calibration drift secondary column (%D= -30.5%), Calibration drift secondary column (%D= -41.5%)
HERBICIDES							
460-60019-3	BF-SER-RAMPD-DD-6c-001-20130724	SILVEX (2,4,5-TP)	18	U	ug/kg	UJ	Low MS recovery (65%) on primary column; Low MSD recovery (61%) on primary column
460-60019-6	BF-SER-RAMPD-DD-7c-001-20130724	SILVEX (2,4,5-TP)	19	U	ug/kg	UJ	Low MS recovery (65%) on primary column; Low MSD recovery (61%) on primary column
VOLATILE ORGANIC COMPOUNDS (VOC)							
460-56528-1	BF-SER-RAMPD-DD-1g-001-20130521	ACETONE	10	B	ug/kg	J+	Method blank contamination (8.23 J ug/kg); Calibration drift (%D= +26.2%)
460-56528-2	BF-SER-RAMPD-DD-1g-002-20130521	ACETONE	9.5	BJ	ug/kg	U	Method blank contamination (8.23 J ug/kg); Calibration drift (%D= +26.2%)
460-56528-3	BF-SER-RAMPD-DD-1g-003-20130521	ACETONE	11	B	ug/kg	J+	Method blank contamination (8.23 J ug/kg); Calibration drift (%D= +26.2%)
460-56528-4	BF-SER-RAMPD-DD-1g-004-20130521	ACETONE	12	B	ug/kg	J+	Method blank contamination (8.23 J ug/kg); Calibration drift (%D= +26.2%)
460-56528-5	BF-SER-RAMPD-DD-1g-005-20130521	ACETONE	12	B	ug/kg	J+	Method blank contamination (8.23 J ug/kg); Calibration drift (%D= +26.2%)
460-56528-6	BF-SER-RAMPD-DD-1g-006-20130521	ACETONE	11	B	ug/kg	J+	Method blank contamination (8.23 J ug/kg); Calibration drift (%D= +26.2%)
460-56528-7	BF-SER-RAMPD-DD-1g-007-20130521	ACETONE	8.7	BJ	ug/kg	U	Method blank contamination (8.23 J ug/kg); Calibration drift (%D= +26.2%)
460-58750-5	BF-SER-RAMP D-DD-3g-002-20130628	ACETONE	4.5	J	ug/kg	J	Result between MDL and RL
460-58750-11	BF-SER-RAMP D-DD-5g-002-20130628	1,4-DIOXANE (P-DIOXANE)	42	U	ug/kg	R	Low internal standard response (26.6%)
460-60019-1	BF-SER-RAMPD-DD-6g-001-20130724	ACETONE	24	B	ug/kg	J+	Method blank contamination (2.44 J ug/kg)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-60019-1	BF-SER-RAMPD-DD-6g-001-20130724	METHYLENE CHLORIDE	0.52 J ug/kg	J	Result between MDL and RL
460-60019-4	BF-SER-RAMPD-DD-7g-001-20130724	METHYLENE CHLORIDE	0.75 J ug/kg	J	Result between MDL and RL
460-60831-1	BF-SER-RAMPD-DD-8g-001-20130807	ACETONE	97 ug/kg	J-	Calibration drift (%D= -23.4%)
460-60831-2	BF-SER-RAMPD-DD-8g-002-20130807	ACETONE	7.5 J ug/kg	J	Calibration drift (%D= -23.4%); Result between MDL and RL
460-60831-4	BF-SER-RAMPD-DD-9g-001-20130807	ACETONE	18 ug/kg	J-	Calibration drift (%D= -23.4%)
460-60831-4	BF-SER-RAMPD-DD-9g-001-20130807	METHYLENE CHLORIDE	0.71 J ug/kg	J	Result between MDL and RL
460-60831-5	BF-SER-RAMPD-DD-9g-002-20130807	ACETONE	5.2 J ug/kg	J	Calibration drift (%D= -23.4%); Result between MDL and RL
460-60942-1	BF-SER-RAMPD-DD-10g-001-20130808	METHYLENE CHLORIDE	0.90 J ug/kg	U	Trip blank contamination (2 ug/l)
460-60942-2	BF-SER-RAMPD-DD-10g-002-20130808	METHYLENE CHLORIDE	0.87 J ug/kg	U	Trip blank contamination (2 ug/l)
460-60942-4	BF-SER-RAMPD-DD-11g-001-20130808	METHYLENE CHLORIDE	1.1 ug/kg	J+	Trip blank contamination (2 ug/l)
460-60942-7	BF-SER-RAMPD-DD-11g-001x-20130808	METHYLENE CHLORIDE	0.85 J ug/kg	U	Trip blank contamination (2 ug/l)
460-60942-9	BF-SER-RAMPD-DD-12g-001-20130808	METHYLENE CHLORIDE	0.85 J ug/kg	U	Trip blank contamination (2 ug/l)
460-60942-10	BF-SER-RAMPD-DD-12g-002-20130808	METHYLENE CHLORIDE	0.83 J ug/kg	U	Trip blank contamination (2 ug/l)
460-63880-1	BF-SER-RAMPD-DD-13g-001-20130930	VINYL CHLORIDE	0.97 U ug/kg	UJ	Calibration drift (%D= -21.9%)
460-63880-2	BF-SER-RAMPD-DD-13g-002-20130930	CHLOROBENZENE	0.19 J ug/kg	J	Result between MDL and RL
460-63880-2	BF-SER-RAMPD-DD-13g-002-20130930	VINYL CHLORIDE	0.97 U ug/kg	UJ	Calibration drift (%D= -21.9%)
460-63880-4	BF-SER-RAMPD-DD-14g-001-20130930	VINYL CHLORIDE	0.83 U ug/kg	UJ	Calibration drift (%D= -21.9%)
460-63880-5	BF-SER-RAMPD-DD-14g-002-20130930	VINYL CHLORIDE	0.87 U ug/kg	UJ	Calibration drift (%D= -21.9%)
SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)					
460-56528-8	BF-SER-RAMPD-DD-1c-001-20130521	BENZO(G,H,I) PERYLENE	36 J ug/kg	J	Result between MDL and RL
460-56528-8	BF-SER-RAMPD-DD-1c-001-20130521	BENZO(K) FLUORANTHENE	34 J ug/kg	J	Result between MDL and RL
460-56528-8	BF-SER-RAMPD-DD-1c-001-20130521	CHRYSENE	44 J ug/kg	J	Result between MDL and RL
460-56528-8	BF-SER-RAMPD-DD-1c-001-20130521	FLUORANTHENE	84 J ug/kg	J	Result between MDL and RL
460-56528-8	BF-SER-RAMPD-DD-1c-001-20130521	PYRENE	73 J ug/kg	J	Result between MDL and RL
460-56528-9	BF-SER-RAMPD-DD-1c-002-20130521	BENZO(G,H,I) PERYLENE	36 J ug/kg	J	Result between MDL and RL
460-56528-9	BF-SER-RAMPD-DD-1c-002-20130521	BENZO(K) FLUORANTHENE	25 J ug/kg	J	Result between MDL and RL
460-56528-9	BF-SER-RAMPD-DD-1c-002-20130521	CHRYSENE	51 J ug/kg	J	Result between MDL and RL
460-56528-9	BF-SER-RAMPD-DD-1c-002-20130521	DIBENZ(A,H) ANTHRACENE	13 J ug/kg	J	Result between MDL and RL
460-56528-9	BF-SER-RAMPD-DD-1c-002-20130521	FLUORANTHENE	95 J ug/kg	J	Result between MDL and RL
460-56528-9	BF-SER-RAMPD-DD-1c-002-20130521	PHENANTHRENE	59 J ug/kg	J	Result between MDL and RL
460-56528-9	BF-SER-RAMPD-DD-1c-002-20130521	PYRENE	91 J ug/kg	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-58750-12	BF-SERV-RAMP D-DD-5c-001-20130628	BENZO(K) FLUORANTHENE	34	J	ug/kg	J	Result between MDL and RL
460-58750-12	BF-SERV-RAMP D-DD-5c-001-20130628	CHRYSENE	87	J	ug/kg	J	Result between MDL and RL
460-58750-12	BF-SERV-RAMP D-DD-5c-001-20130628	FLUORANTHENE	260	J	ug/kg	J	Result between MDL and RL
460-58750-12	BF-SERV-RAMP D-DD-5c-001-20130628	PHENANTHRENE	220	J	ug/kg	J	Result between MDL and RL
460-58750-12	BF-SERV-RAMP D-DD-5c-001-20130628	PYRENE	220	J	ug/kg	J	Result between MDL and RL
460-60019-3	BF-SER-RAMPD-DD-6c-001-20130724	NAPHTHALENE	65	J	ug/kg	J	Result between MDL and RL
460-60019-3	BF-SER-RAMPD-DD-6c-001-20130724	PENTACHLORO-PHENOL	1100	U	ug/kg	UJ	MSD recovery (46%) within lab limits but <50%
460-60019-6	BF-SER-RAMPD-DD-7c-001-20130724	PENTACHLORO-PHENOL	1100	U	ug/kg	UJ	MSD recovery (46%) within lab limits but <50%
460-60831-3	BF-SER-RAMPD-DD-8c-001-20130807	BENZO(A) ANTHRACENE	28	J	ug/kg	J	Result between MDL and RL
460-60831-3	BF-SER-RAMPD-DD-8c-001-20130807	BENZO(A)PYRENE	15	J	ug/kg	J	Result between MDL and RL
460-60831-3	BF-SER-RAMPD-DD-8c-001-20130807	BENZO(B) FLUORANTHENE	21	J	ug/kg	J	Result between MDL and RL
460-60831-3	BF-SER-RAMPD-DD-8c-001-20130807	BENZO(K) FLUORANTHENE	14	J	ug/kg	J	Result between MDL and RL
460-60831-3	BF-SER-RAMPD-DD-8c-001-20130807	DIBENZ(A,H) ANTHRACENE	40	U	ug/kg	UJ	Calibration drift (%D= -22.5%)
460-60831-3	BF-SER-RAMPD-DD-8c-001-20130807	INDENO(1,2,3-C,D) PYRENE	13	J	ug/kg	J	Result between MDL and RL
460-60831-6	BF-SER-RAMPD-DD-9c-001-20130807	BENZO(A) ANTHRACENE	26	J	ug/kg	J	Result between MDL and RL
460-60831-6	BF-SER-RAMPD-DD-9c-001-20130807	BENZO(A)PYRENE	20	J	ug/kg	J	Result between MDL and RL
460-60831-6	BF-SER-RAMPD-DD-9c-001-20130807	BENZO(B) FLUORANTHENE	28	J	ug/kg	J	Result between MDL and RL
460-60831-6	BF-SER-RAMPD-DD-9c-001-20130807	DIBENZ(A,H) ANTHRACENE	35	U	ug/kg	UJ	Calibration drift (%D= -22.5%)
460-60831-6	BF-SER-RAMPD-DD-9c-001-20130807	INDENO(1,2,3-C,D) PYRENE	20	J	ug/kg	J	Result between MDL and RL
460-60831-6	BF-SER-RAMPD-DD-9c-001-20130807	PYRENE	48	J	ug/kg	J	Result between MDL and RL

1) Results in red have been elevated to the reporting limit per the NFG. The laboratory reported a detect between the MDL and RL for this analyte, but the result has been qualified (U flag) and raised to the reporting limit due to laboratory or field contamination.

TABLE 5
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action

FIELD DUPLICATE RESULTS

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-55575-7	460-55575-8	ECS-103-F-20130507	1311 LEAD	10200		ug/l	1590		ug/l	NA	NA	150	NO
460-57129-7	460-57129-8	ECS-61-F-20130531	1311 LEAD	62.9		ug/l	243		ug/l	180.1	50	NA	NO
460-57129-7	460-57129-8	ECS-61-F-20130531	ARSENIC	5.7		mg/kg	6.5		mg/kg	NA	NA	13	y
460-57129-7	460-57129-8	ECS-61-F-20130531	LEAD	18		mg/kg	39.6		mg/kg	NA	NA	75	NO
460-59467-1	460-59467-2	ECS-81-F-20130715	1311 LEAD	25	U	ug/l	25	U	ug/l	0	50	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	1,1,1-TRICHLOROETHANE	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	1,1-DICHLOROETHANE	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	1,1-DICHLOROETHENE	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	1,2,4-TRIMETHYLBENZENE	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	1,2-DICHLOROBENZENE	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	1,2-DICHLOROETHANE	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	1,3-DICHLOROBENZENE	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	1,4-DICHLOROBENZENE	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	1,4-DIOXANE (P-DIOXANE)	49	U	ug/kg	43	U	ug/kg	6	98	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	ACETONE	9.8	U	ug/kg	8.5	U	ug/kg	1.3	19.6	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	BENZENE	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	CARBON TETRACHLORIDE	0.98	U	ug/kg	0.85	U	ug/kg	0.13	1.96	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	CHLOROBENZENE	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	CHLOROFORM	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	CIS-1,2-DICHLOROETHYLENE	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	ETHYLBENZENE	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	METHYL ETHYL KETONE (2-BUTANONE)	9.8 U ug/kg	8.5 U ug/kg	1.3	19.6	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	METHYLENE CHLORIDE	1.1 ug/kg	0.39 J ug/kg	0.71	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	N-BUTYLBENZENE	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	N-PROPYLBENZENE	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	SEC-BUTYLBENZENE	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	T-BUTYLBENZENE	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	TERT-BUTYL METHYL ETHER	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	TETRACHLOROETHYLENE (PCE)	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	TOLUENE	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	TRANS-1,2-DICHLOROETHENE	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	TRICHLOROETHYLENE (TCE)	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	VINYL CHLORIDE	0.98 U ug/kg	0.85 U ug/kg	0.13	1.96	NA	y
460-60942-4	460-60942-7	BF-SER-RAMPD-DD-11g-001-20130808	XYLENES, TOTAL	2.9 U ug/kg	2.6 U ug/kg	0.3	5.8	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ARSENIC	7 mg/kg	7.7 mg/kg	NA	NA	9.5	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	BARIUM	48.8 mg/kg	48.1 mg/kg	0.7	84.2	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	BERYLLIUM	0.44 mg/kg	0.44 mg/kg	0	0.84	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	CADMIUM	0.2 J mg/kg	0.19 J mg/kg	0.01	2.2	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	CHROMIUM, TOTAL	17.4 mg/kg	17.6 mg/kg	NA	NA	1.1	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	COPPER	30.4 mg/kg	34 mg/kg	NA	NA	11	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	LEAD	16.2 mg/kg	18.4 mg/kg	NA	NA	13	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	MANGANESE	761 mg/kg	826 mg/kg	NA	NA	8.2	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	NICKEL	27.7 mg/kg	28.3 mg/kg	0.6	16.8	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	SELENIUM	2.1 U mg/kg	2.1 U mg/kg	0	4.2	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	SILVER	0.27 J mg/kg	0.25 J mg/kg	0.02	4.2	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ZINC	75.7 mg/kg	77.9 mg/kg	NA	NA	2.9	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	CHROMIUM III	17.4 mg/kg	17.6 mg/kg	NA	NA	1.1	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	CHROMIUM, HEXAVALENT	2.2 U mg/kg	2.1 U mg/kg	0.1	4.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	MERCURY	0.028 mg/kg	0.026 mg/kg	0.002	0.036	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ALDRIN	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ALPHA ENDOSULFAN	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	BETA ENDOSULFAN	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	CHLORDANE	71 U ug/kg	72 U ug/kg	1	144	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	DIELDRIN	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ENDOSULFAN SULFATE	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ENDRIN	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ENDRIN ALDEHYDE	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ENDRIN KETONE	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	GAMMA BHC (LINDANE)	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	HEPTACHLOR	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	HEPTACHLOR EPOXIDE	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	METHOXYCHLOR	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	P,P'-DDD	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	P,P'-DDE	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	P,P'-DDT	7.1 U ug/kg	7.2 U ug/kg	0.1	14.4	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	TOXAPHENE	71 U ug/kg	72 U ug/kg	1	144	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PCB-1016 (AROCLOR 1016)	71 U ug/kg	72 U ug/kg	1	144	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PCB-1221 (AROCLOR 1221)	71 U ug/kg	72 U ug/kg	1	144	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PCB-1232 (AROCLOR 1232)	71 U ug/kg	72 U ug/kg	1	144	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PCB-1242 (AROCLOR 1242)	71 U ug/kg	72 U ug/kg	1	144	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PCB-1248 (AROCLOR 1248)	71 U ug/kg	72 U ug/kg	1	144	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PCB-1254 (AROCLOR 1254)	71 U ug/kg	72 U ug/kg	1	144	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PCB-1260 (AROCLOR 1260)	71 U ug/kg	72 U ug/kg	1	144	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	SILVEX (2,4,5-TP)	18 U ug/kg	18 U ug/kg	0	36	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	2-METHYLPHENOL (O-CRESOL)	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ACENAPHTHENE	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ACENAPHTHYLENE	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	ANTHRACENE	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	BENZO(A)ANTHRACENE	35 U ug/kg	35 U ug/kg	0	70	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	BENZO(A)PYRENE	35 U ug/kg	35 U ug/kg	0	70	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	BENZO(B)FLUORANTHENE	35 U ug/kg	35 U ug/kg	0	70	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	BENZO(G,H,I)PERYLENE	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	BENZO(K)FLUORANTHENE	35 U ug/kg	35 U ug/kg	0	70	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	CHRYSENE	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	CRESOLS, M & P	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	DIBENZ(A,H)ANTHRACENE	35 U ug/kg	35 U ug/kg	0	70	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	DIBENZOFURAN	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	FLUORANTHENE	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	FLUORENE	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	HEXACHLOROBENZENE	35 U ug/kg	35 U ug/kg	0	70	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	INDENO(1,2,3-C,D)PYRENE	35 U ug/kg	35 U ug/kg	0	70	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	NAPHTHALENE	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PENTACHLOROPHENOL	1100 U ug/kg	1100 U ug/kg	0	2200	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PHENANTHRENE	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PHENOL	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	PYRENE	350 U ug/kg	350 U ug/kg	0	700	NA	y
460-60942-6	460-60942-8	BF-SER-RAMPD-DD-11c-001-20130808	CYANIDE	0.11 U mg/kg	0.11 U mg/kg	0	0.22	NA	y
460-61374-3	460-61374-5	ECS-91-F-20130815	1311 LEAD	192 ug/l	179 ug/l	NA	NA	7.0	y
460-62377-2	460-62377-6	ECS-95-F-20130904	1311 LEAD	1350 ug/l	353 ug/l	NA	NA	120	NO
460-63302-2	460-63302-3	ECS-62-F-20130919	1311 LEAD	31.7 ug/l	81.5 ug/l	49.8	50	NA	y

Note: The RPD test (≤35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test (≤ 2x RL) applies.

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact	Project Number/ Manager: E7976B/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B)	QC Level: IV
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see below
Reviewer: Taryn Scholz	Date Checked: 11/17/13
Parameters: TCLP Pb, Metals, CrIII/VI, Pesticide, PCB, Herbicide, VOC, SVOC, CN	Methods: 1311/6010B, 6010B&C/7471A&B, 7196A, 8081A&B, 8082&A, 8151A, 5035/8260B&C, 8270C&D, 9012A

ITEM	YES	NO	N/A	(CRITERIA) COMMENT
Laboratory NELAP/ELAP accredited?	x			NYDOH (NELAP) #11452, NYDOH (ELAP) #11452
Signed Narrative included?	x			see Comment no. 0
Narrative issues noted by lab?	x			See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required)
COCs properly executed and seals used?		x		some hand-delivered; see Comment no. 1
Samples received within 2 days?		x		(DER10 - recommended) 460-59430-1 rec'd day 3
Analytical Results				
All requested analyses reported?		x		see Comment no. 1A
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'quantitation_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' (SQL), J-values reported NOTE: For metals in soils, MDL 0.47 & MQL = 0.5 ppm for Arsenic so SDL=SQL for some.
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL) see Comment no. 2
RLs acceptable?		x		(ASP Exh C Part III and/or DER-10 App 5) see Comment no. 3
No elevated RLs for NDs?	x			Note: 4x std dilution for total metals in soil, 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D); (5035 used for VOC soils this phase) see Comment no. 4
If analytical cleanup used, method ref included and approved?	x			(ASP Exh D) see Comment no. 4A
Sample matrix included?	x			
Soils on dry weight basis?	x*			
Correct and consistent units?	x			Organics in ug/L (TBs) and ug/kg for rest; Inorganics in mg/kg or ug/L (TCLP)
Holding time to analysis not expired?	x**			(Workplan Table 2, SW846 for those not in table per ASP Exh I, which gives only aq HTs) Hg 28-d, Herb 14/40-d, Cr VI 30/7-d, CN 14-d
Holding time to preparation not expired?	x**			same as above
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory		x		No trip blank for BF samples in 460-56528-1, 460-60831-1 or 460-63880-1
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)	x			Total samples = 97/26 (TCLP/Total) confirmation + 15 BF comp + 33 BF grab = 171; Total FD = 9 (6/1 conf + 1 comp + 1 grab)
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible	x			MS/LR used for metals (ICP, Hg, Cr VI - %R not reported for calc Cr III); met for conf (5/2 conf) but no field MS/MSD for BF and project sample not selected for lab MS/MSD for Pest, PCB, VOC, or CN
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 2337/2338=99.96%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-55575-1, 460-55575-2, 460-55576-1, 460-55958-1, 460-56076-1, 460-56528-1, 460-57026-1, 460-57129-1, 460-57258-1, 460-57341-1, 460-57472-1, 460-57911-1, 460-58360-1, 460-58502-1, 460-58750-1, 460-59430-1, 460-59467-1, 460-59818-1, 460-60019-1, 460-60394-1, 460-60768-1, 460-60831-1, 460-60942-1, 460-61374-1, 460-61488-1, 460-62377-1, 460-62755-1, 460-62905-1, 460-63151-1, 460-63302-1, 460-63399-1, 460-63880-1

*For the 7196A analyses, Cr III is shown as not dry-weight corrected. However, Cr III is calculated from the results for Cr VI and Total Cr, which are dry-weight corrected, and thus the Cr III is not directly dry-weight corrected but is on a dry-weight basis.
** The holding time was calculated using dates only with regard to the time of day since all holding times are greater than 24 hours. Also, note that Cr III is a calculated result and the holding time check does not apply for this analyte.
0. Several work orders do not include the signed certification page. Similar language on the signed front cover so no further action taken.
1. Issues for custody records:
For work order work order 460-55575-1, TAL metals analysis was added for sample ECS-104-F per Entact's request and the results are reported in work order 460-55575-2.
For work orders 460-55575-1/2 and 460-59818-1, the Sample Receipt Check indicates a custody seal was not present, but in each case, the number of the custody seal appears on the custody record as entered by the laboratory upon receipt.
For work orders 460-55575-1, 460-55958-1,460-58750-1, 460-59430-1, 460-59467-1, and 460-59818-1, the sample IDs for some samples were updated from that on the custody record per Entact's request as delineated in the laboratory case narratives.
1A. For work order 460-60831-1, a trip blank is listed on the custody record but was not received and thus not logged in or analyzed.
2. Analyte List:
P1 WP Table 3, P2A/B WP Table 2/4, and DER10 App5 list m-cresol, o-cresol, and p-cresol separately. The laboratory reported m,p-cresol and o-cresol as it is not possible to separate m-cresol and p-cresol using method 8270C. P1 WP Table 3, which only lists RLs for the DER-10 metals and not the 23 TAL metals, also mistakenly lists Antimony. This metal does not appear in DER10 Appendix 5 and was not reported by the laboratory for the P1 backfill samples.
For all BF samples (and the associated QC), the laboratory reported technical Chlordane rather than Chlordane (alpha) as listed in the workplan and DER10 Appendix 5.
For all BF samples (and the associated QC), the laboratory inadvertently reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of just the DER-10 analytes as requested. Note: These extra analytes are all ND in the samples.
For the LB/BS/BD in EN366,EN376,EN386,EN396 - the lab reported m,p-Xylene and o-Xylene. For the LB, Xylenes (total) is also reported.
Note: The analyte names in the hardcopy report differ from those in the EDD for some analytes.
3. The MQL (Unadj) for several DER-10 analytes is above the CRQL, but in each case, it is below the Allowable Constituent Level in DER10 App 5 except for Pentachlorophenol. The actual lab RL is above the CRQL and the ACL in DER10 App5 for this analyte. The MDL is < 1/8 the ACL and J-values are reported, so NDs for undiluted samples may show conformance. Additionally, the MQL (Unadj) for the TAL metal Iron is above the CRQL. There are no action levels for this analyte.
4. Update III Pest/PCB methods (8081A/8082) used for BF samples except those in 63880 instead of Update IV as per WP; Update IV methods (6010C,7471B,8260C, 8270D) used for 63880 (last work order) instead of Update III as in WP and for earlier sets
4A. Per laboratory, Florisil cleanup (SW3620B/C) used for Pesticide analyses and sulfuric acid cleanup (SW3665A) used for PCB analyses (not indicated in package exc on prep log or EDD). No cleanup used for SVOC or Herbicides.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	TCLP Metals	All analyses	Diluted 5x before analysis as standard practice, further dilution may be required, refer to results forms	noted in QA report narrative
All	All	Total Metals	All analyses	Diluted 2-4x before analysis as standard practice	noted in QA report narrative
All	All	Total Metals	All samples	Required 4x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
EN360	460-55575-1	NA	NA	no issues noted	NA
EN361	460-55575-2	Total Metals	159804/NA	MD RPD out for Mn	none required (non-project (not reported) MD)
EN362	460-55576-1	TCLP Metals	NA/4	MS %R out for Pb	see QC Deficiencies
	460-55576-1	TCLP Metals	NA	'4' qualifier indicates conc in unspiked sample > 4x spiking amount	NA
	460-55576-1	TCLP Metals	2,3,4	Required 100x, 300x, 100x dilution prior to analysis; RLs adjusted accordingly	NA - result is not non-detect
EN364	460-55958-1	NA	NA	no issues noted	NA
EN365	460-56076-1	NA	NA	no issues noted	NA
EN366	460-56528-1	Pesticides	163246/CCVRT-4	CCVRT %R out for SU (DCB) on 2° column, data qualified and reported	none required (sample TA results not affected)
	460-56528-1	Pesticides	163364/CCVRT-22	CCVRT %R hi for a-BHC, samples all ND, data reported	see QC Deficiencies
	460-56528-1	Pesticides	163364/CCVRT-22	SU (DCB) %R hi for CCVRT on 2° column, TCX in control, data qualified and reported	none required (sample results not affected)
	460-56528-1	Pesticides	163364/CCV-44	CCV %R hi for SU (DCB) on 2° column, TCX in control, data qualified and reported	none required (sample TA results not affected)
	460-56528-1	VOCs	163462	Blank contains Acetone/MeCl2 >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
	460-56528-1	VOCs	163462	LCS/LCSD %R hi for 12DCA	see QC Deficiencies
EN367	460-57026-1	Total Metals	163598/1	MS %R out for Pb, LCS passes	see QC Deficiencies
EN368	460-57129-1	Total Metals	163850/NA	MS %R out for Sb, LCS passes	see QC Deficiencies
	460-57129-1	Total Metals	163879?/7	MS %R low for Sb, Fe and Mn; hi for Al	see QC Deficiencies
	460-57129-1	Total Metals	163879/7	MD RPD hi for As	see QC Deficiencies
	460-57129-1	Total Metals	1	Required 20x dilution prior to analysis; RLs adjusted accordingly	NA - result is not non-detect
EN369	460-57258-1	NA	NA	no issues noted	NA
EN370	460-57341-1	NA	NA	no issues noted	NA
EN371	460-57472-1	NA	NA	no issues noted	NA
EN373	460-57911-1	NA	NA	no issues noted	NA
EN374	460-58360-1	NA	NA	no issues noted	NA
EN375	460-58502-1	NA	NA	no issues noted	NA
EN376	460-58750-1	HexCr	168660/NA	MSS %R out due to sample matrix, samples RE per method, LCSS/LCSI pass	none required (non-project (not reported) MS)
	460-58750-1	HexCr	169031/NA	MSS %R for reprep out due to sample matrix, LCSS/LCSI pass, both data sets reported	none required (non-project (not reported) MS)
	460-58750-1	Pesticides	169054/CCV-38	CCV %R hi for multi TAs on 1° column, samples all ND, data qualified and reported	see QC Deficiencies
	460-58750-1	Pesticides	169054/CCVRT-11	CCV %R out for Hept on 2° column, 1° column passes, data qualified and reported	see QC Deficiencies
	460-58750-1	Pesticides	9	SU (TCX) %R hi	see QC Deficiencies
	460-58750-1	VOCs	11	IS (14Dioxd8) response out, reanalyzed with same results	see QC Deficiencies
EN378	460-59430-1	TCLP Metals	170864	Blank contains Pb >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
EN379	460-59467-1	TCLP Metals	170864	Blank contains Pb >MDL but <RL, conc <5% reg level, samples >MDL or >RL B-flagged	see QC Deficiencies
EN380	460-59818-1	NA	NA	no issues noted	NA
EN381	460-60019-1	Total Metals	173696/6	MS %R hi for Mn	see QC Deficiencies
	460-60019-1	Herbicides	173534/3	MSD %R low for Silvex	see QC Deficiencies
	460-60019-1	VOCs	173716	Blank contains Acetone >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
	460-60019-1	SVOCs	173696/3	MS %R hi for bz(ghi)p, dibz(ah)a, ind(123cd)p	see QC Deficiencies
	460-60019-1	SVOCs	173188?/3	MSD %R hi for bz(ghi)p, dibz(ah)a, ind(123cd)p	see QC Deficiencies
EN382	460-60394-1	NA	NA	no issues noted	NA
EN383	460-60768-1	NA	NA	no issues noted	NA
EN384	460-60831-1	HexCr	175752/NA	MSS/MSI %R out due to sample matrix, samples RE per method, LCSS/LCSI pass	see QC Deficiencies
	460-60831-1	HexCr	176210?/6	MS %R low	see QC Deficiencies
	460-60831-1	Pesticides	3	SU %R hi, sample ND so no RE	see QC Deficiencies
	460-60831-1	Pesticides	60439-2 (extant)	SU %R hi for MSD, SU %R for LCS, MS within limits, data qualified and reported	none required (sample results not affected, non-project MSD)
	460-60831-1	Herbicides	175471?/3	MSD RPD hi for Silvex	see QC Deficiencies
	460-60831-1	VOCs	175740	LCS %R hi for 111TCA, samples all ND, data reported	see QC Deficiencies
	460-60831-1	SVOCs	175280/NA	MS/MSD %R out for several TAs, LCS passes	see QC Deficiencies

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
	460-60831-1	Total CN	175471/NA	MSD RPD hi, sample non-homog suspected, LCSD RPD passes, '4' qualifier indicates conc in unspiked sample > 4x spiking amount	none required (non-project (not reported) MSD)
EN386	460-60942-1	Total Metals	175830/3	MS %R hi for Mn	see QC Deficiencies
	460-60942-1	Pesticides	175878	SU %R (DCB) out for closing CCV, data qualified and reported	none required (sample results not affected)
	460-60942-1	Pesticides	8	SU %R hi on 2° column, sample ND so no RE	see QC Deficiencies
	460-60942-1	Pesticides	175830/60644-5 (extant)	MS %R hi for Heptachlor	none required (non-project MS)
	460-60942-1	Pesticides	176451?/60644-5 (extant)	MSD %R hi for several analytes	none required (non-project MSD)
	460-60942-1	Herbicides	NA	SU %R hi on 1° column for LCS/LCSD, 2° column passes, data reported	none required (sample results not affected)
	460-60942-1	Herbicides	3	SU %R hi, sample ND so no RE	see QC Deficiencies
	460-60942-1	VOCs	176451/61002-1 (extant)	MS/MSD %R low for Acetone, '4' qualifier indicates conc in unspiked sample > 4x spiking amount	none required (non-project MS/MSD for TB only)
EN387	460-61374-1	TCLP Metals	176683/NA	MS %R out for Sb, LCS passes	none required (non-project (not reported) MS)
	460-61374-1	Total Metals	61334-20 (extant)	MS %R out for several analytes, '4' qualifier indicates conc in unspiked sample > 4x spiking amount	none required (non-project MS)
EN388	460-61488-1	NA	NA	no issues noted	NA
EN389	460-62377-1	NA	NA	no issues noted	NA
EN390	460-62755-1	NA	NA	no issues noted	NA
EN391	460-62905-1	NA	NA	no issues noted	NA
EN392	460-63151-1	NA	NA	no issues noted	NA
EN393	460-63302-1	NA	NA	no issues noted	NA
EN395	460-63399-1	TCLP Metals	182725?/NA	MS %R out for Sb, Cd, Ag; LCS passes	none required (non-project (not reported) MS)
	460-63399-1	TCLP Metals	182733/NA	MD RPD out for As due to sample nonhomog	none required (non-project (not reported) MD)
	460-63399-1	TCLP Metals	9 +PDS,SD,MS,MD	Required dilution due to sample matrix (high iron), elevated RLs	NA - result is not non-detect
	460-63399-1	Total Metals	NA/63389-9 (extant)	MS %R low for Sb, Cd, Ag and hi for Al, Cr, Fe, Mn; '4' qualifier indicates conc in unspiked sample > 4x spiking amount	none required (non-project MS)
	460-63399-1	Total Metals	NA/63204-7 (extant)	MD RPD out for As	none required (non-project MD)
EN396	460-63880-1	HexCr	NA/63481-3 (extant)	MD RPD out	none required (non-project MD)
	460-63880-1	Pesticides	63766-1	SU %R hi, sample ND so no RE	none required (non-project sample)
	460-63880-1	Pesticides	184228	SU (DCB and TCX) %R hi for MB on 2° column, 1° column in control, all assoc samples ND so data reported	none required (sample results not affected)
	460-63880-1	Pesticides	184303/63776-1 (extant)	SU (DCB AND TCX) %R hi for MSD	none required (sample results not affected, non-project MSD)
	460-63880-1	Pesticides	184521	Closing CCV %R out for multiple analytes on 1° column; samples ND, data qualified and reported	none required (only one non-TA (alpha-Chlordane) out)
	460-63880-1	Pesticides	184521	Closing CCV %R out for DDE, Heptachlor on 2° column; data qualified and reported	none required (none actually out)
	460-63880-1	Herbicides	184071/NA	MS/MSD %R out for Silvex, LCS passes	see QC Deficiencies
	460-63880-1	Herbicides	NA	'4' qualifier indicates conc in unspiked sample > 4x spiking amount	NA
	460-63880-1	Herbicides	184303	CCV %R out for SU (DCAA), data qualified and reported	none required (sample TA results not affected)
	460-63880-1	Herbicides	184303	Closing CCV %R out for SU (DCAA), data qualified and reported	none required (sample TA results not affected)
	460-63880-1	VOCs	185287	Blank contains Acetone >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
	460-63880-1	VOCs	185287	CCV %R out for Vinyl Chloride, samples ND, data reported	see QC Deficiencies
	460-63880-1	SVOCs	184664/163979-3 (extant)	MS %R hi for b(a)p	none required (non-project MS)
	460-63880-1	SVOCs	184521/163979-3 (extant)	MSD %R hi for b(a)p	none required (non-project MSD)
	460-63880-1	SVOCs	184394	LCS/MS/MSD did not come from same source as calibration standards	none required (sample results not affected)

Data Validation Checklist: Metals/Wet Chem

Client Name: Entact		Project Number/ Manager: E7976B/ Jenny Self			
Site Name: Revere Smelting and Refining (Phase 2B)		QC Level: IV			
Laboratory: TestAmerica (Edison, NJ)		Laboratory Job No: see DURC			
Reviewer: Taryn Scholz		Date Checked: 11/17/13			
Parameters: TCLP Pb, Metals, CrIII/VI, CN		Methods: 1311/6010B, 6010B&C/7471A&B, 7196A, 9012A			
%PERFORMED/ ITEM		**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?	x			With the exception of Cr III, which is a calculated value
100	Criteria met? (< MDL, ≥ -RL)		x		see QC Deficiencies
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			With the exception of Cr III, which is a calculated value
100	%R criteria met?		x		method (lab but within 50-200%) see QC Def
	Matrix spike data included in lab package?	x			
100	%R criteria met?		x		method (75-125%) see QC Deficiencies
	Sample duplicate data included in lab package?	x			as LR
100	RPD criteria met?		x		method (20% if >10xMDL) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL) see QC Deficiencies
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)			x	CL per ASP Exh E - not reported
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	Intensities within limits? (min 30-120% of calib std)			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

*No QC reported for Chromium III, which is calculated from the Total Chromium and Chromium VI result.

TOTAL METALS VS LEACHED - all leach results < max possible

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976B/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B)	QC Level: IV
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 11/17/13, 1/3/14
Parameters: TCLP Pb	Methods: 1311/6010B

%PERFORMED/ ITEM		YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all; see Comment no.1
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			pH of fluid not reported but pH of LB leachate 4.86-5.0
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)		x		see Comment no. 2
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)		x		see QC Deficiencies

COMMENTS

TCLP Batches: 5/7 18:00, 5/13 17:00 (2), 5/15 16:52, 6/6 14:00, 6/16 14:00, 6/17 18:30 (2), 6/19 19:00, 6/24 17:00, 6/27 15:00, 7/12 17:00, 7/16 14:16, 7/22 17:00, 8/1 17:00, 8/8 16:54, 8/11 14:00, 8/18 14:00, 8/19 16:49, 9/5 17:00, 9/11 17:05, 9/15 14:00, 9/18 17:00, 9/22 14:00 (2), 9/23 16:15, 9/24 17:00

1. Batch 167429 (EN374) - LB initial pH 2.92, leachate pH 2.80. Benchsheet revised 12/23/13 to show correct pH of 4.92/4.86

Batch 175182 (EN383) - worksheet indicates fluid no. 2 used when pH<5 -> should be no. 1 (error per lab, fluid used was no. 1 as confirmed by pH of 4.92

2. Batch 176735 (EN388) and 176924 (EN387) max temp 25.8 C - ok, no effect

Data Validation Checklist: GC

Client Name: Entact	Project Number/ Manager: E7976B/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B)	QC Level: IV
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 11/17/13
Parameters: Pesticide, PCB, Herbicide	Methods: 8081A&B, 8082&A, 8151A

%PERFORMED/ ITEM			YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)		x			
100	Criteria met for field blanks? (<MDL)				x	
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			With the exception of multi-component pesticides Chlordane (technical) andToxaphene; only two multi-component Aroclors (1016 and 1260) spiked per method recommendations
	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?		x			
	Matrix spike data included in lab package?		x			
	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?			x		method (lab but within 40%) see QC Deficiencies
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?			x		method (lab but within 10-200%) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)		x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Initial calibration documentation included in lab package?		x			5 peaks used for all multi-comp Pest/PCB
	All target analytes included?		x			
100	%RSD criteria met? (max 20% or min r/COD 0.99)		x			
100	DDT/Endrin %breakdown max 15%?		x			
	Calibration verification data included in lab package?		x			
100	%R criteria met for TAs? (max +/-15%)			x		see Comment no. 1 and QC Deficiencies
100	Dual column/detector confirmation data incl in lab package?		x			
100	%Difference criteria met? (<40%)			x		see QC Deficiencies
10	Analyte qualitative ID criteria met?		x			
10	Analyte quantitation/RLs correct?		x			
10	QC parameters calculated correctly?		x			
	Surrogate	**Control Limits**				
PEST/	Decachlorobiphenyl	**60**-150/**45-138**				bold updated from P2A
PCB	Tetrachloro-m-xylene	**37**-150				bold updated from P2A
HERB	2,4-DCPA	**53**-150				

COMMENTS

1. The validator did not delineate cases where the surrogate has a %D outside the criteria since surrogate recoveries for each analysis are evaluated separately.

Data Validation Checklist: GC/MS

Client Name: Entact			Project Number/ Manager: E7976B/ Jenny Self			
Site Name: Revere Smelting and Refining (Phase 2B)			QC Level: IV			
Laboratory: TestAmerica (Edison, NJ)			Laboratory Job No: see DURC			
Reviewer: Taryn Scholz			Date Checked: 11/17/13			
Parameters: VOC, SVOC			Methods: 5035/8260B&C, 8270C&D			
	%PERFORMED/ ITEM		**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)			x		see QC Deficiencies
100	Criteria met for field blanks? (<MDL)			x		see QC Deficiencies
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			
100	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?		x			method (lab but within 40%)
	Matrix spike data included in lab package?		x			
100	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?		x			method (lab but within 40%)
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?		x			method (lab but within 10-200% extr, 20-200% purg)
100	Field dup RPD criteria met? (individual, mean, and overall)		x			20% aq, 35% solid (+/-2RL aq, +/-3RL sol if either≤5RL)
	Instrument Tune (12-hr) for GC/MS included in lab package?		x			
100	Instrument Tune method criteria met?		x			
	Initial calibration documentation included in lab package?		x			
	All target analytes included at min 5 levels w low≤ RL?		x			
	RRF met SPCCs/14Dioxane(advisory)/PoorPerf/TAs (*/0.005/0.01/0.05)?		x			*11DCA 0.1, CB 0.3; SVOC 0.05
100	%RSD criteria met for CCCs/TAs? (30% max for CCC, 15% max (mean) for TAs or curve min r 0.99)			x		see QC Deficiencies
	Calibration verification data included in lab package?		x			
	RRF met SPCCs/14Dioxane(advisory)/PoorPerf/TAs (*/0.005/0.01/0.05)?		x			*11DCA 0.1, CB 0.3; SVOC 0.05
100	%D criteria met for CCC/TAs? (20% max)			x		see QC Deficiencies
100	Internal standard data included in lab package?		x			
100	Areas within limits (within -50/+100% of last calib check)?			x		for CCV and samples; see QC deficiencies
100	RTs within limits (<30 sec diff from last calib check)?		x			
10	Analyte qualitative ID criteria met?		x			
10	Analyte quantitation/RLs correct?		x			
10	QC parameters calculated correctly?		x			
	Surrogate	**Control Limits**				
VOC	1,2-Dichloroethane-d4	70-130				
	Toluene-d8	70-130				
	Bromofluorobenzene	70-130				
	Dibromofluoromethane	70-130				
SVOC	2,4,6-Tribromophenol	10-120				
	Terphenyl-d14	16-151				
	2-Fluorobiphenyl	40-109				
	Nitrobenzene-d5	38-105				
	2-Fluorophenol	37-125				
	Phenol-d5	41-118				

COMMENTS

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

May 2013 to October 2013

Prepared by:

Quality Assurance Associates (*QAA, L.L.C.*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

January 3, 2014

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 3

3.0 DATA VALIDATION RESULTS 4

3.1 PRECISION 4
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 4
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 4
3.1.3 Field Duplicate (FD) Precision 4
3.2 ACCURACY 4
3.2.1 Laboratory Control Spike (LCS) Accuracy 4
3.2.2 Matrix Spike (MS) Accuracy 5
3.2.3 Serial Dilution (SD) %Difference 5
3.3 REPRESENTATIVENESS 5
3.3.1 Chain-of-Custody and Analysis Requests 5
3.3.2 Sample Preservation and Holding Time 5
3.3.3 Laboratory and Method Selection 5
3.3.4 Blanks (Laboratory and Field) 6
3.3.5 Analytical Procedures 6
3.4 COMPLETENESS 6
3.4.1 Laboratory Deliverables Completeness 6
3.4.2 EDD Correctness 6
3.4.3 Analytical Completeness 7
3.5 COMPARABILITY 7

LIST OF TABLES

Table 1 – Samples and Tests Selected for Validation
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – Qualified Results for Validated Samples
Table 4 – Field Duplicate Results for Validated Samples

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The data include 21 investigative soil samples plus two field duplicate samples as shown in Table 1. The samples comprise more than 10% of the Phase II-B post-stabilization verification (PSV) samples. A total of 156 PSV samples were collected in May 2013 to October 2013 by ENTACT from the stabilized material stockpiles and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals to ensure that the stabilized material meets the appropriate criteria for disposal in the on-site containment cell. Per the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, the PSV data are considered Level 2 and require minimal data review. Per ENTACT's request, QAA performed a full validation of the selected samples and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010). QAA completed the validation using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Data Review* (October 2004), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The validator assessed precision using the laboratory and field duplicates. For the PSV samples selected for validation, the laboratory prepared two unspiked matrix duplicates (MD) using a sample from the site and the RPDs are at or below the limit, which indicates good precision for the analytical technique on the given sample matrix. Additionally, the sampler collected two field duplicates with the 21 investigative samples and the RPDs are within the limits for Antimony, Arsenic, and Cadmium, which indicates good precision for the sampling and analytical technique on the given matrix. The validator qualified the Lead results for the original and duplicate samples as estimated (J) based on field duplicate precision.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The validator assessed accuracy using the laboratory spikes and matrix spikes. For the PSV samples selected for validation, the laboratory prepared a laboratory control spike (LCS) using reagent water with each analytical batch and reported the recovery for every analyte. The LCS recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. Additionally, the laboratory prepared two matrix spikes (MS) plus two serial dilutions (SD) using a sample from the site. The MS recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, and the SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy of metals results that are substantially above the reporting limit.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the

representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, PSV samples were collected as required in the approved sampling and analysis plan. Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory blanks, and analytical instrument setup (i.e., calibration, interference correction, etc.) For the PSV samples selected for validation, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank and leachate blank with each analytical batch and the blanks show no contamination, which indicates the samples were not affected by laboratory procedures. Additionally, proper analytical procedures were used and calibration results met the method requirements.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. For the PSV samples selected for validation, all analyses produced valid analytical measurements, which gives a completeness of 100%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The PSV analytical results are classified as Level 2 data with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated. Note that results are reported in µg/L for all field samples.

DATA USABILITY

All sample results are acceptable for use with the qualifications shown in Table 3. Some results are qualified with a J (estimated) and may be either low or high. For results qualified due to field duplicate precision, the higher result (i.e., from either the original or duplicate sample as indicated in Table 3) should be used for project decisions. This gives a conservative approach relative to protection of the environment. (For field duplicate pairs that pass the precision criteria, the value should be selected based on accepted convention for the site and/or agency requirements, e.g., select the value reported for the original sample, the average of the two values, etc.) Note that both the lower result and the higher result are below the regulatory limit for the qualified field duplicate pairs. For results qualified solely because the concentration is between the MDL and RL, the actual value is not expected to exceed the sample RL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include hardcopy data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). For the samples selected for validation, the laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD), and
- Field Duplicates (FD).

Additionally, the validator examined the raw data for one of the seven sample batches (randomly selected by the validator) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are 80-120% for laboratory accuracy and 75-125% for matrix accuracy for metals analyses.
- Laboratory Precision – the control limit (20 RPD) as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. A data rejection limit of 30% was used for these inorganic analyses. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

No LCSD were analyzed (or required) with the samples selected for validation.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

For the PSV samples selected for validation, the laboratory analyzed an MD for every analytical batch (maximum 20 samples) and reported RPDs for MD prepared using a sample from the site. Two of the 21 soil samples (as designated by the sampler on the custody record) were used to prepare an MD, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. All MD RPDs are at or below the control limit. Note that, for cases where either result for the duplicate pair is non-detect, the check does not apply and the laboratory reported the RPD as NC (not calculable) in the pdf report and as 0 in the EDD.

3.1.3 FIELD DUPLICATE (FD) PRECISION

For the PSV samples selected for validation, the samplers collected two FD with the 21 investigative samples, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Results for the field duplicates are summarized in Table 4 and are within the criteria, except as follows:

- Both pairs of results are outside the field precision criteria for Lead and the validator qualified the original and duplicate sample results as estimated (J). Table 3 lists all qualified results for the field samples.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD) and matrix spikes (MS/MSD) plus serial dilutions (SD). LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

For the PSV samples selected for validation, the laboratory analyzed a LCS for every analytical batch (maximum 20 samples) as required and reported recoveries for all analytes. All LCS recoveries are within the control limits.

3.2.2 MATRIX SPIKE (MS) ACCURACY

For the PSV samples selected for validation, the laboratory analyzed an MS for every analytical batch (maximum 20 samples) and reported recoveries for MS prepared using a sample from the site. Two of the 21 soil samples (as designated by the sampler on the custody record) were used to prepare an MS, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. All MS recoveries are within the control limits.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all metals detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The PSV samples selected for validation were delivered to the laboratory by the sampler or an overnight, commercial carrier with properly executed chain-of-custody records and custody seals, which confirms that sample integrity was maintained. Additionally, the information on the custody records is complete, no issues were noted during sample log-in at the laboratory, and all field samples were analyzed for the tests requested on the chain-of-custody, except as follows:

- For work order 460-59222-1, sample PSV-251 was received in a broken container and thus was not logged in or analyzed.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

The PSV samples selected for validation were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. The analyte list includes TCLP Antimony, TCLP Arsenic, TCLP Cadmium, and TCLP Lead as requested and the nominal reporting limits are below the levels of concern (i.e., the treatment goals) for each analyte.

(Note: The laboratory dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank and leachate blank for every analytical batch (maximum 20 samples) plus a calibration blank for every 10 metals analyses as required per the analytical methodology. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used. No analytes were detected in the laboratory blanks.

3.3.5 ANALYTICAL PROCEDURES

For the samples selected for validation, the analytical procedures (initial calibration, continuing calibration verification, and interference correction), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method.

Additionally, no issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes seven analytical batches and the validator re-calculated sample results and QC check parameters for one batch and made the following observation from the review of the raw data:

- For sample 460-60394-3, the leachate batch worksheet indicates the sample pH after addition of HCl is 151. The laboratory confirmed this should be 1.51.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

For the PSV samples selected for validation, the NYSDEC Category B data packages and EDD contain all necessary information or the laboratory submitted a revision upon request as detailed in the case narratives.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	Sample(s)	EDD Field(s)	Action
All	all field and QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.

3.4.3 ANALYTICAL COMPLETENESS

For the samples selected for validation, the validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which an analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which an analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J-flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results are reported in µg/L and are classified as Level 2 data for TCLP metals with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

SAMPLES AND TESTS SELECTED FOR VALIDATION

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Metals
460-55899-1	PSV-190	5/10/13	INV	PSV	Soil	x
460-55899-2	PSV-190-X	5/10/13	FD	PSV	Soil	x
460-55899-3	PSV-191	5/10/13	INV	PSV	Soil	x
460-55899-4	PSV-192	5/10/13	INV	PSV	Soil	x
460-57592-1	PSV-208	6/10/13	INV	PSV	Soil	x
460-57592-2	PSV-209	6/10/13	INV	PSV	Soil	x
460-57592-3	PSV-210	6/10/13	INV	PSV	Soil	x
460-57592-4	PSV-211	6/10/13	INV	PSV	Soil	x
460-59222-6	PSV-253	7/10/13	INV	PSV	Soil	x
460-59222-6MS	PSV-253MS	7/10/13	MS	PSV	Soil	x
460-59222-6LR	PSV-253LR	7/10/13	MD	PSV	Soil	x
460-59222-1	PSV-248	7/10/13	INV	PSV	Soil	x
460-59222-2	PSV-249	7/10/13	INV	PSV	Soil	x
460-59222-3	PSV-250	7/10/13	INV	PSV	Soil	x
460-59222-5	PSV-252	7/10/13	INV	PSV	Soil	x
460-60394-1	PSV-283	7/31/13	INV	PSV	Soil	x
460-60394-2	PSV-284	7/31/13	INV	PSV	Soil	x
460-60394-3	PSV-285	7/31/13	INV	PSV	Soil	x
460-60832-1	PSV-286	8/7/13	INV	PSV	Soil	x
460-60832-2	PSV-287	8/7/13	INV	PSV	Soil	x
460-60832-3	PSV-288	8/7/13	INV	PSV	Soil	x
460-60832-4	PSV-289	8/7/13	INV	PSV	Soil	x
460-63303-2	PSV-319	9/19/13	INV	PSV	Soil	x
460-63303-3	PSV-319X	9/19/13	FD	PSV	Soil	x
460-63303-1	PSV-318	9/19/13	INV	PSV	Soil	x
460-63303-1MS	PSV-318MS	9/19/13	MS	PSV	Soil	x
460-63303-1LR	PSV-318LR	9/19/13	MD	PSV	Soil	x

FD - Field Duplicate Sample
INV - Investigative Sample
MD – Matrix Duplicate Sample (unspiked)
MS - Matrix Spike Sample
PSV – Post-Stabilization Verification Sample

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Metals: 1311/ 3010A/ 6010B for Antimony, Arsenic, Cadmium, and Lead in leachates of soil samples

TABLE 2
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

QUALIFIED RESULTS FOR VALIDATED SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result			DVQ	QC Issue
460-55899-1	PSV-190-20130510	1311 LEAD	2370		ug/l	J	Poor field duplicate precision (130 RPD), use higher result from original sample
460-55899-2	PSV-190-X-20130510	1311 LEAD	526		ug/l	J	Poor field duplicate precision (130 RPD), use higher result from original sample
460-57592-1	PSV-208-20130610	1311 LEAD	20.9	J	ug/l	J	Result between MDL and RL
460-59222-1	PSV-248-20130710	1311 ARSENIC	20.6	J	ug/l	J	Result between MDL and RL
460-63303-1	PSV-318-20130919	1311 CADMIUM	13.6	J	ug/l	J	Result between MDL and RL
460-63303-2	PSV-319-20130919	1311 LEAD	402		ug/l	J	Poor field duplicate precision (40 RPD), use higher result from duplicate sample
460-63303-3	PSV-319X-20130919	1311 LEAD	602		ug/l	J	Poor field duplicate precision (40 RPD), use higher result from duplicate sample

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

FIELD DUPLICATE RESULTS FOR VALIDATED SAMPLES

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-55899-1	460-55899-2	PSV-190-20130510	1311 ANTIMONY	1750		ug/l	2450		ug/l	NA	NA	33	y
460-55899-1	460-55899-2	PSV-190-20130510	1311 ARSENIC	62.2		ug/l	77.7		ug/l	15.5	50	NA	y
460-55899-1	460-55899-2	PSV-190-20130510	1311 CADMIUM	25	U	ug/l	25	U	ug/l	0	50	NA	y
460-55899-1	460-55899-2	PSV-190-20130510	1311 LEAD	2370		ug/l	526		ug/l	NA	NA	130	NO
460-63303-2	460-63303-3	PSV-319-20130919	1311 ANTIMONY	184		ug/l	166		ug/l	18	100	NA	y
460-63303-2	460-63303-3	PSV-319-20130919	1311 ARSENIC	25	U	ug/l	25	U	ug/l	0	50	NA	y
460-63303-2	460-63303-3	PSV-319-20130919	1311 CADMIUM	25	U	ug/l	25	U	ug/l	0	50	NA	y
460-63303-2	460-63303-3	PSV-319-20130919	1311 LEAD	402		ug/l	602		ug/l	NA	NA	40	NO

Note: The RPD test (≤35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test (≤ 2x RL) applies.

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact	Project Number/ Manager: E7976B/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see below
Reviewer: Taryn Scholz	Date Checked: 11/17/13, 1/3/14
Parameters: TCLP Metals	Methods: 1311/3010A/6010B

ITEM	YES	NO	N/A	(CRITERIA) COMMENT
Laboratory NELAP/ELAP accredited?	x			NYDOH (NELAP) #11452, NYDOH (ELAP) #11452
Signed Narrative included?	x			see Comment no. 1
Narrative issues noted by lab?	x			See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required)
COCs properly executed and seals used?	x			
Samples received within 2 days?	x			
Analytical Results				
All requested analyses reported?		x		see Comment no. 1A
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'quantitation_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' (SQL), J-values reported NOTE: For metals in soils, MDL 0.47 & MQL = 0.5 ppm for Arsenic so SDL=SQL for some.
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL)
RLs acceptable?	x			(ASP Exh C Part III and/or DER-10 App 5)
No elevated RLs for NDs?	x			Note: 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D)
If analytical cleanup used, method ref included and approved?			x	(ASP Exh D)
Sample matrix included?	x			
Soils on dry weight basis?			x	
Correct and consistent units?	x			in ug/L
Holding time to analysis not expired?	x			(Workplan Table 2)
Holding time to preparation not expired?	x			(Workplan Table 2)
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory			NA	
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)	x			Total samples = 21 PSV; Total FD = 2 PSV
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible	x			MS/LR used for all metals - 2 PSV for 21 samples
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-55899-1, 460-57592-1, 460-59222-1, 460-60394-1, 460-60832-1, 460-63303-1 (10% selected by Entact)

1. Work orders 460-60832-1, 460-63303-1 do not include the signed certification page. Similar language on the signed front cover so no further action taken

1A. For work order 460-59222-1, sample PSV-251 was received in broken container and thus not logged in or analyzed.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	TCLP Metals	All analyses	Diluted 5x before analysis as standard practice, further dilution may be required, refer to results forms	noted in QA report narrative
EN363	460-55899-1	NA	NA	no issues noted	NA
EN372	460-57592-1	NA	NA	no issues noted	NA
EN377	460-59222-1	TCLP Metals	170300/24C	Blank contains Pb >RL, samples >MDL or > RL B-flagged	no action (blank does not apply - see blank 1C)
EN382	460-60394-1	NA	NA	no issues noted	NA
EN385	460-60832-1	NA	NA	no issues noted	NA
EN394	460-63303-1	NA	NA	no issues noted	NA

Data Validation Checklist: Metals/Wet Chem

Client Name: Entact	Project Number/ Manager: E7976B/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 11/17/13, 1/3/14
Parameters: TCLP As,Cd,Pb,Sb	Methods: 1311/3010A/6010B

%PERFORMED	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			
100	%R criteria met?	x			method (lab but within 50-200%)
	Matrix spike data included in lab package?	x			
100	%R criteria met?	x			method (75-125%)
	Sample duplicate data included in lab package?	x			as LR
100	RPD criteria met?	x			method (20% if >10xMDL)
100	Field dup RPD criteria met? (individual, mean, and overall)		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL) see QC Deficiencies
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)			x	CL per ASP Exh E - not reported
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	Intensities within limits? (min 30-120% of calib std)			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976B/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 11/17/13, 1/3/14
Parameters: TCLP As,Cd,Pb,Sb	Methods: 1311/3010A/6010B

%PERFORMED/ ITEM		YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all; see Comment no.1
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			pH of fluid not reported but pH of LB leachate 4.86-5.0
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)		x		see Comment no. 2
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)		x		see QC Deficiencies

COMMENTS

TCLP Batches: 5/13 17:00, 6/17 18:30, 7/12 17:00, 8/1 17:00, 8/11 14:00, 9/22 14:00

Comment no. 1

Batch 170300 (EN377) - LB initial pH 2.92, leachate pH 2.78. Fluid no. not indicated. Benchsheet revised 12/23/13 to show correct pH of 4.94

Batch 173959 (EN382) - sx 3 pH after adding acid shown as 151 -> should be 1.51 (typo per lab)

Comment no. 2

Max temp for some batches 25.5 C -> no significant effect

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Post-Stabilization Verification Samples and
Stockpile Characterization Samples

April 2014 to October 2014

Prepared by:

Quality Assurance Associates (*QAA, L.L.C.*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

November 14, 2014

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 3

3.0 DATA VALIDATION RESULTS 4

3.1 PRECISION 4
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 4
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 4
3.1.3 Field Duplicate (FD) Precision 4
3.2 ACCURACY 4
3.2.1 Laboratory Control Spike (LCS) Accuracy 4
3.2.2 Matrix Spike (MS) Accuracy 5
3.2.3 Serial Dilution (SD) %Difference 5
3.3 REPRESENTATIVENESS 5
3.3.1 Chain-of-Custody and Analysis Requests 5
3.3.2 Sample Preservation and Holding Time 5
3.3.3 Laboratory and Method Selection 5
3.3.4 Blanks (Laboratory and Field) 6
3.3.5 Analytical Procedures 6
3.4 COMPLETENESS 6
3.4.1 Laboratory Deliverables Completeness 6
3.4.2 EDD Correctness 6
3.4.3 Analytical Completeness 6
3.5 COMPARABILITY 6

LIST OF TABLES

Table 1 – Samples and Tests Selected for Validation
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – Qualified Results for Validated Samples
Table 4 – Field Duplicate Results for Validated Samples

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The data include four investigative soil samples plus two field duplicate samples as shown in Table 1. The samples comprise 10% of the Phase II-B post-stabilization verification (PSV) samples and 10% of the stockpile characterization samples collected during April 2014 to October 2014. (A total of 20 PSV samples and 23 stockpile characterization samples were collected during this period.) The PSV samples were collected by ENTACT from the stabilized material stockpiles and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals to ensure that the stabilized material meets the appropriate criteria for disposal in the on-site containment cell. The stockpile characterization samples were collected by ENTACT from the excavated soil stockpiles and analyzed for TCLP lead to determine if the excavated soil would require treatment to render the material non-hazardous prior to disposal in the containment cell. These soils were excavated from the ecological areas of the site where source material, which requires treatment, is not necessarily present based on the results from the remedial investigation.

Per the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, these data are considered Level 2 and require minimal data review. Per ENTACT's request, QAA performed a full validation of the selected samples and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010). QAA completed the validation using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (October 2013), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The validator assessed precision using the field duplicates. (No laboratory duplicates were prepared using one of the selected samples from the site.) For the samples selected for validation, the sampler collected one field duplicate with the two PSV investigative samples and one field duplicate with the two stockpile characterization investigative samples, and the RPDs are within the limits for all metals, which indicates good precision for the sampling and analytical technique on the given matrices.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The validator assessed accuracy using the laboratory spikes. (No matrix spikes were prepared using one of the selected samples from the site.) For the samples selected for validation, the laboratory prepared a laboratory control spike (LCS) using reagent water with each analytical batch and reported the recovery for every analyte. The LCS recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the

representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, PSV and stockpile characterization samples were collected as required in the approved sampling and analysis plan. Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory blanks, and analytical instrument setup (i.e., calibration, interference correction, etc.) For the samples selected for validation, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank and leachate blank with each analytical batch and the blanks show no contamination, which indicates the samples were not affected by laboratory procedures. Additionally, proper analytical procedures were used and calibration results met the method requirements.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. For the samples selected for validation, all analyses produced valid analytical measurements, which gives a completeness of 100%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The PSV and stockpile characterization analytical results are classified as Level 2 data with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated. Note that results are reported in µg/L for all field samples.

DATA USABILITY

All sample results are acceptable for use. As shown in Table 3, two results are qualified solely because the concentration is between the MDL and RL. The actual value is not expected to exceed the sample RL. No other data quality issues were noted.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). For the samples selected for validation, the laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD), and
- Field Duplicates (FD).

Additionally, the validator examined the raw data for one of the three sample batches (randomly selected by the validator) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are 80-120% for laboratory accuracy and 75-125% for matrix accuracy for metals analyses.
- Laboratory Precision – the control limit (20 RPD) as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. A data rejection limit of 30% was used for these inorganic analyses. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

No LCSD were analyzed (or required) with the samples selected for validation.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every analytical batch (maximum 20 samples) and reported RPDs for all analytes. All MD RPDs are at or below the control limit. For the samples selected for validation, none of the MD were prepared using a sample from the site. Note that non-project MD results are included in the data packages but not in the EDD.

3.1.3 FIELD DUPLICATE (FD) PRECISION

For the samples selected for validation, the samplers collected one FD with the two PSV investigative samples and one FD with the two stockpile characterization investigative samples, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Results for the field duplicates are summarized in Table 4 and are within the criteria.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD) and matrix spikes (MS/MSD) plus serial dilutions (SD). LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

For the samples selected for validation, the laboratory analyzed a LCS for every analytical batch (maximum 20 samples) as required and reported recoveries for all analytes. All LCS recoveries are within the control limits.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS for every analytical batch (maximum 20 samples) and reported recoveries for all analytes. All MS recoveries are within the control limits. For the samples selected for validation, none of the MS were prepared using a sample from the site. Note that non-project MS results are included in the data packages but not in the EDD.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all metals detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples selected for validation were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records and custody seals, which confirms that sample integrity was maintained. Additionally, the information on the custody records is complete, no issues were noted during sample log-in at the laboratory, and all field samples were analyzed for the tests requested on the chain-of-custody.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

The samples selected for validation were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. The analyte list includes TCLP Antimony, TCLP Arsenic, TCLP Cadmium, and/or TCLP Lead as requested and the nominal reporting limits are below the levels of concern (i.e., the treatment goals) for each analyte.

(Note: The laboratory dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank and leachate blank for every analytical batch (maximum 20 samples) plus a calibration blank for every 10 metals analyses as required per the analytical methodology. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used. No analytes were detected in the laboratory blanks.

3.3.5 ANALYTICAL PROCEDURES

For the samples selected for validation, the analytical procedures (initial calibration, continuing calibration verification, and interference correction), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method.

Additionally, no issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes three analytical batches and the validator re-calculated sample results and QC check parameters for one batch (batch 460-243250 in work order 460-81077-1).

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

For the samples selected for validation, the NYSDEC Category B data packages and EDD contain all necessary information.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	**Sample(s)**	**EDD Field(s)**	**Action**
All	all field and QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.

3.4.3 ANALYTICAL COMPLETENESS

For the samples selected for validation, the validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and

provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which an analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which an analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J-flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results are reported in µg/L and are classified as Level 2 data for TCLP metals with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples and
Stockpile Characterization Samples
April 2014 to October 2014

SAMPLES AND TESTS SELECTED FOR VALIDATION

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Sb, As, Cd, Pb	TCLP Pb
460-74178-1	PSV-323	4/9/14	INV	PSV	Soil	x	
460-81077-1	PSV-338	8/13/14	INV	PSV	Soil	x	
460-81077-2	PSV-338-X	8/13/14	FD	PSV	Soil	x	
460-84592-1	C-AREA2-Stockpile-11	10/15/14	INV	SC	Soil		x
460-84592-2	C-AREA4-Stockpile-1	10/15/14	INV	SC	Soil		x
460-84592-3	C-AREA4-Stockpile-1-X	10/15/14	FD	SC	Soil		x

FD - Field Duplicate Sample
INV - Investigative Sample
PSV – Post-Stabilization Verification Sample
SC – Stockpile Characterization Sample

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Metals: 1311/ 3010A/ 6010B for Antimony, Arsenic, Cadmium, and/or Lead in leachates of soil samples

TABLE 2
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples and
Stockpile Characterization Samples
April 2014 to October 2014

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples and
Stockpile Characterization Samples
April 2014 to October 2014

QUALIFIED RESULTS FOR VALIDATED SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-74178-1	PSV-323-20140409	1311 ARSENIC	33.7 J ug/l	J	Result between MDL and RL
460-81077-1	PSV-338-20140813	1311 LEAD	25.3 J ug/l	J	Result between MDL and RL

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples and
Stockpile Characterization Samples
April 2014 to October 2014

FIELD DUPLICATE RESULTS FOR VALIDATED SAMPLES

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-81077-1	460-81077-2	PSV-338-20140813	1311 ANTIMONY	463		ug/l	445		ug/l	18	200	NA	y
460-81077-1	460-81077-2	PSV-338-20140813	1311 ARSENIC	134		ug/l	153		ug/l	19	150	NA	y
460-81077-1	460-81077-2	PSV-338-20140813	1311 CADMIUM	20	U	ug/l	20	U	ug/l	0	40	NA	y
460-81077-1	460-81077-2	PSV-338-20140813	1311 LEAD	25.3	J	ug/l	53.1		ug/l	27.8	100	NA	y
460-84592-2	460-84592-3	C-AREA4-Stockpile-1-20141015	1311 LEAD	23800		ug/l	17800		ug/l	NA	NA	29	y

Note: The RPD test (≤35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test (≤ 2x RL) applies.

ATTACHMENT A

VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact			Project Number/ Manager: E7976H/ Jenny Self	
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC 2014)			QC Level: II	
Laboratory: TestAmerica (Edison, NJ)			Laboratory Job No: 460-74178-1, 460-81077-1, 460-84592-1	
Reviewer: Taryn Scholz			Date Checked: 11/10/14	
Parameters: TCLP Metals			Methods: 1311/3010A/6010B	
ITEM	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
Laboratory NELAP/ELAP accredited?	x			NYDOH (NELAP) #11452, NYDOH (ELAP) #11452
Signed Narrative included?	x			see Comment no. 1
Narrative issues noted by lab?		x		
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required)
COCs properly executed and seals used?	x			
Samples received within 2 days?	x			
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL)
RLs acceptable?	x			(ASP Exh C Part III and/or DER-10 App 5)
No elevated RLs for NDs?	x			Note: 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D)
If analytical cleanup used, method ref included and approved?			x	(ASP Exh D)
Sample matrix included?	x			
Soils on dry weight basis?			x	
Correct and consistent units?	x			in ug/L
Holding time to analysis not expired?	x			(Workplan Table 2)
Holding time to preparation not expired?	x			(Workplan Table 2)
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory			NA	
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)	x			Total samples = 2 PSV, 2 SC; Total FD = 1 PSV, 1 SC
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible		x		none for PSV or SC, all non-project and in HC only not EDD
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

1. Work orders 460-74178-1, 460-81077-1 do not include the signed certification page. Similar language on the signed front cover so no further action taken.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
EN416	460-74178-1	NA	NA	no issues noted	NA
EN417	460-81077-1	NA	NA	no issues noted	NA
EN418	460-84592-1	NA	NA	no issues noted	NA

Data Validation Checklist: Metals/Wet Chem

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC 2014)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 460-74178-1, 460-81077-1, 460-84592-1
Reviewer: Taryn Scholz	Date Checked: 11/10/14
Parameters: TCLP As,Cd,Pb,Sb and TCLP Pb	Methods: 1311/3010A/6010B

%PERFORMED	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			
100	%R criteria met?	x			method (lab but within 50-200%)
	Matrix spike data included in lab package?	x			all non-project, only in HC not EDD
100	%R criteria met?			x	method (75-125%)
	Sample duplicate data included in lab package?	x			as LR; all non-project, only in HC not EDD
100	RPD criteria met?			x	method (20% if >10xMDL)
100	Field dup RPD criteria met? (individual, mean, and overall)	x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	Intensities within limits? (min 30-120% of calib std)			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC 2014)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 460-74178-1, 460-81077-1, 460-84592-1
Reviewer: Taryn Scholz	Date Checked: 11/10/14
Parameters: TCLP As,Cd,Pb,Sb and TCLP Pb	Methods: 1311/3010A/6010B

%PERFORMED/	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			pH of fluid not reported but pH of LB leachate 4.88-4.90
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)		x		see Comment no. 1
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

TCLP Batches: 4/13 14:00, 8/15 18:00, 10/19 13:00

Comment no. 1

Temp range for batches 19.5 - 25.3 C -> no significant effect

DATA USABILITY SUMMARY REPORT

REVERE SMELTING AND REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples

May 2014 to October 2014

Prepared by:

Quality Assurance Associates (*QAA, L.L.C.*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

December 31, 2014

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 6

3.0 DATA VALIDATION RESULTS 8

3.1 PRECISION 8
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 8
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 8
3.1.3 Field Duplicate (FD) Precision 8
3.2 ACCURACY 9
3.2.1 Laboratory Control Spike (LCS) Accuracy 9
3.2.2 Matrix Spike (MS) Accuracy 9
3.2.3 Serial Dilution (SD) %Difference 10
3.2.4 Surrogate (SU) Recovery 10
3.3 REPRESENTATIVENESS 10
3.3.1 Chain-of-Custody and Analysis Requests 10
3.3.2 Sample Preservation and Holding Time 12
3.3.3 Laboratory and Method Selection 12
3.3.4 Blanks (Laboratory and Field) 13
3.3.5 Analytical Procedures 13
3.4 COMPLETENESS 14
3.4.1 Laboratory Deliverables Completeness 14
3.4.2 EDD Correctness 14
3.4.3 Analytical Completeness 16
3.5 COMPARABILITY 16

LIST OF TABLES

Table 1 – Sample Summary
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – QC Deficiencies and Data Qualification Actions
Table 4 – Qualified Results for Field Samples
Table 5 – Field Duplicate Results

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting and Refining Site Operable Unit 1 in Middletown, New York. The independent data review was completed in accord with the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 191 investigative soil samples plus the associated field QC samples, which were collected by ENTACT in May through October 2014 with the intended use of confirming that backfill materials are suitable for use on-site and verifying that remediation goals have been achieved in excavated grids. A complete listing of the samples collected and tests performed is shown in Table 1. QAA performed a full validation of the data and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) as specified in Section 5.9 of the Workplan. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (October 2013) and *National Functional Guidelines for Superfund Organic Methods Data Review* (October 2013), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The Workplan stipulates that the precision control limits will be dictated by the analytical method. For inorganics, the method RPD limit is 20%. For organics, the analytical methods stipulate that the laboratory calculate in-house performance criteria (which range from 12%-50% for this data set). In order to better assess data usability, an RPD limit of 40% was employed where the method limit for an analyte falls above this value. The validator assessed precision using the laboratory and field duplicates. The laboratory prepared a laboratory control spike duplicate (LCSD) using reagent water for each VOC analytical batch plus at least one unspiked matrix duplicate (MD) or matrix spike duplicate (MSD) using a sample from the site for each test except VOCs for the backfill samples. All LCS/LCSD RPDs are within the limits, which indicates good precision for the analytical technique on a sample free of matrix effects. The RPDs for the matrix duplicates are within the limits, which indicates good precision for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the duplicate. Of the 5,666 total results for field samples (investigative samples and field duplicates), just one result is qualified as estimated (J) based on matrix duplicate precision. Additionally, the sampler collected seven field duplicates with the 191 investigative samples and the RPDs are within the limits, which indicates good precision for the sampling and analytical technique on the given matrix, or the validator qualified the results for the original and duplicate sample. Three (one for Lead and two for Acetone) of the 198 pairs of results are qualified as estimated (UJ for non-detects and J for detects) based on field duplicate precision.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The Workplan stipulates that the accuracy control limits will be dictated by the analytical method. For inorganics, the method recovery limits are 75-125% or the manufacturer's established control limit for solid reference materials (which range from 0%-252% for this data

set). For organics, the analytical methods stipulate that the laboratory calculate in-house performance criteria (which range from 10%-162% for this data set). In order to better assess data usability, limits of 50-200% were employed where the method limits for a spiked analyte falls outside these values. The validator assessed accuracy using the laboratory spikes and matrix spikes. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with each analytical batch and reported the recovery for every target compound except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result). The laboratory also prepared a laboratory control spike duplicate (LCSD) with each VOC analytical batch and one of the Total Metals batches. For this Total Metals batch, the laboratory was not able to report acceptable results for Antimony for the LCS/LCSD. Thus, the validator qualified the non-detect result for Antimony for the sample in this batch as rejected (R) due to inadequate QC. The recoveries for all other LCS/LCSD are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects, with a few exceptions. Most of exceedances did not result in data qualification (i.e., the recovery was above the limit indicating a potential bias for detected results and the analyte was not detected in any of the associated samples). However, one result (a non-detect for Antimony) is qualified as rejected (R) due to extremely low laboratory spike recovery (less than 40%). Note that the recovery is within the laboratory limits and thus the laboratory did not take any corrective action. A second result is qualified as estimated (J) due to laboratory spike recovery. Additionally, the laboratory prepared several matrix spikes (MS) and matrix spike duplicates (MSD) plus several post digestion spikes (PDS) and serial dilutions (SD) for the metals analyses using a sample from the site. All SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy of metals results that are substantially above the reporting limit. The MS/MSD/PDS recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the spike samples. Of the 5,666 total results for field samples, 15 results are qualified as estimated based on matrix spike recovery. The qualification includes the expected direction of bias where known (i.e., J+ for high MS/MSD recovery and J- for low MS/MSD recovery with no other non-directional QC issues). Additionally, the laboratory utilized one or more surrogate spikes for each organic analysis. The surrogate recoveries are within the laboratory limits for all field samples, with a few exceptions. Most of the exceedances did not result in data qualification (i.e., the recovery was affected by sample dilution or was above the limit indicating a potential bias for detected results and the sample results are all non-detect). Eighteen (18) detects for VOCs are qualified due to high surrogate recovery.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, investigative samples were collected as required in the approved sampling and analysis plans. (Note that sampling is an on-going process at the site and all samples may not be reflected in this validation batch.) Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratories are properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory and field QC blanks, and analytical instrument setup (i.e., tuning, calibration, interference correction, etc.) For all samples, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank with each analytical batch and the sampler collected 13 trip blanks with the VOC samples. The laboratory and field QC blanks show no contamination, which indicates the samples were not affected by laboratory or field procedures, or the validator qualified the samples associated with the blank that have a concentration similar to that in the blank. Twelve (12)

detects for Acetone and seven detects for Methylene Chloride are qualified as potentially contaminated (U) due to laboratory and/or trip blank contamination. Per the NFG, detects below the reporting limit (i.e., laboratory J-values) with a U flag should be considered not detected at the reporting limit. This is the case for one of the Methylene Chloride results, and thus the validator replaced the concentration reported by the laboratory with the reporting limit. Detects above the reporting limit should be considered not detected at the sample result per the NFG, and thus no replacement was made for the remaining cases. Proper analytical procedures were used and calibration results met the method requirements or the validator qualified the affected samples. Three detects for Zinc are qualified as estimated (J) due to poor calibration curve fit. Sixty-eight (68) results (for various organic analytes) are qualified due to calibration drift. One non-detect result for Sodium is qualified as rejected (R) due to extremely low interference check standard (ICS) recovery (less than 50%). Additionally, several VOC results are qualified based on internal standard response. Two-hundred-thirty-two (232) VOC results are qualified as estimated (UJ for non-detects, J for detects below the reporting limit, and J+ for detects above the reporting limit) due to low laboratory response. Twenty-five (25) VOC results are qualified as rejected (R) due to extremely low internal standard response (less than 20%). The affected results are the non-detects for nine analytes in three samples. Note that the laboratory re-analyzed all samples with inadequate internal standard response and found concurring results.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. The analyses of field samples produced valid analytical measurements, with the exception of 28 non-detect results. With 5,666 total results for field samples, this gives a completeness of 99.5%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results for all field samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics.

DATA USABILITY

The following non-detect results are qualified as rejected (R) and thus are not suitable for use:

Lab ID	Field ID	Test	Analyte(s)	Result	DVQ	QC Issue
460-82849-1	ECS-AZ5-F	ICP	Antimony	10.5 U mg/kg	R	Acceptable result not available to report in the LCS/LCSD
		ICP	Sodium	211 U mg/kg	R	Extremely low ICS recovery (2%)
460-84193-1	ECS-AREA2-Q16-F	ICP	Antimony	3.8 U mg/kg	R	Extremely low laboratory control spike recovery (39.3%)
460-82730-3	BF-5L-UT-4g-02	VOC	1,2-Dichlorobenzene	1.5 U ug/kg	R	Extremely low internal standard response (14.8%)
			1,3,5-Trimethylbenzene	1.5 U ug/kg	R	
			1,3-Dichlorobenzene	1.5 U ug/kg	R	
			1,4-Dichlorobenzene	1.5 U ug/kg	R	
			n-Butylbenzene	1.5 U ug/kg	R	
			n-Propylbenzene	1.5 U ug/kg	R	
			sec-Butylbenzene	1.5 U ug/kg	R	
			t-Butylbenzene	1.5 U ug/kg	R	

Lab ID	Field ID	Test	Analyte(s)	Result	DVQ	QC Issue
460-82735-1	BF-ORI-WT-3g-01	VOC	1,2,4-Trimethylbenzene	1.7 U ug/kg	R	Extremely low internal standard response (14.6%)
			1,2-Dichlorobenzene	1.7 U ug/kg	R	
			1,3,5-Trimethylbenzene	1.7 U ug/kg	R	
			1,3-Dichlorobenzene	1.7 U ug/kg	R	
			1,4-Dichlorobenzene	1.7 U ug/kg	R	
			n-Butylbenzene	1.7 U ug/kg	R	
			n-Propylbenzene	1.7 U ug/kg	R	
			sec-Butylbenzene	1.7 U ug/kg	R	
			t-Butylbenzene	1.7 U ug/kg	R	
460-82735-2	BF-ORI-WT-3g-02	VOC	1,2-Dichlorobenzene	1.7 U ug/kg	R	Extremely low internal standard response (16.3%)
			1,3,5-Trimethylbenzene	1.7 U ug/kg	R	
			1,3-Dichlorobenzene	1.7 U ug/kg	R	
			1,4-Dichlorobenzene	1.7 U ug/kg	R	
			n-Butylbenzene	1.7 U ug/kg	R	
			n-Propylbenzene	1.7 U ug/kg	R	
			sec-Butylbenzene	1.7 U ug/kg	R	
			t-Butylbenzene	1.7 U ug/kg	R	

In each case, the absence or presence of the analyte cannot be confirmed in the sample due to serious QC issues.

All other results for the samples are acceptable for use with the qualifications shown in Table 4. Results that are qualified with a UJ should be considered not present above the reporting limit; however the reporting limit is an estimated value. Results that are qualified with a J- (biased low) can be used for determining the presence of the analyte and as an indication that the concentration of the analyte exceeds a given criterion. However, the concentration reported for detects may be low. The following J- results are of particular note because in each case the analyte was detected, and thus the result was not rejected, but the analyte recovery in the MS/MSD prepared using the sample is extremely low (a negative recovery indicates that the analyte was not recovered above the sum of the amount of spike added and the amount in the unspiked sample):

Lab ID	Field ID	Test	Analyte(s)	Result	DVQ	QC Issue
460-82584-3	BF-ORI-WT-2c-01	SVOC	Benzo(a)anthracene	1600 ug/kg	J-	Extremely low matrix spike recovery (12%), Extremely low matrix spike duplicate recovery (4%)
			Benzo(a)pyrene	1600 ug/kg	J-	Extremely low matrix spike recovery (9%), Extremely low matrix spike duplicate recovery (4%)
			Benzo(b)fluoranthene	2300 ug/kg	J-	Extremely low matrix spike recovery (-7%), Extremely low matrix spike duplicate recovery (-17%)
			Chrysene	1600 ug/kg	J-	Extremely low matrix spike recovery (5%), Extremely low matrix spike duplicate recovery (-1%)
			Pyrene	2300 ug/kg	J-	Extremely low matrix spike recovery (-18%), Extremely low matrix spike duplicate recovery (-23%)

Results that are qualified with a J+ (biased high) can be used for determining the presence of the analyte and as an indication that the concentration of the analyte is less than a given criterion. However, the concentration reported for detects may be high. Similarly, results that are qualified with a J (estimated) may be either low or high. For results qualified with a U (potentially contaminated), the analyte should be considered not detected at the reported value. For results qualified due to field duplicate precision, the higher result (i.e., from either the original or duplicate sample) should be used for project decisions. This gives a conservative approach relative to protection of the environment. (For field duplicate pairs that pass the precision criteria, the value should be selected based on accepted convention for the site and/or agency requirements,

e.g., select the value reported for the original sample, the average of the two values, etc.) For results qualified solely because the concentration is between the MDL and RL, the actual value is not expected to exceed the sample RL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include pdf data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Instrument Tuning and Initial Calibration,
- Calibration Verification,
- Interference Check Standards (ICS),
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD),
- Field Duplicates (FD),
- Dual Column Confirmation,
- Surrogates (SU), and
- Internal Standards (IS).

Additionally, the validator examined the raw data for 10% of the sample batches (randomly selected by the validator across the various analysis dates and tests) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not less than 50% lower limit or greater than 200% upper limit)
- Laboratory Precision – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not greater than 40%)
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator

considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 40% and 30% for inorganics laboratory and matrix spikes, and 30%, 20% and 10% for organics laboratory, matrix and surrogate spikes were used. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

The laboratory analyzed an LCSD and reported RPDs for all target compounds for each VOC batch (maximum 20 samples). All RPDs are at or below the criteria.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every inorganics analytical batch (maximum 20 samples) and an MSD for every organics analytical batch (maximum 20 samples) and reported RPDs for MD and MSD prepared using a sample from the site. Three excavation confirmation soil (ECS) samples (two of which were designated by the sampler on the custody record) were used to prepare an MD for TCLP Metals and Total Metals. With a total of 59 investigative ECS samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix. No soil samples were designated by the sampler for MD or MSD for the backfill samples. The laboratory selected a backfill sample for batch QC for one or more MD/MSD for Total Metals, Chromium (VI), Pesticides, PCBs, Herbicides, SVOCs, and Cyanide. No MSD were prepared using a backfill sample for VOCs.

Some MD and MSD RPDs are above the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that, for cases where either result for the duplicate pair is non-detect, the check does not apply and the laboratory reported the RPD as NC (not calculable) in the pdf report and as 0 in the EDD. Additionally, the validator considered samples of the same media (i.e., backfill or excavation confirmation) and source to be of similar matrix (e.g., if deficiencies were noted for a MD or MSD prepared using a backfill sample from a particular source, all backfill samples from that source in the same analytical batch were qualified).

3.1.3 FIELD DUPLICATE (FD) PRECISION

The samplers collected seven FD with the 191 investigative samples, which does not meet the Workplan requirement of one per 20 or fewer samples per sample matrix. This is due to only two field duplicates being collected with the 95 investigative backfill grab samples that were analyzed for VOCs. Sufficient field duplicates were collected with the backfill composite samples that were analyzed for the remaining DER-10 tests and with the ECS samples. Results for the field duplicates are summarized in Table 5.

Three pairs of results are outside the field precision criteria and the validator qualified the data as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4

lists all qualified results for the field samples. Note that the remaining 195 pairs of FD results meet the criteria, which indicates good overall precision, and thus the validator only qualified the original and duplicate sample for the three FD deficiencies.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD), matrix spikes including post digestion spikes (MS/MSD/PDS), serial dilutions (SD), and surrogate (SU) spikes. LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD/PDS are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit. Surrogates are added to each sample before preparation and analysis and provide an indication of accuracy for each individual sample analysis.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS and/or LCSD for every analytical batch (maximum 20 samples) as required and reported recoveries for all target compounds except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result). Additionally, the laboratory was not able to report acceptable results for Antimony for the LCS/LCSD for Total Metals batch 490-192308. Thus, the validator qualified the non-detect result for Antimony for the sample in this batch (ECS-AZ5-F) as rejected (R) due to inadequate QC.

Some LCS/LCSD recoveries are outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator did not qualify the data for cases where the LCS or LCSD recovery for an organic analyte is outside the criteria (i.e., the laboratory-derived recovery control limits based on historical performance or 50-200%, whichever is more stringent) but within 70-130% since this is considered within the inherent method error and suitable for the intended use.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS/PDS for every inorganics analytical batch (maximum 20 samples) and an MS/MSD for every organics analytical batch (maximum 20 samples) and reported recoveries for MS and MSD prepared using a sample from the site. Three excavation confirmation soil (ECS) samples (two of which were designated by the sampler on the custody record) were used to prepare an MS for TCLP Metals and Total Metals. With a total of 59 investigative ECS samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix. No soil samples were designated by the sampler for MS/MSD for the backfill samples. The laboratory selected a backfill sample for batch QC for one or more MS/MSD for Total Metals, Chromium (VI), Pesticides, PCBs, Herbicides, SVOCs, and Cyanide. No MS/MSD were prepared using a backfill sample for VOCs.

Some MS/MSD/PDS recoveries are outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that if an analyte was detected in the unspiked parent sample at a concentration well above (greater than four times for inorganics or greater than one times for organics)

the concentration of spike added to the sample, thereby rendering the recoveries inconclusive, the check was waived and the validator did not qualify the data. For cases where the MS or MSD recovery is outside the criteria but greater than the data rejection limit (30% for inorganics and 20% for organics) and the average MS/MSD recovery is in control, the validator did not qualify the data. The validator also did not qualify the data for cases where the MS or MSD recovery for an organic analytes is outside the criteria (i.e., the laboratory-derived recovery control limits based on historical performance or 50-200%, whichever is more stringent) but within 70-130% since this is considered within the inherent method error and suitable for the intended use. Additionally, the validator considered samples of the same media (i.e., backfill or excavation confirmation) and source to be of similar matrix (e.g., if deficiencies were noted for a MS/MSD prepared using a backfill sample from a particular source, all backfill samples from that source in the same analytical batch were qualified).

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all target compounds detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit (10%).

3.2.4 SURROGATE (SU) RECOVERY

The laboratory spiked each organic sample with one or more surrogates before preparation and analysis.

Some surrogate recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records, which confirms that sample integrity was maintained. The validator noted the following regarding the custody records and sample log-in at the laboratory:

- All samples were received within two days of collection as recommended in DER-10 except those in laboratory job numbers 460-828491-1 and 460-84379-1, which were received three days after collection in good condition.
- For work order 460-78812-1, TestAmerica-Edison in Edison, NJ sent the Pesticide sample aliquots to TestAmerica-Buffalo in Amherst, NY for performance of the 8081B analyses. Likewise, for work orders 460-82461-1, 460-82584-1, 460-82585-1, 460-82730-1, and 460-82735-1, TestAmerica-Edison sent the SVOC sample aliquots to TestAmerica-Nashville in Nashville, TN for performance of the 8270D analyses. TestAmerica-Nashville also performed the 6010C ICP Metals analyses for work order 460-82849-1.
- For work orders 460-75773-1, 460-79992-1, 460-80009-1, 460-80015-1, 460-80075-1, and 460-80130-1, the documentation indicates that no custody seals were used for the transfer of the samples from the field to the laboratory. The samples were transferred by commercial, overnight courier and were received in good condition, and thus no further action was taken.

- For work orders 460-82461-1, 460-82584-1, 460-82585-1, 460-82730-1, and 460-82735-1, the documentation indicates that no custody seals were used for the transfer of the SVOC sample aliquots from TestAmerica-Edison to TestAmerica-Nashville. The samples were transferred by commercial, overnight courier and were received in good condition, and thus no further action was taken.
- For work order 460-80015-1, the sampler did not sign and date the custody record upon release of the samples to the overnight courier. The laboratory signed upon receipt from the courier and the samples were received in good condition, and thus no further action was taken.
- For work orders 460-80075-1 and 460-82461-1, some containers were received broken. Samples were transferred to new containers upon receipt. Analyses were performed for metals and non-volatile organics only, and thus this is not considered to significantly affect data quality.
- For work order 460-81828-1, one of the two 8-ounce jars collected on 8/27/14 was received broken with contents emptied into the cooler. A second aliquot was collected on 9/3/14 and sent to the laboratory to be used as needed. All analyses were performed using the remaining unbroken container from 8/27/14.
- For work order 460-82730-1, the VOC vial containing methanol was received broken for sample BF-5L-UT-4g-01. Low-level VOC analysis was performed using the remaining vials.

The information on the custody record is correct and agrees with that reported in the analytical results except as follows:

- For work order 460-80075-1, the sampler entered 7/24/14 as the relinquished date on the custody record. The actual date is 7/25/14 per the sample collection and laboratory receipt dates. Likewise, for work order 460-80130-1, the sampler entered 7/24/14 as the relinquished date on the custody record. The actual date is 7/28/14 per the sample collection and laboratory receipt dates.
- For work order 460-81232-1, the laboratory entered 8/15/14 as the received date on the custody record. The actual date is 8/16/14 per the sample collection and relinquish dates and as shown in the laboratory report. Likewise, for work orders 460-82584-1 and 460-82585-1, the laboratory entered 9/10/14 as the received date on the custody record. The actual date is 9/11/14 per the sample collection and relinquish dates and as shown in the laboratory report.
- For laboratory work order 460-82155-1, the custody record indicates the trip blank is a water matrix. The results for the trip blank are reported in mg/Kg and the matrix is shown as solid in the pdf report. Two methanol containers were received for this blank with no low level (DI water) containers and thus it was analyzed as a high level soil with results reported in soil units.
- For work order 460-83792-1, sample BF-ORI-HS-5c-01 is reported with a sample collection time of 13:05. The actual time as shown on the custody record is 15:05. The sample collection date is correctly reported as 10/1/2014 and the pass/fail status for the holding time checks is not affected, and thus no further action was taken.
- For work order 460-84428-1, the field IDs on the custody record do not match those on the sample labels. The sampler revised the custody record to include the correct IDs as shown on the labels.

All samples were analyzed for the tests requested on the chain-of-custody except as follows:

- For work order 460-82585-1, a trip blank is listed on the custody record but was not received and thus not logged in or analyzed.
- For work orders 460-79992-1, 460-80075-1, and 460-80130-1, results for the post stabilization verification (PSV) samples that appear on the custody record are reported separately per ENTACT's request.
- For the three backfill composite samples in laboratory work orders 460-82155-1 and 460-83311-1, the laboratory reported an original result (9/5/14 and 9/25/14 prep dates) and re-extracted/re-analyzed result (9/7/14 and 9/26/14 prep dates) for Chromium (VI). The samples were re-extracted/ re-analyzed due to deficiencies for the MS/MSD, which were prepared using samples from another site and thus do not reflect on data quality for the backfill

samples. The sample results for both sets are all non-detect and the validator did not find any QC deficiencies for either set. In the EDD, the laboratory reported the original set with a reportable_result of Yes and the second set with a reportable_result of No. The validator confirmed this selection and made no changes.

- For the one backfill composite sample in laboratory work order 460-83792-1, the laboratory reported an original result (10/8/14 prep date) and re-extracted/re-analyzed result (10/9/14 prep date) for Chromium (VI). The samples were re-extracted/ re-analyzed due to deficiencies for the MS/MSD, which also was prepared using a sample from another site and thus does not reflect on data quality for the backfill samples. The sample results for both sets are all non-detect; however, the QC results for the laboratory blanks and spikes are not reported for the first set of results. The validator did not find any QC deficiencies requiring qualification for the second set of results. In the EDD, the laboratory reported the original set with a reportable_result of Yes and the second set with a reportable_result of No. Due to the missing QC results, the validator changed the reportable_result to No for the original set and to Yes for the second set.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

All samples were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan, and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratories are accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (no. 11452 for TestAmerica-Edison, no. 10026 for TestAmerica-Buffalo and no. 11342 for TestAmerica-Nashville).

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. (In some cases, the method update number used by the laboratory may differ from that in the Workplan. For example, method 8260C was used rather than 8260B for the VOCs for all backfill samples.)

For the backfill samples, the target analyte list includes all DER-10 analytes and the nominal reporting limits (i.e., without dry-weight correction or sample dilution and based on the standard sample weight and final volume) are at or below the levels of concern (i.e., the Allowable Constituent Levels (ACLs) for imported fill or soil from Appendix 5 of the DER-10), except as follows:

- DER-10 Appendix 5 lists m-Cresol(s), o-Cresol(s), and p-Cresol(s). The laboratory reported m & p-Cresols and o-Cresol as it is not possible to separate m-Cresol and p-Cresol using method 8270D.
- DER-10 Appendix 5 lists Chlordane (alpha). The laboratory reported technical Chlordane, which is a commercial mixture that contains alpha-Chlordane and gamma-Chlordane along with other related compounds.
- The laboratories inadvertently reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) for the backfill samples instead of the DER-10 analytes as requested.
- TestAmerica-Nashville's nominal reporting limit for Pentachlorophenol of 0.830 mg/kg is slightly above the ACL of 0.8 mg/kg. Note however that the laboratory reported any confirmed detects above the method detection limit (MDL) but below the reporting limit (i.e., J-values) and the laboratory's MDL for Pentachlorophenol is well below the ACL at 0.130 mg/kg.

Five backfill samples required dilution due to matrix effects and have elevated reporting limits for one or more non-detect results, as follows:

Lab ID	Field ID	Test	Dilution Rate
460-78812-8	BF-ORI-HS-1C-01	8081B Pesticides	20
460-78812-9	BF-ORI-HS-1C-02	8081B Pesticides	20
460-82155-8	BF-5L-WT-1c-01	8270D SVOCs	2
460-82155-9	BF-5L-WT-1c-02	8270D SVOCs	2
460-82735-5	BF-ORI-WT-3c-01-X	8270D SVOCs	5

For the excavation confirmation samples, the target analyte list includes total Arsenic, total Lead, and/or TCLP Lead as requested and all Contract Laboratory Program (CLP) metals for the TAL metals. The nominal reporting limits are below the levels of concern (i.e., the remedial goals) for total Arsenic, total Lead, and TCLP Lead. There are no established levels of concern for TAL metals. The nominal reporting limits comply with the requirements in the ASP for TAL metals with the exception of Iron, which has a nominal reporting limit of 30 mg/kg for the TestAmerica-Edison soil samples and a nominal reporting limit of 40 mg/kg for the TestAmerica-Nashville soil samples, both of which are above the ASP reporting limit of 20 mg/kg.

None of the excavation confirmation samples have elevated reporting limits for a non-detect result. (Note: The laboratory dilutes all total metals samples 2-4x before analysis as standard practice. All Revere samples were diluted 4x and thus nominal reporting limits were determined at this dilution rate. The laboratory also dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank (and leachate blank for TCLP) for every analytical batch (maximum 20 samples) and a calibration blank for every 10 metals analyses as required per the analytical methodology. Additionally, a trip blank was included with 13 of the 21 shipments of VOC samples, which does not meet the Workplan requirement of one for every cooler of VOC samples. A trip blank was not included with the backfill samples in work orders 460-80767-1, 460-81561-1, 460-82584-1, 460-82585-1, 460-82735-1, 460-83311-1, 460-83792-1, and 460-84432-1, and thus potential contamination with VOCs during shipment could not be evaluated for these samples. (Acetone, Chloroform, and/or Methylene Chloride were detected in one or more of the 13 trip blanks collected with the other samples.) Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used.

Some detects are reported in the laboratory and trip blanks and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator calculated a blank equivalent concentration taking into account the sample weight, moisture content, and dilution factor for each sample when determining if the contamination in the blank is near that in the sample, and thus if data quality is affected for that sample. When comparing aqueous blank concentrations (e.g., for trip blanks) to solid samples, the validator assumed that all contamination found in the aqueous blank aliquot analyzed is potentially present in the solid sample aliquot analyzed.

3.3.5 ANALYTICAL PROCEDURES

The analytical procedures (instrument tuning and initial calibration, calibration verification, interference check standards, dual column confirmation, and internal standards), including the leaching procedures for the method-defined parameter TCLP,

met the requirements in the analytical method with some exceptions. The validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator did not delineate cases where the surrogate has a continuing calibration verification (CCV) %difference above the control limit for the organic analyses, since surrogate recoveries for each sample are evaluated separately.

No issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes 165 analytical batches and the validator re-calculated sample results and QC check parameters for 16 batches and made the following observations from the review of the raw data:

- The laboratory used dual column confirmation for all GC analyses (including Pesticides, PCBs, and Herbicides). For surrogates and spiked analytes, the laboratory reports the results from both columns. For target analytes in blanks and field samples, the laboratory reports the result from the column with the higher concentration (unless chromatographic performance is better on one column and it is therefore used for all analyses), provided that the RPD between the two columns is less than 40%. If the RPD is greater than 40%, the column with the lower concentration is reported with a note in the narrative and the result is reported with a P flag. The RPD did not exceed 40% for any field samples in this data set.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The Level 4 data packages and EDD contain all necessary information or the laboratory submitted a revision upon request as detailed in the case narratives.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
All	all laboratory QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.
460-82730-1 460-84428-1	460-82730-4 460-84428-1 460-84428-2 460-84428-3	sample_matrix_code	The validator changed the entry from WG or WQ to SO for these soil samples.
460-82730-1	460-82730-6	sample_matrix_code	The validator changed the entry from WG to WQ for this trip blank.

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
460-76301-1 460-78812-1 460-80009-1 460-80015-1 460-80767-1 460-80768-1 460-82155-1 460-82461-1 460-82584-1 460-82585-1 460-82730-1 460-81828-1	all backfill composite samples (*c-001 and *c-002)	composite_yn	The validator changed the entry from N to Y based on the custody record.
All	all 6010C Total metals samples	prep_method	The validator changed the method reference from SW3020B to SW3050B based on the pdf analytical results and as confirmed by the laboratory.
460-78812-1	460-78812-8 460-78812-9	analysis_date	The validator changed the date for the SW7196A analysis from 7/7/14 to 7/8/14 based on the pdf analytical results and as confirmed in the raw data.
460-80009-1 460-81552-1 460-83312-1 460-84428-1 460-84432-1	4602391191B (LB) 4602391192B (BS) 4602516551A (LB) 4602516552A (BS) 4602559721A (LB) 4602559722A (BS) 460-80009-8 460-80009-9 460-81552-8 460-83312-3 460-83312-6 460-83312-9 460-84428-3 460-84432-3 460-84432-6 460-84432-6MS 460-84432-6SD	reportable_result	The SW8081B surrogate results from both columns were set to not reportable. The validator changed the entry for the higher concentration for each surrogate from No to Yes per the laboratory standard procedure as confirmed in the pdf analytical results.
460-83311-1	460-83311-3SD	reportable_result	The SW8151A surrogate results from both columns were set to not reportable. The validator changed the entry for the higher concentration for the surrogate from No to Yes per the laboratory standard procedure as confirmed in the pdf analytical results.

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
460-76301-1 460-78812-1	460-76301-3 460-76301-6 460-76301-9 460-76301-12 460-76301-15 460-78812-8 460-78812-9	method_detection_limit minimum_detectable_conc	The validator changed the value from 0 to 2 based on the pdf analytical results.

3.4.3 ANALYTICAL COMPLETENESS

The validator rejected two non-detect results for Antimony due to extremely low laboratory control spike recovery or lack of laboratory control spike data, one non-detect result for Sodium due to extremely low interference check standard recovery, and 25 non-detect results for various VOC analytes due to extremely low internal standard response. With 5,666 total results for field samples (investigative samples and field duplicates), this gives a completeness of 99.5%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which a target analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which a target analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size and include dry-weight correction for all soil samples as required per Section 5.7.1 of the Workplan. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results for the investigative samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics. (For the 7196A analyses, Trivalent Chromium is shown as not dry-weight corrected. Trivalent Chromium is calculated from the results for Hexavalent Chromium and total Chromium, which are dry-weight corrected, and thus the Trivalent Chromium is not directly dry-weight corrected but is on a dry-weight basis.)

The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
May 2014 to October 2014

SAMPLE SUMMARY

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-75773-1	ECS-116-F	05/07/14	INV	ECS	Soil	x											
460-75773-2	DS-116-SW	05/07/14	INV	ECS	Soil	x											
460-75773-2LR	DS-116-SWLR	05/07/14	MD	ECS	Soil	x											
460-75773-2MS	DS-116-SWMS	05/07/14	MS	ECS	Soil	x											
460-75773-3	DS-116-SS	05/07/14	INV	ECS	Soil	x											
460-75773-4	DS-115-SW	05/07/14	INV	ECS	Soil	x											
460-75773-5	DS-115-SS	05/07/14	INV	ECS	Soil	x											
460-75773-6	ECS-115-F	05/07/14	INV	ECS	Soil	x											
460-75773-7	ECS-43-F	05/07/14	INV	ECS	Soil	x											
460-76301-1	BF-SER-RAMPD-DD-15g-001	05/16/14	INV	BF	Soil										x		
460-76301-2	BF-SER-RAMPD-DD-15g-002	05/16/14	INV	BF	Soil										x		
460-76301-3	BF-SER-RAMPD-DD-15c-001	05/16/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-76301-3MS	BF-SER-RAMPD-DD-15c-001MS	05/16/14	MS	BF	Soil							x		x			x
460-76301-3SD	BF-SER-RAMPD-DD-15c-001SD	05/16/14	MSD	BF	Soil							x		x			x
460-76301-4	BF-SER-RAMPD-DD-16g-001	05/16/14	INV	BF	Soil										x		
460-76301-5	BF-SER-RAMPD-DD-16g-002	05/16/14	INV	BF	Soil										x		
460-76301-6	BF-SER-RAMPD-DD-16c-001	05/16/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-76301-7	BF-SER-RAMPD-DD-17g-001	05/16/14	INV	BF	Soil										x		
460-76301-8	BF-SER-RAMPD-DD-17g-002	05/16/14	INV	BF	Soil										x		

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-76301-9	BF-SER-RAMPD-DD-17c-001	05/16/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-76301-10	BF-SER-RAMPD-DD-18g-001	05/16/14	INV	BF	Soil										x		
460-76301-11	BF-SER-RAMPD-DD-18g-002	05/16/14	INV	BF	Soil										x		
460-76301-12	BF-SER-RAMPD-DD-18c-001	05/16/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-76301-13	BF-SER-RAMPD-DD-19g-001	05/16/14	INV	BF	Soil										x		
460-76301-14	BF-SER-RAMPD-DD-19g-002	05/16/14	INV	BF	Soil										x		
460-76301-15	BF-SER-RAMPD-DD-19c-001	05/16/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-76301-16	TB-5/16/14	05/16/14	TB	TB	Water										x		
460-78812-1	BF-ORI-HS-1g-01	07/02/14	INV	BF	Soil										x		
460-78812-2	BF-ORI-HS-1g-02	07/02/14	INV	BF	Soil										x		
460-78812-3	BF-ORI-HS-1g-03	07/02/14	INV	BF	Soil										x		
460-78812-4	BF-ORI-HS-1g-04	07/02/14	INV	BF	Soil										x		
460-78812-5	BF-ORI-HS-1g-05	07/02/14	INV	BF	Soil										x		
460-78812-6	BF-ORI-HS-1g-06	07/02/14	INV	BF	Soil										x		
460-78812-7	BF-ORI-HS-1g-07	07/02/14	INV	BF	Soil										x		
460-78812-8	BF-ORI-HS-1C-01	07/02/14	INV	BF	Soil				x	x	x	x[(1)]	x	x		x	x
460-78812-8MS	BF-ORI-HS-1C-01MS	07/02/14	MS	BF	Soil							x[(1)]					
460-78812-8SD	BF-ORI-HS-1C-01SD	07/02/14	MSD	BF	Soil							x[(1)]					
460-78812-9	BF-ORI-HS-1C-02	07/02/14	INV	BF	Soil				x	x	x	x[(1)]	x	x		x	x
460-78812-9LR	BF-ORI-HS-1C-02LR	07/02/14	MD	BF	Soil					x							
460-78812-9MS	BF-ORI-HS-1C-02MS	07/02/14	MS	BF	Soil					x							
460-78812-10	TB-7/2/14	07/02/14	TB	TB	Water										x		
460-79992-1	DS-115-SS	07/24/14	INV	ECS	Soil	x	x										
460-79992-2	ECS-Area2-E1-F	07/24/14	INV	ECS	Soil	x	x										
460-79992-3	DS-Area2-E1-SS	07/24/14	INV	ECS	Soil	x	x										
460-80009-1	BF-ORI-UT-1g-01	07/24/14	INV	BF	Soil										x		
460-80009-2	BF-ORI-UT-1g-02	07/24/14	INV	BF	Soil										x		
460-80009-3	BF-ORI-UT-1g-03	07/24/14	INV	BF	Soil										x		
460-80009-4	BF-ORI-UT-1g-04	07/24/14	INV	BF	Soil										x		
460-80009-5	BF-ORI-UT-1g-05	07/24/14	INV	BF	Soil										x		
460-80009-6	BF-ORI-UT-1g-06	07/24/14	INV	BF	Soil										x		
460-80009-7	BF-ORI-UT-1g-07	07/24/14	INV	BF	Soil										x		
460-80009-8	BF-ORI-UT-1c-01	07/24/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-80009-9	BF-ORI-UT-1c-02	07/24/14	INV	BF	Soil				x	x	x	x	x	x		x	x

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-80009-10	TB 7/24/14	07/24/14	TB	TB	Water										x		
460-80015-1	BF-ORI-WT-1g-01	07/24/14	INV	BF	Soil										x		
460-80015-2	BF-ORI-WT-1g-02	07/24/14	INV	BF	Soil										x		
460-80015-3	BF-ORI-WT-1g-03	07/24/14	INV	BF	Soil										x		
460-80015-4	BF-ORI-WT-1g-04	07/24/14	INV	BF	Soil										x		
460-80015-5	BF-ORI-WT-1g-05	07/24/14	INV	BF	Soil										x		
460-80015-6	BF-ORI-WT-1g-06	07/24/14	INV	BF	Soil										x		
460-80015-7	BF-ORI-WT-1g-07	07/24/14	INV	BF	Soil										x		
460-80015-8	BF-ORI-WT-1c-01	07/24/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-80015-9	BF-ORI-WT-1c-02	07/24/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-80015-10	TB 7/24/14	07/24/14	TB	TB	Water										x		
460-80075-1	ECS-Area 2-E2-F	07/25/14	INV	ECS	Soil	x	x										
460-80075-1LR	ECS-Area 2-E2-FLR	07/25/14	MD	ECS	Soil	x											
460-80075-1MS	ECS-Area 2-E2-FMS	07/25/14	MS	ECS	Soil	x											
460-80130-1	ECS-Area 2-E3-F	07/28/14	INV	ECS	Soil	x	x										
460-80767-1	BF-ORI-HS-2g-01	08/07/14	INV	BF	Soil										x		
460-80767-2	BF-ORI-HS-2g-02	08/07/14	INV	BF	Soil										x		
460-80767-3	BF-ORI-HS-2c-01	08/07/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-80767-3MS	BF-ORI-HS-2c-01MS	08/07/14	MS	BF	Soil											x	
460-80767-3SD	BF-ORI-HS-2c-01SD	08/07/14	MSD	BF	Soil											x	
460-80768-1	BF-ETETZ-CF-1g-01	08/07/14	INV	BF	Soil										x		
460-80768-2	BF-ETETZ-CF-1g-02	08/07/14	INV	BF	Soil										x		
460-80768-3	BF-ETETZ-CF-1g-03	08/07/14	INV	BF	Soil										x		
460-80768-4	BF-ETETZ-CF-1g-04	08/07/14	INV	BF	Soil										x		
460-80768-5	BF-ETETZ-CF-1g-05	08/07/14	INV	BF	Soil										x		
460-80768-6	BF-ETETZ-CF-1g-06	08/07/14	INV	BF	Soil										x		
460-80768-7	BF-ETETZ-CF-1g-07	08/07/14	INV	BF	Soil										x		
460-80768-8	BF-ETETZ-CF-1c-01	08/07/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-80768-8LR	BF-ETETZ-CF-1c-01LR	08/07/14	MD	BF	Soil						x						
460-80768-8MS	BF-ETETZ-CF-1c-01MS	08/07/14	MS	BF	Soil						x			x			
460-80768-8SD	BF-ETETZ-CF-1c-01SD	08/07/14	MSD	BF	Soil									x			
460-80768-9	BF-ETETZ-CF-1c-02	08/07/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-80768-10	TB-8/7/14	08/07/14	TB	TB	Water										x		
460-80888-1	ECS-Area20-119-F	08/11/14	INV	ECS	Soil	x											
460-80888-2	ECS-Area20-120-F	08/11/14	INV	ECS	Soil	x											
460-80888-3	ECS-Area20-118-F	08/11/14	INV	ECS	Soil	x											
460-80888-4	DS-Area20-120-SS	08/11/14	INV	ECS	Soil	x											
460-80888-5	DS-Area20-118-SS	08/11/14	INV	ECS	Soil	x											
460-80971-1	ECS-Area20-117-F	08/12/14	INV	ECS	Soil	x											
460-80971-1LR	ECS-Area20-117-FLR	08/12/14	MD	ECS	Soil	x											

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-80971-1MS	ECS-Area20-117-FMS	08/12/14	MS	ECS	Soil	x											
460-80971-2	DS-Area20-117-SS	08/12/14	INV	ECS	Soil	x											
460-81078-1	DS-AREA 20-117-SN	08/12/14	INV	ECS	Soil	x											
460-81232-1	ECS-AREA 11-G6-F	08/15/14	INV	ECS	Soil		x										
460-81232-2	ECS-AREA 11-G5-F	08/15/14	INV	ECS	Soil		x										
460-81232-3	ECS-AREA 11-G5-F-X	08/15/14	FD	ECS	Soil		x										
460-81552-1	BF-5L-UT-1g-01	08/21/14	INV	BF	Soil										x		
460-81552-2	BF-5L-UT-1g-02	08/21/14	INV	BF	Soil										x		
460-81552-3	BF-5L-UT-1g-03	08/21/14	INV	BF	Soil										x		
460-81552-4	BF-5L-UT-1g-04	08/21/14	INV	BF	Soil										x		
460-81552-5	BF-5L-UT-1g-05	08/21/14	INV	BF	Soil										x		
460-81552-6	BF-5L-UT-1g-06	08/21/14	INV	BF	Soil										x		
460-81552-7	BF-5L-UT-1g-07	08/21/14	INV	BF	Soil										x		
460-81552-8	BF-5L-UT-1c-01	08/21/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-81552-8MS	BF-5L-UT-1c-01MS	08/21/14	MS	BF	Soil							x	x				
460-81552-8SD	BF-5L-UT-1c-01SD	08/21/14	MSD	BF	Soil							x	x				
460-81552-9	BF-5L-UT-1c-02	08/21/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-81552-9MS	BF-5L-UT-1c-02MS	08/21/14	MS	BF	Soil												x
460-81552-9SD	BF-5L-UT-1c-02SD	08/21/14	MSD	BF	Soil												x
460-81552-10	TB-8/21/14	08/21/14	TB	TB	Water										x		
460-81561-1	BF-ORI-HS-3g-01	08/21/14	INV	BF	Soil										x		
460-81561-2	BF-ORI-HS-3g-02	08/21/14	INV	BF	Soil										x		
460-81561-3	BF-ORI-HS-3c-01	08/21/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-81634-1	ECS-AREA 8-H3/4-F	08/22/14	INV	ECS	Soil			x	x								
460-81634-2	ECS-AREA 8-H4/5-F	08/22/14	INV	ECS	Soil		x										
460-81634-2LR	ECS-AREA 8-H4/5-FLR	08/22/14	MD	ECS	Soil		x										
460-81634-2MS	ECS-AREA 8-H4/5-FMS	08/22/14	MS	ECS	Soil		x										
460-81749-1	ECS-AREA7-M5/6-F	08/26/14	INV	ECS	Soil		x										
460-81749-2	ECS-AREA7-L5-F	08/26/14	INV	ECS	Soil		x										
460-81749-3	ECS-AREA7-K5-F	08/26/14	INV	ECS	Soil		x										
460-81828-1	SF-ETETZ-TB-1g-01	8/27/14	INV	BF	Soil										x		
460-81828-2	SF-ETETZ-TB-1g-02	8/27/14	INV	BF	Soil										x		
460-81828-3	SF-ETETZ-TB-1g-03	8/27/14	INV	BF	Soil										x		
460-81828-4	SF-ETETZ-TB-1g-04	8/27/14	INV	BF	Soil										x		
460-81828-5	SF-ETETZ-TB-1g-05	8/27/14	INV	BF	Soil										x		
460-81828-6	SF-ETETZ-TB-1g-06	8/27/14	INV	BF	Soil										x		
460-81828-7	SF-ETETZ-TB-1g-07	8/27/14	INV	BF	Soil										x		
460-81828-8	SF-ETETZ-TB-1c-01	8/27/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-81828-8MS	SF-ETETZ-TB-1c-01MS	8/27/14	MS	BF	Soil									x			
460-81828-8SD	SF-ETETZ-TB-1c-01SD	8/27/14	MSD	BF	Soil									x			

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-81828-9	SF-ETETZ-TB-1c-02	8/27/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-81828-10	TB-8/27/14	8/27/14	TB	TB	Water										x		
460-82155-1	BF-5L-WT-1g-01	09/03/14	INV	BF	Soil										x		
460-82155-2	BF-5L-WT-1g-02	09/03/14	INV	BF	Soil										x		
460-82155-3	BF-5L-WT-1g-03	09/03/14	INV	BF	Soil										x		
460-82155-4	BF-5L-WT-1g-04	09/03/14	INV	BF	Soil										x		
460-82155-5	BF-5L-WT-1g-05	09/03/14	INV	BF	Soil										x		
460-82155-6	BF-5L-WT-1g-06	09/03/14	INV	BF	Soil										x		
460-82155-7	BF-5L-WT-1g-07	09/03/14	INV	BF	Soil										x		
460-82155-8	BF-5L-WT-1c-01	09/03/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-82155-8	BF-5L-WT-1c-01	09/03/14	INV RE	BF	Soil						x						
460-82155-8LR	BF-5L-WT-1c-01LR	09/03/14	MD	BF	Soil					x							
460-82155-8MS	BF-5L-WT-1c-01MS	09/03/14	MS	BF	Soil					x		x	x				
460-82155-8SD	BF-5L-WT-1c-01SD	09/03/14	MSD	BF	Soil							x	x				
460-82155-9	BF-5L-WT-1c-02	09/03/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-82155-9	BF-5L-WT-1c-02	09/03/14	INV RE	BF	Soil						x						
460-82155-10	TB-9/3/14	09/03/14	TB	TB	Water*										x		
460-82246-1	ECS-AREA 6-Q8/9-F	09/04/14	INV	ECS	Soil		x										
460-82246-2	ECS-AREA 6-Q7-F	09/04/14	INV	ECS	Soil		x										
460-82246-3	ECS-AREA 6-P7-F	09/04/14	INV	ECS	Soil		x										
460-82246-4	ECS-AREA 6-O7-F	09/04/14	INV	ECS	Soil		x										
460-82246-5	ECS-AREA 13-F/G-9-F	09/04/14	INV	ECS	Soil		x										
460-82246-6	ECS-AREA 12-H10-F	09/04/14	INV	ECS	Soil		x										
460-82461-1	SF-ETETZ-TB-2g-01	09/09/14	INV	BF	Soil										x		
460-82461-2	SF-ETETZ-TB-2g-02	09/09/14	INV	BF	Soil										x		
460-82461-3	SF-ETETZ-TB-2c-01	09/09/14	INV	BF	Soil				x	x	x	x	x	x		x[(2)]	x
460-82461-3MS	SF-ETETZ-TB-2c-01MS	09/09/14	MS	BF	Soil												x
460-82461-3SD	SF-ETETZ-TB-2c-01SD	09/09/14	MSD	BF	Soil												x
460-82461-4	TB-9/9/14	09/09/14	TB	TB	Water										x		
460-82584-1	BF-ORI-WT-2g-01	09/10/14	INV	BF	Soil										x		
460-82584-2	BF-ORI-WT-2g-02	09/10/14	INV	BF	Soil										x		
460-82584-3	BF-ORI-WT-2c-01	09/10/14	INV	BF	Soil				x	x	x	x	x	x		x[(2)]	x
460-82584-3MS	BF-ORI-WT-2c-01MS	09/10/14	MS	BF	Soil											x[(2)]	x
460-82584-3SD	BF-ORI-WT-2c-01SD	09/10/14	MSD	BF	Soil											x[(2)]	x
460-82585-1	BF-5L-UT-2g-01	09/10/14	INV	BF	Soil										x		
460-82585-2	BF-5L-UT-2g-02	09/10/14	INV	BF	Soil										x		
460-82585-3	BF-5L-UT-2c-01	09/10/14	INV	BF	Soil				x	x	x	x	x	x		x[(2)]	x
460-82585-3MS	BF-5L-UT-2c-01MS	09/10/14	MS	BF	Soil												x

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-82585-3SD	BF-5L-UT-2c-01SD	09/10/14	MSD	BF	Soil												x
460-82585-4	BF-5L-UT-3g-01	09/10/14	INV	BF	Soil										x		
460-82585-5	BF-5L-UT-3g-02	09/10/14	INV	BF	Soil										x		
460-82585-6	BF-5L-UT-3c-01	09/10/14	INV	BF	Soil				x	x	x	x	x	x		x(2)	x
460-82657-1	ECS-K18-F	09/11/14	INV	ECS	Soil		x										
460-82657-2	ECS-AREA5-W12-F	09/11/14	INV	ECS	Soil		x										
460-82657-2LR	ECS-AREA5-W12-FLR	09/11/14	MD	ECS	Soil		x										
460-82657-2MS	ECS-AREA5-W12-FMS	09/11/14	MS	ECS	Soil		x										
460-82657-3	ECS-AREA5-X13-F	09/11/14	INV	ECS	Soil		x										
460-82730-1	BF-5L-UT-4g-01	09/12/14	INV	BF	Soil										x		
460-82730-2	BF-5L-UT-4g-01X	09/12/14	FD	BF	Soil										x		
460-82730-3	BF-5L-UT-4g-02	09/12/14	INV	BF	Soil										x		
460-82730-4	BF-5L-UT-4c-01	09/12/14	INV	BF	Soil				x	x	x	x	x	x		x(2)	x
460-82730-5	BF-5L-UT-4c-01X	09/12/14	FD	BF	Soil				x	x	x	x	x	x		x(2)	x
460-82730-6	TB-9/12/14	09/12/14	TB	TB	Water										x		
460-82735-1	BF-ORI-WT-3g-01	09/12/14	INV	BF	Soil										x		
460-82735-2	BF-ORI-WT-3g-02	09/12/14	INV	BF	Soil										x		
460-82735-3	BF-ORI-WT-3g-02-X	09/12/14	FD	BF	Soil										x		
460-82735-4	BF-ORI-WT-3c-01	09/12/14	INV	BF	Soil				x	x	x	x	x	x		x(2)	x
460-82735-4MS	BF-ORI-WT-3c-01MS	09/12/14	MS	BF	Soil												x
460-82735-4SD	BF-ORI-WT-3c-01SD	09/12/14	MSD	BF	Soil												x
460-82735-5	BF-ORI-WT-3c-01-X	09/12/14	FD	BF	Soil				x	x	x	x	x	x		x(2)	x
460-82849-1	ECS-AZ5-F	09/13/14	INV	ECS	Soil			x(2)	x								
460-82904-1	ECS-AREA 3-U/V15-F	09/16/14	INV	ECS	Soil		x										
460-82904-2	ECS-AREA 3-V16-F	09/16/14	INV	ECS	Soil		x										
460-82904-3	ECS-AREA 3-V16-F-X	09/16/14	FD	ECS	Soil		x										
460-82904-4	ECS-AREA 3-U16/17-F	09/16/14	INV	ECS	Soil		x										
460-82981-1	ECS-AREA 3-T17-F	09/17/14	INV	ECS	Soil		x										
460-83056-1	ECS-AREA3-S17-F	09/18/14	INV	ECS	Soil		x										
460-83311-1	BF-ORI-HS-4g-01	09/23/14	INV	BF	Soil										x		
460-83311-2	BF-ORI-HS-4g-02	09/23/14	INV	BF	Soil										x		
460-83311-3	BF-ORI-HS-4c-01	09/23/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-83311-3	BF-ORI-HS-4c-01	09/23/14	INV RE	BF	Soil						x						
460-83311-3MS	BF-ORI-HS-4c-01MS	09/23/14	MS	BF	Soil							x		x			
460-83311-3SD	BF-ORI-HS-4c-01SD	09/23/14	MSD	BF	Soil							x		x			
460-83312-1	BF-5L-WT-2g-01	09/23/14	INV	BF	Soil										x		
460-83312-2	BF-5L-WT-2g-02	09/23/14	INV	BF	Soil										x		
460-83312-3	BF-5L-WT-2c-01	09/23/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-83312-4	BF-5L-WT-3g-01	09/23/14	INV	BF	Soil										x		

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-83312-5	BF-5L-WT-3g-02	09/23/14	INV	BF	Soil										x		
460-83312-6	BF-5L-WT-3c-01	09/23/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-83312-7	BF-5L-WT-4g-01	09/23/14	INV	BF	Soil										x		
460-83312-8	BF-5L-WT-4g-02	09/23/14	INV	BF	Soil										x		
460-83312-9	BF-5L-WT-4c-01	09/23/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-83312-10	TB-9/23/14	09/23/14	TB	TB	Water										x		
460-83693-1	ECS-AREA2-P12-F	09/30/14	INV	ECS	Soil		x										
460-83693-2	ECS-AREA2-P13-F	09/30/14	INV	ECS	Soil		x										
460-83693-3	ECS-AREA2-Q12-F	09/30/14	INV	ECS	Soil		x										
460-83781-1	BF-5L-UT-5g-01	10/01/14	INV	BF	Soil										x		
460-83781-2	BF-5L-UT-5g-02	10/01/14	INV	BF	Soil										x		
460-83781-3	BF-5L-UT-5c-01	10/01/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-83781-4	BF-5L-UT-6g-01	10/01/14	INV	BF	Soil										x		
460-83781-5	BF-5L-UT-6g-02	10/01/14	INV	BF	Soil										x		
460-83781-6	BF-5L-UT-6c-01	10/01/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-83781-7	TB-10/1/14	10/01/14	TB	TB	Water										x		
460-83792-1	BF-ORI-HS-5g-01	10/01/14	INV	BF	Soil										x		
460-83792-2	BF-ORI-HS-5g-02	10/01/14	INV	BF	Soil										x		
460-83792-3	BF-ORI-HS-5c-01	10/01/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-83792-3	BF-ORI-HS-5c-01	10/01/14	INV RE	BF	Soil						x						
460-83792-3MS	BF-ORI-HS-5c-01MS	10/01/14	MS	BF	Soil							x					
460-83792-3SD	BF-ORI-HS-5c-01SD	10/01/14	MSD	BF	Soil							x					
460-83871-1	ECS-AREA2-R13-F	10/02/14	INV	ECS	Soil		x										
460-83871-1LR	ECS-AREA2-R13-FLR	10/02/14	MD	ECS	Soil		x										
460-83871-1MS	ECS-AREA2-R13-FMS	10/02/14	MS	ECS	Soil		x										
460-83871-2	ECS-AREA2-Q13-F	10/02/14	INV	ECS	Soil		x										
460-84043-1	ECS-Area 2-O14/15-F	10/06/14	INV	ECS	Soil		x										
460-84043-2	ECS-Area 2-P14-F	10/06/14	INV	ECS	Soil		x										
460-84043-3	ECS-Area 2-Q14-F	10/06/14	INV	ECS	Soil		x										
460-84043-4	ECS-Area 2-R14-F	10/06/14	INV	ECS	Soil		x										
460-84043-5	ECS-Area 2-O15-F	10/06/14	INV	ECS	Soil		x										
460-84043-6	ECS-Area 2-P15-F	10/06/14	INV	ECS	Soil		x										
460-84043-7	ECS-Area 2-Q15-F	10/06/14	INV	ECS	Soil		x										
460-84193-1	ECS-AREA2-Q16-F	10/08/14	INV	ECS	Soil			x	x								
460-84379-1	ECS-AREA2-R15-F	10/10/14	INV	ECS	Soil		x										
460-84379-2	ECS-AREA2-R15-F-X	10/10/14	FD	ECS	Soil		x										
460-84379-3	ECS-AREA2-P16-F	10/10/14	INV	ECS	Soil		x										
460-84428-1	BF-ORI-HS-6g-01	10/13/14	INV	BF	Soil										x		
460-84428-2	BF-ORI-HS-6g-02	10/13/14	INV	BF	Soil										x		

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-84428-3	BF-ORI-HS-6c-01	10/13/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-84428-3MS	BF-ORI-HS-6c-01MS	10/13/14	MS	BF	Soil								x				
460-84428-3SD	BF-ORI-HS-6c-01SD	10/13/14	MSD	BF	Soil								x				
460-84428-4	TB-10/13/14	10/13/14	TB	TB	Water										x		
460-84432-1	BF-5L-WT-5g-01	10/13/14	INV	BF	Soil										x		
460-84432-2	BF-5L-WT-5g-02	10/13/14	INV	BF	Soil										x		
460-84432-3	BF-5L-WT-5c-01	10/13/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-84432-3LR	BF-5L-WT-5c-01LR	10/13/14	MD	BF	Soil				x								
460-84432-3MS	BF-5L-WT-5c-01MS	10/13/14	MS	BF	Soil				x								
460-84432-4	BF-5L-WT-6g-01	10/13/14	INV	BF	Soil										x		
460-84432-5	BF-5L-WT-6g-02	10/13/14	INV	BF	Soil										x		
460-84432-6	BF-5L-WT-6c-01	10/13/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-84432-6MS	BF-5L-WT-6c-01MS	10/13/14	MS	BF	Soil							x					
460-84432-6SD	BF-5L-WT-6c-01SD	10/13/14	MSD	BF	Soil							x					
460-84593-1	ECS-AREA2-O16-F	10/15/14	INV	ECS	Soil		x										
460-84593-2	ECS-AREA2-R16-F	10/15/14	INV	ECS	Soil		x										

* Two methanol containers were received for this trip blank with no low level (DI water) containers and thus it was analyzed as a high level soil with results reported in soil units.

1) Analysis performed by TestAmerica-Buffalo

2) Analysis performed by TestAmerica-Nashville

BF - Backfill Sample
ECS - Excavation Confirmation Sample
FD - Field Duplicate Sample
INV - Investigative Sample
MD – Matrix Duplicate Sample (unspiked)
MS - Matrix Spike Sample
MSD - Matrix Spike Duplicate Sample
RE - Reextracted/Reanalyzed Sample
TB - Trip Blank

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Pb: 1311/ 3010A/ 6010C for Lead in leachates of soil samples
- Total As and Pb: 3050B/ 6010C for Arsenic and Lead in soil samples
- Total TAL Metals: 3050B (3051 for TestAmerica-Nashville)/ 6010C for 22 ICP-AES Target Analyte List (TAL) Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc) in soil samples
- Hg: 7471B for total Mercury in soil samples

- Total DER10 Metals: 3050B/ 6010C for 12 ICP-AES NYSDEC DER-10 Appendix 5 Metals (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, Selenium, Silver, and Zinc in soil samples
- Cr III/VI: 3060A/7196A for Trivalent Chromium and Hexavalent Chromium in soil samples
- PEST: 3546/ 3620C (3550C for TestAmerica-Buffalo)/ 8081B for 15 NYSDEC DER-10 Appendix 5 pesticides plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene in soil samples
- PCB: 3546/ 3665A/ 8082A for 7 Aroclors in soil samples
- HERB: 8151A for Silvex (2,4,5-TP) in soil samples
- VOC: 5035/8260C for 30 NYSDEC DER-10 Appendix 5 volatile organic compounds (VOCs) in soil samples and 5030B/ 8260C for 30 VOCs in aqueous trip blanks
- SVOC: 3541 prior to October 2014 and 3546 after October 2014 (3550C for TestAmerica-Nashville)/ 8270D for 20 NYSDEC DER-10 Appendix 5 semivolatile organic compounds (SVOCs) plus Dibenzofuran and Hexachlorobenzene in soil samples
- CN: 9012B for Cyanide in soil samples

TABLE 2
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U	=	Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.
UJ	=	Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.
J	=	Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined
J-	=	Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.
J+	=	Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.
R	=	Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
May 2014 to October 2014

QC DEFICIENCIES AND DATA QUALIFICATION ACTIONS

Lab ID	Sample Code	Type	Method			Date and Time			GC	D	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col	F		Qual	LCL	UCL	CL		
MATRIX DUPLICATE (MD) PRECISION																	
460-83871-1LR	ECS-AREA2-R13-F-20141002LR	LR		3050B	6010C		10/3/14 17:47	10/4/14 16:48	NA	4	ARSENIC	*			20	Poor lab duplicate precision (31 RPD)	J/UJ to detects/NDs for ECS samples digested in the same batch
MATRIX SPIKE DUPLICATE (MSD) PRECISION																	
460-78812-8SD	BF-ORI-HS-1C-01-20140702SD	SD		3550C	8081B		7/10/14 15:00	7/11/14 9:54	1C	20	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	*	36	139	19	Poor MS/MSD precision (21 RPD)	J to detects for BF-ORI samples analyzed in the same batch (none)
FIELD DUPLICATE (FD) PRECISION																	
460-81232-3	ECS-AREA 11-G5-F-X-20140815	N		3050B	6010C		8/18/14 14:37	8/21/14 18:55	NA	4	LEAD					Poor field duplicate precision (51 RPD), use higher result from original sample	J/UJ to detects/NDs for original and duplicate sample
460-82730-1	BF-5L-UT-4g-01-20140912	N		5035	8260C		9/13/14 15:03	9/18/14 8:24	NA	1	ACETONE	U				Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate	J/UJ to detects/NDs for original and duplicate sample
460-82735-3	BF-ORI-WT-3g-02-X-20140912	N		5035	8260C		9/13/14 15:03	9/18/14 10:27	NA	1	ACETONE	B				Poor field duplicate precision (49 RPD), use higher result from original sample	J to detects for original and duplicate sample
LABORATORY CONTROL SPIKE (LCS) ACCURACY																	
4602551242A4	4602551242A4	BS		3050B	6010C		10/10/14 17:57	10/12/14 12:42	NA	4	ANTIMONY		0	209.5		Extremely low laboratory control spike recovery (39.3%) - within lab limits but below 50%	J-/R to detects/NDs for samples digested in the same batch (assoc sample is ND)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	ALDRIN	*	53	126		High laboratory control spike recovery (133%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	ALDRIN	*	53	126		High laboratory control spike recovery (131%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	*	50	129		High laboratory control spike recovery (140%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	*	50	129		High laboratory control spike recovery (137%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	ALPHA ENDOSULFAN	*	53	127		High laboratory control spike recovery (142%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	ALPHA ENDOSULFAN	*	53	127		High laboratory control spike recovery (138%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	*	51	131		High laboratory control spike recovery (137%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	BETA ENDOSULFAN	*	52	127		High laboratory control spike recovery (140%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	BETA ENDOSULFAN	*	52	127		High laboratory control spike recovery (135%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	*	40	130		High laboratory control spike recovery (147%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	*	40	130		High laboratory control spike recovery (136%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	DIELDRIN	*	48	126		High laboratory control spike recovery (144%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	DIELDRIN	*	48	126		High laboratory control spike recovery (140%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	ENDOSULFAN SULFATE	*	52	124		High laboratory control spike recovery (140%)	J+ to detects for samples digested in the same batch (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	ENDOSULFAN SULFATE	*	52	124		High laboratory control spike recovery (131%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	ENDRIN	*	48	126		High laboratory control spike recovery (135%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	ENDRIN	*	48	126		High laboratory control spike recovery (130%)	none (recovery within 70-130% data qualification limits)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	ENDRIN ALDEHYDE	*	57	124		High laboratory control spike recovery (125%)	none (recovery within 70-130% data qualification limits)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	ENDRIN KETONE	*	55	124		High laboratory control spike recovery (147%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	ENDRIN KETONE	*	55	124		High laboratory control spike recovery (131%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	GAMMA BHC (LINDANE)	*	52	129		High laboratory control spike recovery (147%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	GAMMA BHC (LINDANE)	*	52	129		High laboratory control spike recovery (132%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	HEPTACHLOR	*	52	128		High laboratory control spike recovery (152%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	HEPTACHLOR	*	52	128		High laboratory control spike recovery (129%)	none (recovery within 70-130% data qualification limits)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	HEPTACHLOR EPOXIDE	*	53	122		High laboratory control spike recovery (137%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	HEPTACHLOR EPOXIDE	*	53	122		High laboratory control spike recovery (128%)	none (recovery within 70-130% data qualification limits)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	METHOXYCHLOR	*	47	126		High laboratory control spike recovery (153%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	METHOXYCHLOR	*	47	126		High laboratory control spike recovery (133%)	J+ to detects for samples digested in the same batch (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	P,P'-DDD	*	50	131		High laboratory control spike recovery (157%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	P,P'-DDD	*	50	131		High laboratory control spike recovery (151%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	P,P'-DDE	*	49	130		High laboratory control spike recovery (143%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	P,P'-DDE	*	49	130		High laboratory control spike recovery (140%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	1C	1	P,P'-DDT	*	48	132		High laboratory control spike recovery (155%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B	BS		3546	8081B		7/28/14 12:40	7/28/14 21:32	2C	1	P,P'-DDT	*	48	132		High laboratory control spike recovery (142%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	ALDRIN	*	53	126		High laboratory control spike recovery (145%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	ALDRIN	*	53	126		High laboratory control spike recovery (140%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	*	50	129		High laboratory control spike recovery (147%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	*	50	129		High laboratory control spike recovery (139%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	ALPHA ENDOSULFAN	*	53	127		High laboratory control spike recovery (150%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	ALPHA ENDOSULFAN	*	53	127		High laboratory control spike recovery (142%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	*	51	131		High laboratory control spike recovery (145%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	*	51	131		High laboratory control spike recovery (133%)	J+ to detects for samples digested in the same batch (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	BETA ENDOSULFAN	*	52	127		High laboratory control spike recovery (140%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	BETA ENDOSULFAN	*	52	127		High laboratory control spike recovery (147%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	*	40	130		High laboratory control spike recovery (158%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	*	40	130		High laboratory control spike recovery (148%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	DIELDRIN	*	48	126		High laboratory control spike recovery (149%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	DIELDRIN	*	48	126		High laboratory control spike recovery (146%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	ENDOSULFAN SULFATE	*	52	124		High laboratory control spike recovery (157%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	ENDOSULFAN SULFATE	*	52	124		High laboratory control spike recovery (169%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	ENDRIN	*	48	126		High laboratory control spike recovery (145%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	ENDRIN	*	48	126		High laboratory control spike recovery (145%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	ENDRIN ALDEHYDE	*	57	124		High laboratory control spike recovery (138%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	ENDRIN ALDEHYDE	*	57	124		High laboratory control spike recovery (135%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	ENDRIN KETONE	*	55	124		High laboratory control spike recovery (156%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	ENDRIN KETONE	*	55	124		High laboratory control spike recovery (150%)	J+ to detects for samples digested in the same batch (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	GAMMA BHC (LINDANE)	*	52	129		High laboratory control spike recovery (153%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	GAMMA BHC (LINDANE)	*	52	129		High laboratory control spike recovery (147%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	HEPTACHLOR	*	52	128		High laboratory control spike recovery (155%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	HEPTACHLOR	*	52	128		High laboratory control spike recovery (159%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	HEPTACHLOR EPOXIDE	*	53	122		High laboratory control spike recovery (147%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	HEPTACHLOR EPOXIDE	*	53	122		High laboratory control spike recovery (147%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	METHOXYCHLOR	*	47	126		High laboratory control spike recovery (162%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	METHOXYCHLOR	*	47	126		High laboratory control spike recovery (150%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	P,P'-DDD	*	50	131		High laboratory control spike recovery (151%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	P,P'-DDD	*	50	131		High laboratory control spike recovery (155%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	P,P'-DDE	*	49	130		High laboratory control spike recovery (151%)	J+ to detects for samples digested in the same batch
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	P,P'-DDE	*	49	130		High laboratory control spike recovery (152%)	J+ to detects for samples digested in the same batch
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	1C	1	P,P'-DDT	*	48	132		High laboratory control spike recovery (157%)	J+ to detects for samples digested in the same batch (none)
4602391192B	4602391192B RA	BS		3546	8081B		7/28/14 12:40	7/29/14 13:05	2C	1	P,P'-DDT	*	48	132		High laboratory control spike recovery (163%)	J+ to detects for samples digested in the same batch (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4602493582A	4602493582A	BS		3546	8081B		9/16/14 11:36	9/18/14 16:16	1C	1	ENDRIN KETONE	*	55	124		High laboratory control spike recovery (130%)	none (recovery within 70-130% data qualification limits)
4602400503	4602400503	BS			8260C			8/1/14 6:21	NA	1	METHYLENE CHLORIDE	*	75	124		High laboratory control spike recovery (130%)	none (recovery within 70-130% data qualification limits)
4602400504	4602400504	BD			8260C			8/1/14 6:45	NA	1	METHYLENE CHLORIDE		75	124	30	NA (within control)	NA
4602520533	4602520533	BS			8260C			9/26/14 17:18	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	*	58	140		High laboratory control spike recovery (141%)	none (average LCS/LCSD recovery (137%) passes)
4602520534	4602520534	BD			8260C			9/26/14 17:42	NA	1	METHYL ETHYL KETONE (2-BUTANONE)		58	140	30	NA (within control)	NA
4602358884	4602358884	BS			8260C			7/12/14 6:24	NA	1	ACETONE		58	139		NA (within control)	NA
4602358885	4602358885	BD			8260C			7/12/14 6:55	NA	1	ACETONE	*	58	139	30	High laboratory control spike duplicate recovery (144%)	none (average LCS/LCSD recovery (130.5%) passes)
4602391964	4602391964	BD			8260C			7/28/14 22:55	NA	1	N-BUTYLBENZENE	*	60	138	30	High laboratory control spike duplicate recovery (142%) - QC for TB only	none (analyte ND in this TB, samples results not affected)
4602391963	4602391963	BS			8260C			7/28/14 22:30	NA	1	SEC-BUTYLBENZENE	*	63	130		High laboratory control spike recovery (131%) - QC for TB only	none (analyte ND in this TB, samples results not affected)
4602391964	4602391964	BD			8260C			7/28/14 22:55	NA	1	SEC-BUTYLBENZENE	*	63	130	30	High laboratory control spike duplicate recovery (133%) - QC for TB only	none (analyte ND in this TB, samples results not affected)
4602400453	4602400453	BS			8260C			8/1/14 6:28	NA	1	ACETONE	*	26	150		High laboratory control spike recovery (153%) - QC for TB only	analyte detected in this TB - do not flag samples based on TB result
4602448933	4602448933	BS			8260C			8/25/14 20:24	NA	1	TRANS-1,2-DICHLOROETHENE	*	79	120		High laboratory control spike recovery (121%) - QC for TB only	none (recovery within 70-130% data qualification limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4602462504	4602462504	BS			8260C			9/2/14 6:55	NA	1	METHYLENE CHLORIDE	*	76	123		High laboratory control spike recovery (125%) - QC for TB only	none (recovery within 70-130% data qualification limits)
4602523904	4602523904	BS			8260C			9/29/14 6:55	NA	1	1,4-DIOXANE (P-DIOXANE)	*	46	150		High laboratory control spike recovery (161%) - QC for TB only	none (analyte ND in this TB, samples results not affected)
4602565193	4602565193	BS			8260C			10/17/14 11:18	NA	1	TRICHLORO-ETHYLENE (TCE)	*	74	120		High laboratory control spike recovery (161%) - QC for TB only	none (analyte ND in this TB, samples results not affected)
4602565194	4602565194	BD			8260C			10/17/14 11:43	NA	1	TRICHLORO-ETHYLENE (TCE)	*	74	120	30	High laboratory control spike duplicate recovery (167%) - QC for TB only	none (analyte ND in this TB, samples results not affected)
4602572583A	4602572583A	BS		3546	8270D		10/21/14 7:57	10/21/14 13:41	NA	1	BENZO(A)PYRENE	*	36	89		High laboratory control spike recovery (98%)	none (recovery within 70-130% data qualification limits)
MATRIX SPIKE (MS) ACCURACY																	
460-78812-9MS	BF-ORI-HS-1C-02-20140702MS	MS		3050B	6010C		7/6/14 17:57	7/7/14 15:28	NA	4	MANGANESE	*	75	125		Low matrix spike recovery (30%)	none (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-78812-9PDS	BF-ORI-HS-1C-02-20140702PDS	PDS		3050B	6010C		7/6/14 17:57	7/7/14 15:32	NA	4	MANGANESE	*	75	125		Low post digestion spike recovery (73%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82155-8MS	BF-5L-WT-1c-01-20140903MS	MS		3050B	6010C		9/4/14 16:37	9/6/14 16:27	NA	4	MANGANESE	*	75	125		Extremely low matrix spike recovery (-119%)	none (checked waived because unspiked sample conc > 4x spike amount), PDS passes
460-78812-8MS	BF-ORI-HS-1C-01-20140702MS	MS		3550C	8081B		7/10/14 15:00	7/11/14 9:36	1C	20	ENDRIN ALDEHYDE	*	20	120		Extremely low matrix spike recovery (0%)	none (recovery affected by 20x dilution of MS)
460-78812-8SD	BF-ORI-HS-1C-01-20140702SD	SD		3550C	8081B		7/10/14 15:00	7/11/14 9:54	1C	20	ENDRIN ALDEHYDE	*	20	120	47	Extremely low matrix spike duplicate recovery (0%)	none (recovery affected by 20x dilution of MSD)
460-84432-6MS	BF-5L-WT-6c-01-20141013MS	MS		3546	8081B		10/15/14 8:05	10/16/14 15:06	1C	1	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	*	67	137		Low matrix spike recovery (56%)	J-/UJ to detects/NDs for BF-5L samples digested in the same batch
460-84432-6SD	BF-5L-WT-6c-01-20141013SD	SD		3546	8081B		10/15/14 8:05	10/16/14 15:20	1C	1	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	*	67	137	30	Low matrix spike duplicate recovery (65%)	J-/UJ to detects/NDs for BF-5L samples digested in the same batch

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-84432-6MS	BF-5L-WT-6c-01-20141013MS	MS		3546	8081B		10/15/14 8:05	10/16/14 15:06	2C	1	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	*	67	137		Low matrix spike recovery (60%)	J-/UJ to detects/NDs for BF-5L samples digested in the same batch
460-84432-6SD	BF-5L-WT-6c-01-20141013SD	SD		3546	8081B		10/15/14 8:05	10/16/14 15:20	2C	1	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	*	67	137	30	Low matrix spike duplicate recovery (65%)	J-/UJ to detects/NDs for BF-5L samples digested in the same batch
460-80767-3MS	BF-ORI-HS-2c-01-20140807MS	MS		3541	8270D		8/11/14 10:09	8/12/14 12:05	NA	1	PENTACHLORO-PHENOL	*	37	99		Low matrix spike recovery (33%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-80767-3SD	BF-ORI-HS-2c-01-20140807SD	SD		3541	8270D		8/11/14 10:09	8/12/14 12:29	NA	1	PENTACHLORO-PHENOL		37	99	30	Low matrix spike duplicate recovery (40%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	BENZO(A) ANTHRACENE	*	23	120		Extremely low matrix spike recovery (12%)	J-/R to detects/NDs for BF-ORI samples digested in the same batch (assoc sample has detect)
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	BENZO(A) ANTHRACENE	*	23	120	50	Extremely low matrix spike duplicate recovery (4%)	J-/R to detects/NDs for BF-ORI samples digested in the same batch (assoc sample has detect)
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	BENZO(A)PYRENE	*	15	128		Extremely low matrix spike recovery (9%)	J-/R to detects/NDs for BF-ORI samples digested in the same batch (assoc sample has detect)
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	BENZO(A)PYRENE	*	15	128	50	Extremely low matrix spike duplicate recovery (4%)	J-/R to detects/NDs for BF-ORI samples digested in the same batch (assoc sample has detect)
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	BENZO(B) FLUORANTHENE	*	12	133		Extremely low matrix spike recovery (-7%)	J-/R to detects/NDs for BF-ORI samples digested in the same batch (assoc sample has detect)
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	BENZO(B) FLUORANTHENE	*	12	133	50	Extremely low matrix spike duplicate recovery (-17%)	J-/R to detects/NDs for BF-ORI samples digested in the same batch (assoc sample has detect)
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	BENZO(G,H,I) PERYLENE		22	120		Low matrix spike recovery (33%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	BENZO(G,H,I) PERYLENE		22	120	50	Low matrix spike duplicate recovery (26%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	BENZO(K) FLUORANTHENE		28	120		Low matrix spike recovery (32%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	BENZO(K) FLUORANTHENE		28	120	45	Low matrix spike duplicate recovery (31%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	CHRYSENE	*	20	120		Extremely low matrix spike recovery (5%)	J-/R to detects/NDs for BF-ORI samples digested in the same batch (assoc sample has detect)
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	CHRYSENE	*	20	120	49	Extremely low matrix spike duplicate recovery (-1%)	J-/R to detects/NDs for BF-ORI samples digested in the same batch (assoc sample has detect)
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	FLUORANTHENE	*	10	143		Extremely low matrix spike recovery (-31%)	none (checked waived because unspiked sample conc > 1x spike amount)
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	FLUORANTHENE	*	10	143	50	Extremely low matrix spike duplicate recovery (-42%)	none (checked waived because unspiked sample conc > 1x spike amount)
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	INDENO(1,2,3-C,D) PYRENE		22	121		Low matrix spike recovery (35%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	INDENO(1,2,3-C,D) PYRENE		22	121	50	Low matrix spike duplicate recovery (30%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	PENTACHLORO-PHENOL		19	145		Low matrix spike recovery (39%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	PENTACHLORO-PHENOL		19	145	50	Low matrix spike duplicate recovery (40%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	PHENANTHRENE		21	122		Low matrix spike recovery (32%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	PHENANTHRENE		21	122	50	Low matrix spike duplicate recovery (25%)	J-/UJ to detects/NDs for BF-ORI samples digested in the same batch
460-82584-3MS	BF-ORI-WT-2c-01-20140910MS	MS		3550C	8270D		9/15/14 10:54	9/16/14 20:52	NA	1	PYRENE	*	20	123		Extremely low matrix spike recovery (-18%)	J-/R to detects/NDs for BF-ORI samples digested in the same batch (assoc sample has detect)
460-82584-3SD	BF-ORI-WT-2c-01-20140910SD	SD		3550C	8270D		9/15/14 10:54	9/16/14 21:15	NA	1	PYRENE	*	20	123	50	Extremely low matrix spike duplicate recovery (-23%)	J-/R to detects/NDs for BF-ORI samples digested in the same batch (assoc sample has detect)

Lab ID	Sample Code	Type	Method			Date and Time			GC	D	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col	F		Qual	LCL	UCL	CL		
SURROGATE (SU) RECOVERY																	
460-78812-8MS	BF-ORI-HS-1C-01-20140702MS	MS		3550C	8081B		7/10/14 15:00	7/11/14 9:36	1C	20	2,4,5,6-TETRACHLORO-META-XYLENE	*	30	124		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8MS	BF-ORI-HS-1C-01-20140702MS	MS		3550C	8081B		7/10/14 15:00	7/11/14 9:36	1C	20	DECACHLORO BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	32	136		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8MS	BF-ORI-HS-1C-01-20140702MS	MS		3550C	8081B		7/10/14 15:00	7/11/14 9:36	2C	20	2,4,5,6-TETRACHLORO-META-XYLENE	*	30	124		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8MS	BF-ORI-HS-1C-01-20140702MS	MS		3550C	8081B		7/10/14 15:00	7/11/14 9:36	2C	20	DECACHLORO BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	32	136		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8SD	BF-ORI-HS-1C-01-20140702SD	SD		3550C	8081B		7/10/14 15:00	7/11/14 9:54	1C	20	2,4,5,6-TETRACHLORO-META-XYLENE	*	30	124		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8SD	BF-ORI-HS-1C-01-20140702SD	SD		3550C	8081B		7/10/14 15:00	7/11/14 9:54	1C	20	DECACHLORO BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	32	136		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8SD	BF-ORI-HS-1C-01-20140702SD	SD		3550C	8081B		7/10/14 15:00	7/11/14 9:54	2C	20	2,4,5,6-TETRACHLORO-META-XYLENE	*	30	124		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8SD	BF-ORI-HS-1C-01-20140702SD	SD		3550C	8081B		7/10/14 15:00	7/11/14 9:54	2C	20	DECACHLORO BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	32	136		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8	BF-ORI-HS-1C-01-20140702	N		3550C	8081B		7/10/14 15:00	7/11/14 10:11	1C	20	2,4,5,6-TETRACHLORO-META-XYLENE	*	30	124		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8	BF-ORI-HS-1C-01-20140702	N		3550C	8081B		7/10/14 15:00	7/11/14 10:11	1C	20	DECACHLORO BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	32	136		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8	BF-ORI-HS-1C-01-20140702	N		3550C	8081B		7/10/14 15:00	7/11/14 10:11	2C	20	2,4,5,6-TETRACHLORO-META-XYLENE	*	30	124		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-8	BF-ORI-HS-1C-01-20140702	N		3550C	8081B		7/10/14 15:00	7/11/14 10:11	2C	20	DECACHLORO BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	32	136		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-78812-9	BF-ORI-HS-1C-02-20140702	N		3550C	8081B		7/10/14 15:00	7/11/14 10:29	1C	20	2,4,5,6-TETRACHLORO-META-XYLENE	*	30	124		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-9	BF-ORI-HS-1C-02-20140702	N		3550C	8081B		7/10/14 15:00	7/11/14 10:29	1C	20	DECACHLORO BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	32	136		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-9	BF-ORI-HS-1C-02-20140702	N		3550C	8081B		7/10/14 15:00	7/11/14 10:29	2C	20	2,4,5,6-TETRACHLORO-META-XYLENE	*	30	124		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-78812-9	BF-ORI-HS-1C-02-20140702	N		3550C	8081B		7/10/14 15:00	7/11/14 10:29	2C	20	DECACHLORO BIPHENYL, 2,2',3,3',4,4',5,5',6,6'-(IUPAC 209)	*	32	136		Extremely low surrogate spike recovery (0%)	none (recovery affected by 20x dilution of sample)
460-76301-9	BF-SER-RAMPD-DD-17c-001-20140516	N		METHOD	8151A		5/20/14 21:40	5/22/14 7:34	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (165%)	J+ to detects for all analytes in this sample (none)
460-76301-12	BF-SER-RAMPD-DD-18c-001-20140516	N		METHOD	8151A		5/20/14 21:40	5/22/14 7:55	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (169%)	J+ to detects for all analytes in this sample (none)
460-76301-15	BF-SER-RAMPD-DD-19c-001-20140516	N		METHOD	8151A		5/20/14 21:40	5/22/14 5:02	1C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (155%)	J+ to detects for all analytes in this sample (none)
460-76301-15	BF-SER-RAMPD-DD-19c-001-20140516	N		METHOD	8151A		5/20/14 21:40	5/22/14 5:02	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (170%)	J+ to detects for all analytes in this sample (none)
460-78812-8	BF-ORI-HS-1C-01-20140702	N		METHOD	8151A		7/7/14 18:35	7/10/14 11:02	1C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (159%)	J+ to detects for all analytes in this sample (none)
460-78812-9	BF-ORI-HS-1C-02-20140702	N		METHOD	8151A		7/7/14 18:35	7/10/14 11:24	1C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (158%)	J+ to detects for all analytes in this sample (none)
460-78812-9	BF-ORI-HS-1C-02-20140702	N		METHOD	8151A		7/7/14 18:35	7/10/14 11:24	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (152%)	J+ to detects for all analytes in this sample (none)
460-80009-8	BF-ORI-UT-1c-01-20140724	N		METHOD	8151A		7/28/14 10:29	7/29/14 15:47	1C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (178%)	J+ to detects for all analytes in this sample (none)
460-80009-9	BF-ORI-UT-1c-02-20140724	N		METHOD	8151A		7/28/14 10:29	7/29/14 16:08	1C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (169%)	J+ to detects for all analytes in this sample (none)
460-80015-9	BF-ORI-WT-1c-02-20140724	N		METHOD	8151A		7/28/14 10:29	7/29/14 16:51	1C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (167%)	J+ to detects for all analytes in this sample (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-81552-8	BF-5L-UT-1c-01-20140821	N		METHOD	8151A		8/26/14 20:58	8/28/14 9:26	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (154%)	J+ to detects for all analytes in this sample (none)
460-81828-8	SF-ETETZ-TB-1c-01-20140827	N		METHOD	8151A		8/29/14 3:10	8/29/14 21:18	1C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (178%)	J+ to detects for all analytes in this sample (none)
460-81828-8	SF-ETETZ-TB-1c-01-20140827	N		METHOD	8151A		8/29/14 3:10	8/29/14 21:18	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (158%)	J+ to detects for all analytes in this sample (none)
460-82461-3	SF-ETETZ-TB-2c-01-20140909	N		METHOD	8151A		9/11/14 0:14	9/11/14 16:30	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (157%)	J+ to detects for all analytes in this sample (none)
460-82735-4	BF-ORI-WT-3c-01-20140912	N		METHOD	8151A		9/15/14 23:33	9/16/14 18:59	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (353%)	J+ to detects for all analytes in this sample (none)
460-82735-5	BF-ORI-WT-3c-01-X-20140912	N		METHOD	8151A		9/15/14 23:33	9/16/14 19:21	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (237%)	J+ to detects for all analytes in this sample (none)
460-83312-3	BF-5L-WT-2c-01-20140923	N		METHOD	8151A		9/24/14 21:06	9/25/14 15:38	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (264%)	J+ to detects for all analytes in this sample (none)
460-83781-3	BF-5L-UT-5c-01-20141001	N		METHOD	8151A		10/3/14 10:54	10/5/14 2:34	1C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (182%)	J+ to detects for all analytes in this sample (none)
460-83781-6	BF-5L-UT-6c-01-20141001	N		METHOD	8151A		10/3/14 10:54	10/5/14 2:56	1C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (167%)	J+ to detects for all analytes in this sample (none)
460-83781-6	BF-5L-UT-6c-01-20141001	N		METHOD	8151A		10/3/14 10:54	10/5/14 2:56	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (152%)	J+ to detects for all analytes in this sample (none)
460-83792-3	BF-ORI-HS-5c-01-20141001	N		METHOD	8151A		10/3/14 10:54	10/4/14 23:42	1C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (179%)	J+ to detects for all analytes in this sample (none)
460-83792-3	BF-ORI-HS-5c-01-20141001	N		METHOD	8151A		10/3/14 10:54	10/4/14 23:42	2C	1	2,4-DICHLORO PHENYLACETIC ACID	*	69	150		High surrogate spike recovery (152%)	J+ to detects for all analytes in this sample (none)
460-80009-1	BF-ORI-UT-1g-01-20140724	N		5035	8260C		7/25/14 15:31	8/1/14 9:07	NA	1	1,2-DICHLORO ETHANE-D4	*	70	130		High surrogate spike recovery (149%)	J+ to detects for all analytes in this sample
460-80009-1	BF-ORI-UT-1g-01-20140724	N		5035	8260C		7/25/14 15:31	8/1/14 9:07	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (135%)	J+ to detects for all analytes in this sample

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-80009-2	BF-ORI-UT-1g-02-20140724	N		5035	8260C		7/25/14 15:31	8/1/14 5:26	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (155%)	J+ to detects for all analytes in this sample
460-80009-3	BF-ORI-UT-1g-03-20140724	N		5035	8260C		7/25/14 15:32	8/1/14 9:56	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (145%)	J+ to detects for all analytes in this sample
460-80009-4	BF-ORI-UT-1g-04-20140724	N		5035	8260C		7/25/14 15:32	8/1/14 6:15	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (147%)	J+ to detects for all analytes in this sample
460-80009-6	BF-ORI-UT-1g-06-20140724	N		5035	8260C		7/25/14 15:33	8/1/14 8:17	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (143%)	J+ to detects for all analytes in this sample
460-80009-7	BF-ORI-UT-1g-07-20140724	N		5035	8260C		7/25/14 15:34	8/1/14 8:42	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (140%)	J+ to detects for all analytes in this sample
460-82155-7	BF-5L-WT-1g-07-20140903	N		5035	8260C		9/4/14 15:59	9/11/14 10:41	NA	1	1,2-DICHLORO ETHANE-D4	*	70	130		High surrogate spike recovery (136%)	J+ to detects for all analytes in this sample (none)
460-82730-1	BF-5L-UT-4g-01-20140912	N		5035	8260C		9/13/14 15:03	9/18/14 8:24	NA	1	1,2-DICHLORO ETHANE-D4	*	70	130		High surrogate spike recovery (135%)	J+ to detects for all analytes in this sample (none)
460-82730-1	BF-5L-UT-4g-01-20140912	N		5035	8260C		9/13/14 15:03	9/18/14 8:24	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (136%)	J+ to detects for all analytes in this sample (none)
460-82730-2	BF-5L-UT-4g-01X-20140912	N		5035	8260C		9/13/14 15:04	9/18/14 8:49	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (148%)	J+ to detects for all analytes in this sample
460-82730-3	BF-5L-UT-4g-02-20140912	N		5035	8260C		9/13/14 15:05	9/18/14 9:14	NA	1	1,2-DICHLORO ETHANE-D4	*	70	130		High surrogate spike recovery (137%)	J+ to detects for all analytes in this sample
460-82730-3	BF-5L-UT-4g-02-20140912	N		5035	8260C		9/13/14 15:05	9/18/14 9:14	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (169%)	J+ to detects for all analytes in this sample
460-82730-3	BF-5L-UT-4g-02-20140912	N		5035	8260C		9/13/14 15:05	9/18/14 9:14	NA	1	TOLUENE-D8	*	70	130		High surrogate spike recovery (147%)	J+ to detects for all analytes in this sample
460-82735-1	BF-ORI-WT-3g-01-20140912	N		5035	8260C		9/13/14 15:01	9/18/14 9:38	NA	1	1,2-DICHLORO ETHANE-D4	*	70	130		High surrogate spike recovery (137%)	J+ to detects for all analytes in this sample
460-82735-1	BF-ORI-WT-3g-01-20140912	N		5035	8260C		9/13/14 15:01	9/18/14 9:38	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (177%)	J+ to detects for all analytes in this sample

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-82735-1	BF-ORI-WT-3g-01-20140912	N		5035	8260C		9/13/14 15:01	9/18/14 9:38	NA	1	TOLUENE-D8	*	70	130		High surrogate spike recovery (162%)	J+ to detects for all analytes in this sample
460-82735-2	BF-ORI-WT-3g-02-20140912	N		5035	8260C		9/13/14 15:02	9/18/14 10:03	NA	1	4-BROMO FLUOROBENZENE	*	70	130		High surrogate spike recovery (142%)	J+ to detects for all analytes in this sample
460-82735-2	BF-ORI-WT-3g-02-20140912	N		5035	8260C		9/13/14 15:02	9/18/14 10:03	NA	1	TOLUENE-D8	*	70	130		High surrogate spike recovery (138%)	J+ to detects for all analytes in this sample
460-83792-2	BF-ORI-HS-5g-02-20141001	N		5035	8260C		10/2/14 18:34	10/9/14 9:42	NA	1	DIBROMOFLUOROMETHANE	*	70	130		High surrogate spike recovery (135%)	J+ to detects for all analytes in this sample (none)
LABORATORY BLANKS																	
4901923081A	4901923081A	LB		3051	6010C		9/22/14 13:11	9/22/14 19:01	NA	1	LEAD	J				Preparation blank contamination (0.634 J mg/kg)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples prepared in the same batch (none)
4901923081A	4901923081A	LB		3051	6010C		9/22/14 13:11	9/22/14 19:01	NA	1	MANGANESE					Preparation blank contamination (7.6 mg/kg)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples prepared in the same batch (none)
4901923081A	4901923081A	LB		3051	6010C		9/22/14 13:11	9/22/14 19:01	NA	1	SELENIUM	J				Preparation blank contamination (1.15 J mg/kg)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples prepared in the same batch (none - all ND)
4901923081A	4901923081A	LB		3051	6010C		9/22/14 13:11	9/22/14 19:01	NA	1	SODIUM					Preparation blank contamination (777.6 mg/kg)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples prepared in the same batch (none - all ND)
4602259206	4602259206	LB			8260C			5/22/14 8:41	NA	1	ACETONE					Method blank contamination (5.5 ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch (none)
4602260946	4602260946	LB			8260C			5/22/14 19:13	NA	1	ACETONE					Method blank contamination (6.08 ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch
4602358887	4602358887	LB			8260C			7/12/14 7:54	NA	1	ACETONE					Method blank contamination (7.29 ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4602400486	4602400486	LB			8260C			8/1/14 4:37	NA	1	ACETONE					Method blank contamination (8.28 ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch
4602400486	4602400486	LB			8260C			8/1/14 4:37	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.21 J ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch (none - all ND)
4602400506	4602400506	LB			8260C			8/1/14 7:51	NA	1	ACETONE					Method blank contamination (6.57 ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch (none - all ND)
4602400506	4602400506	LB			8260C			8/1/14 7:51	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.268 J ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch (none - all ND)
4602466256	4602466256	LB			8260C			9/3/14 20:25	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.284 J ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch (none)
4602490056	4602490056	LB			8260C			9/15/14 8:16	NA	1	ACETONE	J				Method blank contamination (3.61 J ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch (none)
4602498967	4602498967	LB			8260C			9/18/14 5:05	NA	1	ACETONE	J				Method blank contamination (3.85 J ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch (none)
4602521606	4602521606	LB			8260C			9/27/14 7:40	NA	1	ACETONE	J				Method blank contamination (2.29 J ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch (none)
4602564196	4602564196	LB			8260C			10/16/14 19:47	NA	1	ACETONE	J				Method blank contamination (4.55 J ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch (none)
FIELD BLANKS																	
460-78812-10	TB-7/2/14-20140702	TB			8260C			7/9/14 8:17	NA	1	ACETONE					Trip blank contamination (18 ug/l)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples shipped in the same container

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-80009-10	TB 7/24/14-20140724	TB			8260C			7/29/14 3:37	NA	1	ACETONE					Trip blank contamination (20 ug/l)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples shipped in the same container
460-80015-10	TB 7/24/14-20140724	TB			8260C			8/1/14 11:53	NA	1	ACETONE					Trip blank contamination (21 ug/l)	none (TB result affected by high LCS recovery (153%) - possibly lab contamination for aqueous batch only)
460-80768-10	TB-8/7/14-20140807	TB			8260C			8/14/14 18:27	NA	1	CHLOROFORM	J				Trip blank contamination (0.19 J ug/l)	U at RL to Js, U to detects < 1x blank equivalent concentration for samples shipped in the same container (none - all ND)
460-80768-10	TB-8/7/14-20140807	TB			8260C			8/14/14 18:27	NA	1	METHYLENE CHLORIDE					Trip blank contamination (1.2 ug/l)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples shipped in the same container
460-81552-10	TB-8/21/14-20140821	TB			8260C			8/26/14 1:53	NA	1	CHLOROFORM	J				Trip blank contamination (0.24 J ug/l)	U at RL to Js, U to detects < 1x blank equivalent concentration for samples shipped in the same container (none - all ND)
460-81552-10	TB-8/21/14-20140821	TB			8260C			8/26/14 1:53	NA	1	METHYLENE CHLORIDE					Trip blank contamination (1.2 ug/l)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples shipped in the same container
INITIAL CALIBRATION																	
249434	460249434	ICAL			6010C			9/16/14 10:39	NA	1	ZINC		0.998			Poor calibration curve fit (0.992 r)	J/UJ to detects/NDs for samples quantitated with this ICAL
40352	40352	ICAL			8270D			6/25/14 18:51	NA	1	ACENAPHTHENE		0.900			RRF (0.8661) below method requirement for highest ICAL standard (10 ug/ml)	None (lower standards within criteria indicating adequate sensitivity)
CALIBRATION VERIFICATION																	
CCV 460-239208/45	CCV 460-239208/45	CCV 2			8081B			7/29/14 2:02	1C	1	P,P'-DDD	*	-20	20		Calibration drift secondary column (%D= +35.4%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-239208/45	CCV 460-239208/45	CCV 2			8081B			7/29/14 2:02	2C	1	P,P'-DDD	*	-20	20		Calibration drift primary column (%D= +32%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCV 460-242165/22	CCV 460-242165/22	CCV 2			8081B			8/12/14 11:34	2C	1	ENDOSULFAN SULFATE	*	-20	20		Calibration drift primary column (%D= +20.5%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-242175/22	CCV 460-242175/22	CCV 1			8081B			8/12/14 11:34	2C	1	ENDOSULFAN SULFATE	*	-20	20		Calibration drift primary column (%D= +20.5%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-242175/45	CCV 460-242175/45	CCV 2			8081B			8/12/14 11:34	1C	1	ENDOSULFAN SULFATE	*	-20	20		Calibration drift secondary column (%D= +26.2%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-242175/45	CCV 460-242175/45	CCV 2			8081B			8/12/14 11:34	2C	1	ENDOSULFAN SULFATE	*	-20	20		Calibration drift primary column (%D= +28.6%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/13	CCV 460-248337/13	CCV 1			8081B			9/11/14 10:42	1C	1	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	*	-20	20		Calibration drift secondary column (%D= +21.7%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/13	CCV 460-248337/13	CCV 1			8081B			9/11/14 10:42	1C	1	ENDRIN KETONE	*	-20	20		Calibration drift secondary column (%D= +20.6%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	ALDRIN	*	-20	20		Calibration drift secondary column (%D= +21.6%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	*	-20	20		Calibration drift secondary column (%D= +27.4%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	ALPHA ENDOSULFAN	*	-20	20		Calibration drift secondary column (%D= +22%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	*	-20	20		Calibration drift secondary column (%D= +30.7%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	DIELDRIN	*	-20	20		Calibration drift secondary column (%D= +20.6%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	ENDOSULFAN SULFATE	*	-20	20		Calibration drift secondary column (%D= +30%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	ENDRIN KETONE	*	-20	20		Calibration drift secondary column (%D= +31.5%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	GAMMA BHC (LINDANE)	*	-20	20		Calibration drift secondary column (%D= +27.4%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	HEPTACHLOR	*	-20	20		Calibration drift secondary column (%D= +22.6%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	HEPTACHLOR EPOXIDE	*	-20	20		Calibration drift secondary column (%D= +20.2%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	METHOXYCHLOR	*	-20	20		Calibration drift secondary column (%D= +22%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	P,P'-DDD	*	-20	20		Calibration drift secondary column (%D= +28.1%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	1C	1	P,P'-DDE	*	-20	20		Calibration drift secondary column (%D= +21.8%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	2C	1	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	*	-20	20		Calibration drift primary column (%D= +25.2%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	2C	1	ENDOSULFAN SULFATE	*	-20	20		Calibration drift primary column (%D= +23.9%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	2C	1	ENDRIN KETONE	*	-20	20		Calibration drift primary column (%D= +21.6%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCV 460-248337/33	CCV 460-248337/33	CCV 2			8081B			9/11/14 14:36	2C	1	P,P'-DDD	*	-20	20		Calibration drift primary column (%D= +20.5%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-249363/53	CCV 460-249363/53	CCV 2			8081B			9/16/14 16:08	1C	1	ENDOSULFAN SULFATE	*	-20	20		Calibration drift secondary column (%D= +20.8%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-249363/53	CCV 460-249363/53	CCV 2			8081B			9/16/14 16:08	1C	1	ENDRIN KETONE	*	-20	20		Calibration drift secondary column (%D= +25.8%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-256293/15	CCV 460-256293/15	CCV 2			8081B			10/16/14 10:34	1C	1	ENDRIN	*	-20	20		Calibration drift secondary column (%D= +21%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-256369/67	CCV 460-256369/67	CCV 2			8081B			10/16/14 18:59	1C	1	ENDOSULFAN SULFATE	*	-20	20		Calibration drift secondary column (%D= -21.3%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-256369/67	CCV 460-256369/67	CCV 2			8081B			10/16/14 18:59	1C	1	ENDRIN ALDEHYDE	*	-20	20		Calibration drift secondary column (%D= -21.7%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-256369/67	CCV 460-256369/67	CCV 2			8081B			10/16/14 18:59	1C	1	ENDRIN KETONE	*	-20	20		Calibration drift secondary column (%D= -29.4%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-256369/67	CCV 460-256369/67	CCV 2			8081B			10/16/14 18:59	1C	1	METHOXYCHLOR	*	-20	20		Calibration drift secondary column (%D= -37.4%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-256369/67	CCV 460-256369/67	CCV 2			8081B			10/16/14 18:59	1C	1	P,P'-DDT	*	-20	20		Calibration drift secondary column (%D= -41.8%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-256369/67	CCV 460-256369/67	CCV 2			8081B			10/16/14 18:59	2C	1	ENDOSULFAN SULFATE	*	-20	20		Calibration drift primary column (%D= -20.7%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-256369/67	CCV 460-256369/67	CCV 2			8081B			10/16/14 18:59	2C	1	ENDRIN ALDEHYDE	*	-20	20		Calibration drift primary column (%D= -20.8%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCV 460-256369/67	CCV 460-256369/67	CCV 2			8081B			10/16/14 18:59	2C	1	ENDRIN KETONE	*	-20	20		Calibration drift primary column (%D= -23%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-256369/67	CCV 460-256369/67	CCV 2			8081B			10/16/14 18:59	2C	1	METHOXYCHLOR	*	-20	20		Calibration drift primary column (%D= -31.3%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-256369/67	CCV 460-256369/67	CCV 2			8081B			10/16/14 18:59	2C	1	P,P'-DDT	*	-20	20		Calibration drift primary column (%D= -37.3%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-225373/29	CCV 460-225373/29	CCV 1			8082A			5/19/14 22:57	2C	1	PCB-1260 (AROCLOR 1260) - Peak 1	*	-20	20		Calibration drift primary column (%D= +29.7%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-225373/29	CCV 460-225373/29	CCV 1			8082A			5/19/14 22:57	2C	1	PCB-1260 (AROCLOR 1260) - Peak 4	*	-20	20		Calibration drift primary column (%D= -25.5%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-225373/55	CCV 460-225373/55	CCV 2			8082A			5/20/14 7:57	2C	1	PCB-1260 (AROCLOR 1260) - Peak 4	*	-20	20		Calibration drift primary column (%D= -26.8%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-253613/31	CCV 460-253613/31	CCV 1			8082A			10/3/14 21:44	1C	1	PCB-1260 (AROCLOR 1260) - Peak 3	*	-20	20		Calibration drift secondary column (%D= -100%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-239416/20	CCV 460-239416/20	CCV 2			8151A			7/29/14 17:35	1C	1	SILVEX (2,4,5-TP)	*	-20	20		Calibration drift primary column (%D= -23.1%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-248899/16	CCV 460-248899/16	CCV 2			8151A			9/14/14 2:00	1C	1	SILVEX (2,4,5-TP)	*	-20	20		Calibration drift primary column (%D= -22.3%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-249414/22	CCV 460-249414/22	CCV 2			8151A			9/16/14 20:48	1C	1	SILVEX (2,4,5-TP)	*	-20	20		Calibration drift primary column (%D= -28.8%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCV 460-256684/1	CCV 460-256684/1	CCV 1			8151A			10/18/14 6:54	1C	1	SILVEX (2,4,5-TP)	*	-20	20		Calibration drift primary column (%D= +37.1%)	J+ to detects quantitated on this column for samples analyzed after and before this CCV (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-235888/3	CCVIS 460-235888/3	CCV			8260C			7/12/14 6:00	NA	1	ACETONE	*	-20	20		Calibration drift (%D= +37.6%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-246625/2	CCVIS 460-246625/2	CCV			8260C			9/3/14 18:11	NA	1	CARBON TETRACHLORIDE	*	-20	20		Calibration drift (%D= +24.9%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-247296/2	CCVIS 460-247296/2	CCV			8260C			9/7/14 6:30	NA	1	CARBON TETRACHLORIDE	*	-20	20		Calibration drift (%D= +22.7%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-248229/2	CCVIS 460-248229/2	CCV			8260C			9/11/14 6:37	NA	1	CARBON TETRACHLORIDE	*	-20	20		Calibration drift (%D= +28.6%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-252053/2	CCVIS 460-252053/2	CCV			8260C			9/26/14 16:54	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	*	-20	20		Calibration drift (%D= +36.9%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-252160/2	CCVIS 460-252160/2	CCV			8260C			9/27/14 5:45	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	*	-20	20		Calibration drift (%D= +33.2%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-254055/3	CCVIS 460-254055/3	CCV			8260C			10/6/14 17:30	NA	1	ACETONE	*	-20	20		Calibration drift (%D= -28.4%)	J- to detects, UJ to NDs samples analyzed this shift (all detects)
CCVIS 460-256419/2	CCVIS 460-256419/2	CCV			8260C			10/16/14 17:59	NA	1	1,4-DIOXANE (P-DIOXANE)	*	-20	20		Calibration drift (%D= +22.6%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-256419/2	CCVIS 460-256419/2	CCV			8260C			10/16/14 17:59	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	*	-20	20		Calibration drift (%D= +29.9%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCV 460-225468/3	CCV 460-225468/3	CCV			8270D			5/20/14 12:28	NA	1	BENZO(G,H,I) PERYLENE	*	-20	20		Calibration drift (%D= +22.8%)	J+ to detects only since < +40% for samples analyzed this shift
CCV 460-225468/3	CCV 460-225468/3	CCV			8270D			5/20/14 12:28	NA	1	PENTACHLORO-PHENOL	*	-20	20		Calibration drift (%D= +25.6%)	J+ to detects only since < +40% for samples analyzed this shift (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCV 460-225607/2	CCV 460-225607/2	CCV			8270D			5/21/14 2:45	NA	1	BENZO(G,H,I) PERYLENE	*	-20	20		Calibration drift (%D= +23.2%)	None (only LB,BS on this shift, no effect on sample TA results)
CCV 460-225607/2	CCV 460-225607/2	CCV			8270D			5/21/14 2:45	NA	1	PENTACHLORO-PHENOL	*	-20	20		Calibration drift (%D= +26.5%)	None (only LB,BS on this shift, no effect on sample TA results)
CCVIS 460-235836/2	CCVIS 460-235836/2	CCV			8270D			7/11/14 17:44	NA	1	INDENO(1,2,3-C,D) PYRENE	*	-20	20		Calibration drift (%D= +26%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-235836/2	CCVIS 460-235836/2	CCV			8270D			7/11/14 17:44	NA	1	PENTACHLORO-PHENOL	*	-20	20		Calibration drift (%D= +25.4%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-242005/2	CCVIS 460-242005/2	CCV			8270D			8/12/14 2:44	NA	1	BENZO(G,H,I) PERYLENE	*	-20	20		Calibration drift (%D= +22%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-242005/2	CCVIS 460-242005/2	CCV			8270D			8/12/14 2:44	NA	1	CRESOLS, M & P	*	-20	20		Calibration drift (%D= -22.5%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-242005/2	CCVIS 460-242005/2	CCV			8270D			8/12/14 2:44	NA	1	DIBENZ(A,H) ANTHRACENE	*	-20	20		Calibration drift (%D= +20.5%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-246255/2	CCVIS 460-246255/2	CCV			8270D			9/2/14 8:28	NA	1	INDENO(1,2,3-C,D) PYRENE	*	-20	20		Calibration drift (%D= +53.9%)	J+ to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-246255/2	CCVIS 460-246255/2	CCV			8270D			9/2/14 8:28	NA	1	BENZO(G,H,I) PERYLENE	*	-20	20		Calibration drift (%D= +26.2%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-246255/2	CCVIS 460-246255/2	CCV			8270D			9/2/14 8:28	NA	1	DIBENZ(A,H) ANTHRACENE	*	-20	20		Calibration drift (%D= +28.7%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-246423/2	CCVIS 460-246423/2	CCV			8270D			9/3/14 1:16	NA	1	DIBENZ(A,H) ANTHRACENE	*	-20	20		Calibration drift (%D= +23.6%)	None (only LB,BS on this shift, no effect on sample TA results)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-246423/2	CCVIS 460-246423/2	CCV			8270D			9/3/14 1:16	NA	1	INDENO(1,2,3-C,D) PYRENE	*	-20	20		Calibration drift (%D= +31%)	None (only LB,BS on this shift, no effect on sample TA results)
CCVIS 460-247919/2	CCVIS 460-247919/2	CCV			8270D			9/10/14 8:09	NA	1	INDENO(1,2,3-C,D) PYRENE	*	-20	20		Calibration drift (%D= +22.8%)	None (only LB,BS on this shift, no effect on sample TA results)
CCVIS 460-251895/2	CCVIS 460-251895/2	CCV			8270D			9/26/14 4:46	NA	1	INDENO(1,2,3-C,D) PYRENE	*	-20	20		Calibration drift (%D= +26%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-251895/2	CCVIS 460-251895/2	CCV			8270D			9/26/14 4:46	NA	1	BENZO(B) FLUORANTHENE	*	-20	20		Calibration drift (%D= +21.4%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-251895/2	CCVIS 460-251895/2	CCV			8270D			9/26/14 4:46	NA	1	DIBENZ(A,H) ANTHRACENE	*	-20	20		Calibration drift (%D= +23.4%)	J+ to detects only since < +40% for samples analyzed this shift
CCVIS 460-256915/2	CCVIS 460-256915/2	CCV			8270D			10/19/14 14:33	NA	1	FLUORANTHENE	*	-20	20		Calibration drift (%D= -22.9%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
INTERFERENCE CHECK STANDARDS																	
ICSAB 490-192608/16	ICSAB 490-192608/16	ICSAB			6010C			9/23/14 11:22	NA	1	SODIUM		80	120		Extremely low ICS recovery (2%)	J-/R to detects/NDs for samples analyzed on the same shift (assoc sample is ND)
DUAL COLUMN CONFIRMATION																	
460-78812-8MS	BF-ORI-HS-1C-01-20140702MS	MS		3550C	8081B		7/10/14 15:00	7/11/14 9:36	1C	20	DIELDRIN		0	40		High secondary column RPD (43.4%)	none (deficiency for QC sample, environmental samples qualified based on spike recovery, no significant additional effect on environmental sample results)
460-78812-8MS	BF-ORI-HS-1C-01-20140702MS	MS		3550C	8081B		7/10/14 15:00	7/11/14 9:36	1C	20	HEPTACHLOR EPOXIDE		0	40		High secondary column RPD (42.6%)	none (deficiency for QC sample, environmental samples qualified based on spike recovery, no significant additional effect on environmental sample results)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-78812-8MS	BF-ORI-HS-1C-01-20140702MS	MS		3550C	8081B		7/10/14 15:00	7/11/14 9:36	1C	20	METHOXYCHLOR		0	40		High secondary column RPD (89.9%)	none (deficiency for QC sample, environmental samples qualified based on spike recovery, no significant additional effect on environmental sample results)
460-78812-8SD	BF-ORI-HS-1C-01-20140702SD	SD		3550C	8081B		7/10/14 15:00	7/11/14 9:54	1C	20	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)		0	40		High secondary column RPD (53.5%)	none (deficiency for QC sample, environmental samples qualified based on spike recovery, no significant additional effect on environmental sample results)
460-78812-8SD	BF-ORI-HS-1C-01-20140702SD	SD		3550C	8081B		7/10/14 15:00	7/11/14 9:54	1C	20	DIELDRIN		0	40		High secondary column RPD (46.4%)	none (deficiency for QC sample, environmental samples qualified based on spike recovery, no significant additional effect on environmental sample results)
INTERNAL STANDARDS																	
460-80009-1	BF-ORI-UT-1g-01-20140724	N		5035	8260C		7/25/14 15:31	8/1/14 9:07	NA	1	Chlorobenzene-d5	*	50	200		Low internal standard response (49.2%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80009-1	BF-ORI-UT-1g-01-20140724	N		5035	8260C		7/25/14 15:31	8/1/14 9:07	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (29.2%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80009-2	BF-ORI-UT-1g-02-20140724	N		5035	8260C		7/25/14 15:31	8/1/14 5:26	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (37.5%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80009-2	BF-ORI-UT-1g-02-20140724	N		5035	8260C		7/25/14 15:31	8/1/14 5:26	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (29.4%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80009-3	BF-ORI-UT-1g-03-20140724	N		5035	8260C		7/25/14 15:32	8/1/14 9:56	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (39.2%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80009-3	BF-ORI-UT-1g-03-20140724	N		5035	8260C		7/25/14 15:32	8/1/14 9:56	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (34.1%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80009-4	BF-ORI-UT-1g-04-20140724	N		5035	8260C		7/25/14 15:32	8/1/14 6:15	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (24.2%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80009-4	BF-ORI-UT-1g-04-20140724	N		5035	8260C		7/25/14 15:32	8/1/14 6:15	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (34.2%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80009-6	BF-ORI-UT-1g-06-20140724	N		5035	8260C		7/25/14 15:33	8/1/14 8:17	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (43.2%)	J+ to detects/UJ to NDs for analytes quantitated with this IS

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-80009-6	BF-ORI-UT-1g-06-20140724	N		5035	8260C		7/25/14 15:33	8/1/14 8:17	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (49.1%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80009-7	BF-ORI-UT-1g-07-20140724	N		5035	8260C		7/25/14 15:34	8/1/14 8:42	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (30.8%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80009-7	BF-ORI-UT-1g-07-20140724	N		5035	8260C		7/25/14 15:34	8/1/14 8:42	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (49.8%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-1	BF-ORI-WT-1g-01-20140724	N		5035	8260C		7/25/14 15:34	8/1/14 8:16	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (34.3%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-1	BF-ORI-WT-1g-01-20140724	N		5035	8260C		7/25/14 15:34	8/1/14 8:16	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (45.8%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-2	BF-ORI-WT-1g-02-20140724	N		5035	8260C		7/25/14 15:35	8/1/14 8:40	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (41.3%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-2	BF-ORI-WT-1g-02-20140724	N		5035	8260C		7/25/14 15:35	8/1/14 8:40	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (42.8%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-3	BF-ORI-WT-1g-03-20140724	N		5035	8260C		7/25/14 15:35	8/1/14 9:04	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (41.1%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-3	BF-ORI-WT-1g-03-20140724	N		5035	8260C		7/25/14 15:35	8/1/14 9:04	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (42.6%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-4	BF-ORI-WT-1g-04-20140724	N		5035	8260C		7/25/14 15:36	8/1/14 9:28	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (40.8%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-4	BF-ORI-WT-1g-04-20140724	N		5035	8260C		7/25/14 15:36	8/1/14 9:28	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (46%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-5	BF-ORI-WT-1g-05-20140724	N		5035	8260C		7/25/14 15:36	8/1/14 9:52	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (38.9%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-5	BF-ORI-WT-1g-05-20140724	N		5035	8260C		7/25/14 15:36	8/1/14 9:52	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (42.3%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-6	BF-ORI-WT-1g-06-20140724	N		5035	8260C		7/25/14 15:37	8/1/14 10:16	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (40.3%)	J+ to detects/UJ to NDs for analytes quantitated with this IS

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-80015-6	BF-ORI-WT-1g-06-20140724	N		5035	8260C		7/25/14 15:37	8/1/14 10:16	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (39.5%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-7	BF-ORI-WT-1g-07-20140724	N		5035	8260C		7/25/14 15:37	8/1/14 10:40	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (34.9%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80015-7	BF-ORI-WT-1g-07-20140724	N		5035	8260C		7/25/14 15:37	8/1/14 10:40	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (38.5%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-80767-2	BF-ORI-HS-2g-02-20140807	N		5035	8260C		8/8/14 13:33	8/12/14 23:40	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (47.6%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-81552-5	BF-5L-UT-1g-05-20140821	N		5035	8260C		8/22/14 12:51	8/25/14 12:26	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (42.8%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82155-1	BF-5L-WT-1g-01-20140903	N		5035	8260C		9/4/14 15:55	9/7/14 13:45	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (25.6%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82155-2	BF-5L-WT-1g-02-20140903	N		5035	8260C		9/4/14 15:56	9/7/14 14:10	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (39.6%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82584-1	BF-ORI-WT-2g-01-20140910	N		5035	8260C		9/12/14 9:44	9/15/14 15:16	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (37.7%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82584-1	BF-ORI-WT-2g-01-20140910	N		5035	8260C		9/12/14 9:44	9/15/14 15:16	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (40.2%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82584-2	BF-ORI-WT-2g-02-20140910	N		5035	8260C		9/12/14 9:45	9/15/14 15:40	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (41.8%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82585-2	BF-5L-UT-2g-02-20140910	N		5035	8260C		9/12/14 9:43	9/15/14 14:04	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (49.1%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82585-4	BF-5L-UT-3g-01-20140910	N		5035	8260C		9/12/14 9:43	9/15/14 14:28	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (49.9%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82585-5	BF-5L-UT-3g-02-20140910	N		5035	8260C		9/12/14 9:44	9/15/14 14:52	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (49.8%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82730-2	BF-5L-UT-4g-01X-20140912	N		5035	8260C		9/13/14 15:04	9/18/14 8:49	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (47.6%)	J+ to detects/UJ to NDs for analytes quantitated with this IS

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-82730-2	BF-5L-UT-4g-01X-20140912	N		5035	8260C		9/13/14 15:04	9/18/14 8:49	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (37.3%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82730-3	BF-5L-UT-4g-02-20140912	N		5035	8260C		9/13/14 15:05	9/18/14 9:14	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Extremely low internal standard response (14.8%)	J+ to detects/R to NDs for analytes quantitated with this IS
460-82730-3	BF-5L-UT-4g-02-20140912	N		5035	8260C		9/13/14 15:05	9/18/14 9:14	NA	1	Chlorobenzene-d5	*	50	200		Low internal standard response (34.2%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82735-1	BF-ORI-WT-3g-01-20140912	N		5035	8260C		9/13/14 15:01	9/18/14 9:38	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (45.2%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82735-1	BF-ORI-WT-3g-01-20140912	N		5035	8260C		9/13/14 15:01	9/18/14 9:38	NA	1	Chlorobenzene-d5	*	50	200		Low internal standard response (32.4%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82735-1	BF-ORI-WT-3g-01-20140912	N		5035	8260C		9/13/14 15:01	9/18/14 9:38	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Extremely low internal standard response (14.6%)	J+ to detects/R to NDs for analytes quantitated with this IS
460-82735-2	BF-ORI-WT-3g-02-20140912	N		5035	8260C		9/13/14 15:02	9/18/14 10:03	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (46.8%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82735-2	BF-ORI-WT-3g-02-20140912	N		5035	8260C		9/13/14 15:02	9/18/14 10:03	NA	1	Chlorobenzene-d5	*	50	200		Low internal standard response (37%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-82735-2	BF-ORI-WT-3g-02-20140912	N		5035	8260C		9/13/14 15:02	9/18/14 10:03	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Extremely low internal standard response (16.3%)	J+ to detects/R to NDs for analytes quantitated with this IS
460-82735-3	BF-ORI-WT-3g-02-X-20140912	N		5035	8260C		9/13/14 15:03	9/18/14 10:27	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (38.1%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-83312-1	BF-5L-WT-2g-01-20140923	N		5035	8260C		9/24/14 12:36	9/27/14 8:07	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (38.5%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-83312-2	BF-5L-WT-2g-02-20140923	N		5035	8260C		9/24/14 12:36	9/27/14 8:31	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (45%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-83312-2	BF-5L-WT-2g-02-20140923	N		5035	8260C		9/24/14 12:36	9/27/14 8:31	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (46%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-83312-4	BF-5L-WT-3g-01-20140923	N		5035	8260C		9/24/14 12:37	9/27/14 8:56	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (46%)	J+ to detects/UJ to NDs for analytes quantitated with this IS

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-83312-5	BF-5L-WT-3g-02-20140923	N		5035	8260C		9/24/14 12:38	9/27/14 9:20	NA	1	1,4-Dioxane-d8	*	50	200		Low internal standard response (49%)	J+ to detects/UJ to NDs for analytes quantitated with this IS
460-83312-5	BF-5L-WT-3g-02-20140923	N		5035	8260C		9/24/14 12:38	9/27/14 9:20	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (45.1%)	J+ to detects/UJ to NDs for analytes quantitated with this IS

CL – Control Limit

DF – Dilution Factor

LCL – Lower Control Limit

UCL – Upper Control Limit

TABLE 4
REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1
Phase Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
May 2014 to October 2014

QUALIFIED RESULTS FOR FIELD SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result [1]			DVQ	QC Issue
TCLP METALS							
460-80888-1	ECS-Area20-119-F-20140811	1311 LEAD	45.3	J	ug/l	J	Result between MDL and RL
460-80888-3	ECS-Area20-118-F-20140811	1311 LEAD	46.1	J	ug/l	J	Result between MDL and RL
TOTAL METALS							
460-76301-3	BF-SER-RAMPD-DD-15c-001-20140516	SILVER	0.48	J	mg/kg	J	Result between MDL and RL
460-76301-6	BF-SER-RAMPD-DD-16c-001-20140516	SILVER	0.54	J	mg/kg	J	Result between MDL and RL
460-76301-9	BF-SER-RAMPD-DD-17c-001-20140516	SILVER	0.50	J	mg/kg	J	Result between MDL and RL
460-76301-12	BF-SER-RAMPD-DD-18c-001-20140516	SILVER	0.51	J	mg/kg	J	Result between MDL and RL
460-78812-8	BF-ORI-HS-1C-01-20140702	BARIUM	44.2	J	mg/kg	J	Result between MDL and RL
460-78812-8	BF-ORI-HS-1C-01-20140702	BERYLLIUM	0.42	J	mg/kg	J	Result between MDL and RL
460-78812-8	BF-ORI-HS-1C-01-20140702	MANGANESE	782		mg/kg	J-	Low post digestion spike recovery (73%)
460-78812-9	BF-ORI-HS-1C-02-20140702	BARIUM	45.0	J	mg/kg	J	Result between MDL and RL
460-78812-9	BF-ORI-HS-1C-02-20140702	BERYLLIUM	0.44	J	mg/kg	J	Result between MDL and RL
460-78812-9	BF-ORI-HS-1C-02-20140702	MANGANESE	830		mg/kg	J-	Low post digestion spike recovery (73%)
460-80009-8	BF-ORI-UT-1c-01-20140724	ARSENIC	2.9	J	mg/kg	J	Result between MDL and RL
460-80009-9	BF-ORI-UT-1c-02-20140724	ARSENIC	3.3	J	mg/kg	J	Result between MDL and RL
460-80015-8	BF-ORI-WT-1c-01-20140724	BERYLLIUM	0.42	J	mg/kg	J	Result between MDL and RL
460-80767-3	BF-ORI-HS-2c-01-20140807	BARIUM	44.1	J	mg/kg	J	Result between MDL and RL
460-80767-3	BF-ORI-HS-2c-01-20140807	BERYLLIUM	0.44	J	mg/kg	J	Result between MDL and RL
460-80767-3	BF-ORI-HS-2c-01-20140807	SILVER	0.47	J	mg/kg	J	Result between MDL and RL
460-80768-8	BF-ETETZ-CF-1c-01-20140807	SILVER	0.69	J	mg/kg	J	Result between MDL and RL
460-80768-9	BF-ETETZ-CF-1c-02-20140807	SILVER	0.65	J	mg/kg	J	Result between MDL and RL
460-81232-2	ECS-AREA 11-G5-F-20140815	LEAD	92.1		mg/kg	J	Poor field duplicate precision (51 RPD), use higher result from original sample
460-81232-3	ECS-AREA 11-G5-F-X-20140815	LEAD	61.6		mg/kg	J	Poor field duplicate precision (51 RPD), use higher result from original sample
460-81561-3	BF-ORI-HS-3c-01-20140821	BARIUM	45.5	J	mg/kg	J	Result between MDL and RL
460-81561-3	BF-ORI-HS-3c-01-20140821	BERYLLIUM	0.41	J	mg/kg	J	Result between MDL and RL
460-81634-1	ECS-AREA 8-H3/4-F-20140822	COBALT	4.4	J	mg/kg	J	Result between MDL and RL
460-81634-1	ECS-AREA 8-H3/4-F-20140822	POTASSIUM	937	J	mg/kg	J	Result between MDL and RL
460-81634-1	ECS-AREA 8-H3/4-F-20140822	SODIUM	322	J	mg/kg	J	Result between MDL and RL
460-81828-8	SF-ETETZ-TB-1c-01-20140827	BARIUM	31.5	J	mg/kg	J	Result between MDL and RL
460-81828-8	SF-ETETZ-TB-1c-01-20140827	CADMIUM	0.29	J	mg/kg	J	Result between MDL and RL
460-81828-9	SF-ETETZ-TB-1c-02-20140827	BARIUM	29.2	J	mg/kg	J	Result between MDL and RL
460-82461-3	SF-ETETZ-TB-2c-01-20140909	BARIUM	35.6	J	mg/kg	J	Result between MDL and RL
460-82461-3	SF-ETETZ-TB-2c-01-20140909	BERYLLIUM	0.39	J	mg/kg	J	Result between MDL and RL
460-82461-3	SF-ETETZ-TB-2c-01-20140909	SILVER	0.65	J	mg/kg	J	Result between MDL and RL
460-82584-3	BF-ORI-WT-2c-01-20140910	ARSENIC	3.8	J	mg/kg	J	Result between MDL and RL
460-82584-3	BF-ORI-WT-2c-01-20140910	ZINC	89.3		mg/kg	J	Poor calibration curve fit (0.992 r)
460-82585-3	BF-5L-UT-2c-01-20140910	ZINC	70.5		mg/kg	J	Poor calibration curve fit (0.992 r)
460-82585-6	BF-5L-UT-3c-01-20140910	SILVER	0.48	J	mg/kg	J	Result between MDL and RL
460-82585-6	BF-5L-UT-3c-01-20140910	ZINC	70.5		mg/kg	J	Poor calibration curve fit (0.992 r)

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-82657-1	ECS-K18-F-20140911	ARSENIC	2.9	J	mg/kg	J	Result between MDL and RL
460-82657-2	ECS-AREA5-W12-F-20140911	ARSENIC	2.7	J	mg/kg	J	Result between MDL and RL
460-82730-4	BF-5L-UT-4c-01-20140912	SILVER	0.38	J	mg/kg	J	Result between MDL and RL
460-82735-5	BF-ORI-WT-3c-01-X-20140912	BERYLLIUM	0.34	J	mg/kg	J	Result between MDL and RL
460-82849-1	ECS-AZ5-F-20140913	ANTIMONY	10.5	U	mg/kg	R	Acceptable result not available to report in the LCS/LCSD
460-82849-1	ECS-AZ5-F-20140913	SODIUM	211	U	mg/kg	R	Extremely low ICS recovery (2%)
460-82904-1	ECS-AREA 3-U/V15-F-20140916	ARSENIC	3.6	J	mg/kg	J	Result between MDL and RL
460-82904-4	ECS-AREA 3-U16/17-F-20140916	ARSENIC	2.6	J	mg/kg	J	Result between MDL and RL
460-83311-3	BF-ORI-HS-4c-01-20140923	BARIUM	46.4	J	mg/kg	J	Result between MDL and RL
460-83311-3	BF-ORI-HS-4c-01-20140923	BERYLLIUM	0.40	J	mg/kg	J	Result between MDL and RL
460-83312-3	BF-5L-WT-2c-01-20140923	ARSENIC	3.5	J	mg/kg	J	Result between MDL and RL
460-83312-3	BF-5L-WT-2c-01-20140923	CADMIUM	0.49	J	mg/kg	J	Result between MDL and RL
460-83312-6	BF-5L-WT-3c-01-20140923	ARSENIC	4.2	J	mg/kg	J	Result between MDL and RL
460-83312-9	BF-5L-WT-4c-01-20140923	BERYLLIUM	0.35	J	mg/kg	J	Result between MDL and RL
460-83792-3	BF-ORI-HS-5c-01-20141001	CADMIUM	0.56	J	mg/kg	J	Result between MDL and RL
460-83871-1	ECS-AREA2-R13-F-20141002	ARSENIC	7.6		mg/kg	J	Poor lab duplicate precision (31 RPD)
460-84193-1	ECS-AREA2-Q16-F-20141008	ANTIMONY	3.8	U	mg/kg	R	Extremely low laboratory control spike recovery (39.3%)
460-84193-1	ECS-AREA2-Q16-F-20141008	CALCIUM	742	J	mg/kg	J	Result between MDL and RL
460-84193-1	ECS-AREA2-Q16-F-20141008	COBALT	5.8	J	mg/kg	J	Result between MDL and RL
460-84193-1	ECS-AREA2-Q16-F-20141008	COPPER	2.7	J	mg/kg	J	Result between MDL and RL
460-84193-1	ECS-AREA2-Q16-F-20141008	POTASSIUM	602	J	mg/kg	J	Result between MDL and RL
460-84428-3	BF-ORI-HS-6c-01-20141013	BARIUM	44.5	J	mg/kg	J	Result between MDL and RL
460-84428-3	BF-ORI-HS-6c-01-20141013	BERYLLIUM	0.43	J	mg/kg	J	Result between MDL and RL
460-84432-3	BF-5L-WT-5c-01-20141013	SILVER	0.83	J	mg/kg	J	Result between MDL and RL
460-84432-6	BF-5L-WT-6c-01-20141013	SILVER	0.76	J	mg/kg	J	Result between MDL and RL
CHROMIUM VI							
460-76301-3	BF-SER-RAMPD-DD-15c-001-20140516	CHROMIUM, HEXAVALENT	0.87	J	mg/kg	J	Result between MDL and RL
460-76301-6	BF-SER-RAMPD-DD-16c-001-20140516	CHROMIUM, HEXAVALENT	0.58	J	mg/kg	J	Result between MDL and RL
460-78812-9	BF-ORI-HS-1C-02-20140702	CHROMIUM, HEXAVALENT	1.3	J	mg/kg	J	Result between MDL and RL
PESTICIDES							
460-80009-8	BF-ORI-UT-1c-01-20140724	P,P'-DDE	4.3	J	ug/kg	J	High laboratory control spike recovery (151% and 152%); Result between MDL and RL
460-84428-3	BF-ORI-HS-6c-01-20141013	CHLORDANE	47	J	ug/kg	J	Result between MDL and RL
460-84428-3	BF-ORI-HS-6c-01-20141013	ENDOSULFAN SULFATE	8.5	U	ug/kg	UJ	Calibration drift primary column (%D= -20.7%); Calibration drift secondary column (%D= -21.3%)
460-84428-3	BF-ORI-HS-6c-01-20141013	ENDRIN ALDEHYDE	8.5	U	ug/kg	UJ	Calibration drift primary column (%D= -20.8%); Calibration drift secondary column (%D= -21.7%)
460-84428-3	BF-ORI-HS-6c-01-20141013	ENDRIN KETONE	8.5	U	ug/kg	UJ	Calibration drift primary column (%D= -23%); Calibration drift secondary column (%D= -29.4%)
460-84428-3	BF-ORI-HS-6c-01-20141013	METHOXYCHLOR	8.5	U	ug/kg	UJ	Calibration drift primary column (%D= -31.3%); Calibration drift secondary column (%D= -37.4%)
460-84428-3	BF-ORI-HS-6c-01-20141013	P,P'-DDE	8.3	J	ug/kg	J	Result between MDL and RL
460-84428-3	BF-ORI-HS-6c-01-20141013	P,P'-DDT	8.5	U	ug/kg	UJ	Calibration drift primary column (%D= -37.3%); Calibration drift secondary column (%D= -41.8%)
460-84432-3	BF-5L-WT-5c-01-20141013	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	2.4	U	ug/kg	UJ	Low matrix spike recovery (56% and 60%), Low matrix spike duplicate recovery (65% and 65%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-84432-3	BF-5L-WT-5c-01-20141013	ENDOSULFAN SULFATE	8.2 U ug/kg	UJ	Calibration drift primary column (%D= -20.7%); Calibration drift secondary column (%D= -21.3%)
460-84432-3	BF-5L-WT-5c-01-20141013	ENDRIN ALDEHYDE	8.2 U ug/kg	UJ	Calibration drift primary column (%D= -20.8%); Calibration drift secondary column (%D= -21.7%)
460-84432-3	BF-5L-WT-5c-01-20141013	ENDRIN KETONE	8.2 U ug/kg	UJ	Calibration drift primary column (%D= -23%); Calibration drift secondary column (%D= -29.4%)
460-84432-3	BF-5L-WT-5c-01-20141013	METHOXYCHLOR	8.2 U ug/kg	UJ	Calibration drift primary column (%D= -31.3%); Calibration drift secondary column (%D= -37.4%)
460-84432-3	BF-5L-WT-5c-01-20141013	P,P'-DDE	4.2 J ug/kg	J	Result between MDL and RL
460-84432-3	BF-5L-WT-5c-01-20141013	P,P'-DDT	8.2 U ug/kg	UJ	Calibration drift primary column (%D= -37.3%); Calibration drift secondary column (%D= -41.8%)
460-84432-6	BF-5L-WT-6c-01-20141013	BETA BHC (BETA HEXACHLOROCYCLO HEXANE)	2.4 U ug/kg	UJ	Low matrix spike recovery (56% and 60%), Low matrix spike duplicate recovery (65% and 65%)
460-84432-6	BF-5L-WT-6c-01-20141013	ENDOSULFAN SULFATE	8.2 U ug/kg	UJ	Calibration drift primary column (%D= -20.7%); Calibration drift secondary column (%D= -21.3%)
460-84432-6	BF-5L-WT-6c-01-20141013	ENDRIN ALDEHYDE	8.2 U ug/kg	UJ	Calibration drift primary column (%D= -20.8%); Calibration drift secondary column (%D= -21.7%)
460-84432-6	BF-5L-WT-6c-01-20141013	ENDRIN KETONE	8.2 U ug/kg	UJ	Calibration drift primary column (%D= -23%); Calibration drift secondary column (%D= -29.4%)
460-84432-6	BF-5L-WT-6c-01-20141013	METHOXYCHLOR	8.2 U ug/kg	UJ	Calibration drift primary column (%D= -31.3%); Calibration drift secondary column (%D= -37.4%)
460-84432-6	BF-5L-WT-6c-01-20141013	P,P'-DDE	4.3 J ug/kg	J	Result between MDL and RL
460-84432-6	BF-5L-WT-6c-01-20141013	P,P'-DDT	8.2 U ug/kg	UJ	Calibration drift primary column (%D= -37.3%); Calibration drift secondary column (%D= -41.8%)
PCB AROCLORS					
460-76301-3	BF-SER-RAMPD-DD-15c-001-20140516	PCB-1260 (AROCLOR 1260)	79 U ug/kg	UJ	Calibration drift primary column (%D= -25.5%); Calibration drift primary column (%D= -26.8%)
460-76301-6	BF-SER-RAMPD-DD-16c-001-20140516	PCB-1260 (AROCLOR 1260)	78 U ug/kg	UJ	Calibration drift primary column (%D= -25.5%); Calibration drift primary column (%D= -26.8%)
460-76301-9	BF-SER-RAMPD-DD-17c-001-20140516	PCB-1260 (AROCLOR 1260)	77 U ug/kg	UJ	Calibration drift primary column (%D= -25.5%); Calibration drift primary column (%D= -26.8%)
460-76301-12	BF-SER-RAMPD-DD-18c-001-20140516	PCB-1260 (AROCLOR 1260)	80 U ug/kg	UJ	Calibration drift primary column (%D= -25.5%); Calibration drift primary column (%D= -26.8%)
460-76301-15	BF-SER-RAMPD-DD-19c-001-20140516	PCB-1260 (AROCLOR 1260)	79 U ug/kg	UJ	Calibration drift primary column (%D= -25.5%); Calibration drift primary column (%D= -26.8%)
460-83792-3	BF-ORI-HS-5c-01-20141001	PCB-1260 (AROCLOR 1260)	95 U ug/kg	UJ	Calibration drift secondary column (%D= -100%)
HERBICIDES					
460-80009-8	BF-ORI-UT-1c-01-20140724	SILVEX (2,4,5-TP)	23 U ug/kg	UJ	Calibration drift primary column (%D= -23.1%)
460-80009-9	BF-ORI-UT-1c-02-20140724	SILVEX (2,4,5-TP)	23 U ug/kg	UJ	Calibration drift primary column (%D= -23.1%)
460-80015-8	BF-ORI-WT-1c-01-20140724	SILVEX (2,4,5-TP)	21 U ug/kg	UJ	Calibration drift primary column (%D= -23.1%)
460-80015-9	BF-ORI-WT-1c-02-20140724	SILVEX (2,4,5-TP)	20 U ug/kg	UJ	Calibration drift primary column (%D= -23.1%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-82584-3	BF-ORI-WT-2c-01-20140910	SILVEX (2,4,5-TP)	27 U ug/kg	UJ	Calibration drift primary column (%D= -22.3%)
460-82585-3	BF-5L-UT-2c-01-20140910	SILVEX (2,4,5-TP)	20 U ug/kg	UJ	Calibration drift primary column (%D= -22.3%)
460-82585-6	BF-5L-UT-3c-01-20140910	SILVEX (2,4,5-TP)	22 U ug/kg	UJ	Calibration drift primary column (%D= -22.3%)
460-82730-4	BF-5L-UT-4c-01-20140912	SILVEX (2,4,5-TP)	22 U ug/kg	UJ	Calibration drift primary column (%D= -28.8%)
460-82730-5	BF-5L-UT-4c-01X-20140912	SILVEX (2,4,5-TP)	20 U ug/kg	UJ	Calibration drift primary column (%D= -28.8%)
460-82735-4	BF-ORI-WT-3c-01-20140912	SILVEX (2,4,5-TP)	32 U ug/kg	UJ	Calibration drift primary column (%D= -28.8%)
460-82735-5	BF-ORI-WT-3c-01-X-20140912	SILVEX (2,4,5-TP)	27 U ug/kg	UJ	Calibration drift primary column (%D= -28.8%)
VOLATILE ORGANIC COMPOUNDS (VOC)					
460-76301-2	BF-SER-RAMPD-DD-15g-002-20140516	METHYLENE CHLORIDE	0.61 J ug/kg	J	Result between MDL and RL
460-76301-5	BF-SER-RAMPD-DD-16g-002-20140516	METHYLENE CHLORIDE	0.41 J ug/kg	J	Result between MDL and RL
460-76301-7	BF-SER-RAMPD-DD-17g-001-20140516	METHYLENE CHLORIDE	0.24 J ug/kg	J	Result between MDL and RL
460-76301-8	BF-SER-RAMPD-DD-17g-002-20140516	METHYLENE CHLORIDE	0.40 J ug/kg	J	Result between MDL and RL
460-76301-10	BF-SER-RAMPD-DD-18g-001-20140516	METHYL ETHYL KETONE (2-BUTANONE)	0.99 J ug/kg	J	Result between MDL and RL
460-76301-11	BF-SER-RAMPD-DD-18g-002-20140516	ACETONE	8.7 B ug/kg	U	Method blank contamination (6.08 ug/kg)
460-76301-11	BF-SER-RAMPD-DD-18g-002-20140516	METHYL ETHYL KETONE (2-BUTANONE)	0.65 J ug/kg	J	Result between MDL and RL
460-76301-13	BF-SER-RAMPD-DD-19g-001-20140516	METHYL ETHYL KETONE (2-BUTANONE)	0.91 J ug/kg	J	Result between MDL and RL
460-76301-14	BF-SER-RAMPD-DD-19g-002-20140516	METHYL ETHYL KETONE (2-BUTANONE)	2.1 J ug/kg	J	Result between MDL and RL
460-76301-14	BF-SER-RAMPD-DD-19g-002-20140516	METHYLENE CHLORIDE	0.26 J ug/kg	J	Result between MDL and RL
460-78812-1	BF-ORI-HS-1g-01-20140702	ACETONE	16 B ug/kg	U	Method blank contamination (7.29 ug/kg); Trip blank contamination (18 ug/l); Calibration drift (%D= +37.6%)
460-78812-2	BF-ORI-HS-1g-02-20140702	ACETONE	19 B ug/kg	U	Trip blank contamination (18 ug/l); Calibration drift (%D= +37.6%)
460-78812-3	BF-ORI-HS-1g-03-20140702	ACETONE	70 B ug/kg	J+	Calibration drift (%D= +37.6%)
460-78812-3	BF-ORI-HS-1g-03-20140702	METHYL ETHYL KETONE (2-BUTANONE)	1.9 J ug/kg	J	Result between MDL and RL
460-78812-4	BF-ORI-HS-1g-04-20140702	ACETONE	50 B ug/kg	J+	Calibration drift (%D= +37.6%)
460-78812-5	BF-ORI-HS-1g-05-20140702	ACETONE	54 B ug/kg	U	Trip blank contamination (18 ug/l); Calibration drift (%D= +37.6%)
460-78812-6	BF-ORI-HS-1g-06-20140702	ACETONE	41 B ug/kg	U	Trip blank contamination (18 ug/l); Calibration drift (%D= +37.6%)
460-78812-7	BF-ORI-HS-1g-07-20140702	ACETONE	38 B ug/kg	U	Trip blank contamination (18 ug/l); Calibration drift (%D= +37.6%)
460-80009-1	BF-ORI-UT-1g-01-20140724	1,2,4-TRIMETHYLBENZENE	0.32 J ug/kg	J	High surrogate spike recovery (149% and 135%); Low internal standard response (29.2%); Result between MDL and RL
460-80009-1	BF-ORI-UT-1g-01-20140724	1,2-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (29.2%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-80009-1	BF-ORI-UT-1g-01-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.8	U	ug/kg	UJ	Low internal standard response (29.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	1,3-DICHLOROBENZENE	1.8	U	ug/kg	UJ	Low internal standard response (29.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	1,4-DICHLOROBENZENE	1.8	U	ug/kg	UJ	Low internal standard response (29.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	ACETONE	520	B	ug/kg	J+	High surrogate spike recovery (149% and 135%)
460-80009-1	BF-ORI-UT-1g-01-20140724	BENZENE	0.44	J	ug/kg	J	High surrogate spike recovery (149% and 135%); Low internal standard response (49.2%); Result between MDL and RL
460-80009-1	BF-ORI-UT-1g-01-20140724	CHLOROBENZENE	1.8	U	ug/kg	UJ	Low internal standard response (49.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	ETHYLBENZENE	1.8	U	ug/kg	UJ	Low internal standard response (49.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	METHYL ETHYL KETONE (2-BUTANONE)	35		ug/kg	J+	High surrogate spike recovery (149% and 135%)
460-80009-1	BF-ORI-UT-1g-01-20140724	N-BUTYLBENZENE	1.8	U	ug/kg	UJ	Low internal standard response (29.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	N-PROPYLBENZENE	1.8	U	ug/kg	UJ	Low internal standard response (29.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	SEC-BUTYLBENZENE	1.8	U	ug/kg	UJ	Low internal standard response (29.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	T-BUTYLBENZENE	1.8	U	ug/kg	UJ	Low internal standard response (29.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	TETRACHLORO ETHYLENE(PCE)	1.8	U	ug/kg	UJ	Low internal standard response (49.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	TOLUENE	1.9		ug/kg	J+	High surrogate spike recovery (149% and 135%); Low internal standard response (49.2%)
460-80009-1	BF-ORI-UT-1g-01-20140724	XYLENES, TOTAL	3.7	U	ug/kg	UJ	Low internal standard response (49.2%)
460-80009-2	BF-ORI-UT-1g-02-20140724	1,2,4-TRIMETHYLBENZENE	1.3	U	ug/kg	UJ	Low internal standard response (29.4%)
460-80009-2	BF-ORI-UT-1g-02-20140724	1,2-DICHLOROBENZENE	1.3	U	ug/kg	UJ	Low internal standard response (29.4%)
460-80009-2	BF-ORI-UT-1g-02-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.3	U	ug/kg	UJ	Low internal standard response (29.4%)
460-80009-2	BF-ORI-UT-1g-02-20140724	1,3-DICHLOROBENZENE	1.3	U	ug/kg	UJ	Low internal standard response (29.4%)
460-80009-2	BF-ORI-UT-1g-02-20140724	1,4-DICHLOROBENZENE	1.3	U	ug/kg	UJ	Low internal standard response (29.4%)
460-80009-2	BF-ORI-UT-1g-02-20140724	1,4-DIOXANE (P-DIOXANE)	26	U	ug/kg	UJ	Low internal standard response (37.5%)
460-80009-2	BF-ORI-UT-1g-02-20140724	ACETONE	16	B	ug/kg	U	Method blank contamination (8.28 ug/kg); Trip blank contamination (20 ug/l); High surrogate spike recovery (155%)
460-80009-2	BF-ORI-UT-1g-02-20140724	N-BUTYLBENZENE	1.3	U	ug/kg	UJ	Low internal standard response (29.4%)
460-80009-2	BF-ORI-UT-1g-02-20140724	N-PROPYLBENZENE	1.3	U	ug/kg	UJ	Low internal standard response (29.4%)
460-80009-2	BF-ORI-UT-1g-02-20140724	SEC-BUTYLBENZENE	1.3	U	ug/kg	UJ	Low internal standard response (29.4%)
460-80009-2	BF-ORI-UT-1g-02-20140724	T-BUTYLBENZENE	1.3	U	ug/kg	UJ	Low internal standard response (29.4%)
460-80009-3	BF-ORI-UT-1g-03-20140724	1,2,4-TRIMETHYLBENZENE	1.4	U	ug/kg	UJ	Low internal standard response (34.1%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-80009-3	BF-ORI-UT-1g-03-20140724	1,2-DICHLOROBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.1%)
460-80009-3	BF-ORI-UT-1g-03-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.4 U ug/kg	UJ	Low internal standard response (34.1%)
460-80009-3	BF-ORI-UT-1g-03-20140724	1,3-DICHLOROBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.1%)
460-80009-3	BF-ORI-UT-1g-03-20140724	1,4-DICHLOROBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.1%)
460-80009-3	BF-ORI-UT-1g-03-20140724	1,4-DIOXANE (P-DIOXANE)	28 U ug/kg	UJ	Low internal standard response (39.2%)
460-80009-3	BF-ORI-UT-1g-03-20140724	ACETONE	11 B ug/kg	U	Method blank contamination (8.28 ug/kg); Trip blank contamination (20 ug/l); High surrogate spike recovery (145%)
460-80009-3	BF-ORI-UT-1g-03-20140724	N-BUTYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.1%)
460-80009-3	BF-ORI-UT-1g-03-20140724	N-PROPYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.1%)
460-80009-3	BF-ORI-UT-1g-03-20140724	SEC-BUTYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.1%)
460-80009-3	BF-ORI-UT-1g-03-20140724	T-BUTYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.1%)
460-80009-4	BF-ORI-UT-1g-04-20140724	1,2,4-TRIMETHYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.2%)
460-80009-4	BF-ORI-UT-1g-04-20140724	1,2-DICHLOROBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.2%)
460-80009-4	BF-ORI-UT-1g-04-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.4 U ug/kg	UJ	Low internal standard response (34.2%)
460-80009-4	BF-ORI-UT-1g-04-20140724	1,3-DICHLOROBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.2%)
460-80009-4	BF-ORI-UT-1g-04-20140724	1,4-DICHLOROBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.2%)
460-80009-4	BF-ORI-UT-1g-04-20140724	1,4-DIOXANE (P-DIOXANE)	28 U ug/kg	UJ	Low internal standard response (24.2%)
460-80009-4	BF-ORI-UT-1g-04-20140724	ACETONE	11 B ug/kg	U	Method blank contamination (8.28 ug/kg); Trip blank contamination (20 ug/l); High surrogate spike recovery (147%)
460-80009-4	BF-ORI-UT-1g-04-20140724	N-BUTYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.2%)
460-80009-4	BF-ORI-UT-1g-04-20140724	N-PROPYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.2%)
460-80009-4	BF-ORI-UT-1g-04-20140724	SEC-BUTYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.2%)
460-80009-4	BF-ORI-UT-1g-04-20140724	T-BUTYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (34.2%)
460-80009-5	BF-ORI-UT-1g-05-20140724	ACETONE	13 B ug/kg	U	Method blank contamination (8.28 ug/kg); Trip blank contamination (20 ug/l)
460-80009-6	BF-ORI-UT-1g-06-20140724	1,2,4-TRIMETHYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (49.1%)
460-80009-6	BF-ORI-UT-1g-06-20140724	1,2-DICHLOROBENZENE	1.4 U ug/kg	UJ	Low internal standard response (49.1%)
460-80009-6	BF-ORI-UT-1g-06-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.4 U ug/kg	UJ	Low internal standard response (49.1%)
460-80009-6	BF-ORI-UT-1g-06-20140724	1,3-DICHLOROBENZENE	1.4 U ug/kg	UJ	Low internal standard response (49.1%)
460-80009-6	BF-ORI-UT-1g-06-20140724	1,4-DICHLOROBENZENE	1.4 U ug/kg	UJ	Low internal standard response (49.1%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-80009-6	BF-ORI-UT-1g-06-20140724	1,4-DIOXANE (P-DIOXANE)	27 U ug/kg	UJ	Low internal standard response (43.2%)
460-80009-6	BF-ORI-UT-1g-06-20140724	ACETONE	12 B ug/kg	U	Method blank contamination (8.28 ug/kg); Trip blank contamination (20 ug/l); High surrogate spike recovery (143%)
460-80009-6	BF-ORI-UT-1g-06-20140724	N-BUTYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (49.1%)
460-80009-6	BF-ORI-UT-1g-06-20140724	N-PROPYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (49.1%)
460-80009-6	BF-ORI-UT-1g-06-20140724	SEC-BUTYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (49.1%)
460-80009-6	BF-ORI-UT-1g-06-20140724	T-BUTYLBENZENE	1.4 U ug/kg	UJ	Low internal standard response (49.1%)
460-80009-7	BF-ORI-UT-1g-07-20140724	1,2,4-TRIMETHYLBENZENE	1.3 U ug/kg	UJ	Low internal standard response (49.8%)
460-80009-7	BF-ORI-UT-1g-07-20140724	1,2-DICHLOROBENZENE	1.3 U ug/kg	UJ	Low internal standard response (49.8%)
460-80009-7	BF-ORI-UT-1g-07-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.3 U ug/kg	UJ	Low internal standard response (49.8%)
460-80009-7	BF-ORI-UT-1g-07-20140724	1,3-DICHLOROBENZENE	1.3 U ug/kg	UJ	Low internal standard response (49.8%)
460-80009-7	BF-ORI-UT-1g-07-20140724	1,4-DICHLOROBENZENE	1.3 U ug/kg	UJ	Low internal standard response (49.8%)
460-80009-7	BF-ORI-UT-1g-07-20140724	1,4-DIOXANE (P-DIOXANE)	25 U ug/kg	UJ	Low internal standard response (30.8%)
460-80009-7	BF-ORI-UT-1g-07-20140724	ACETONE	9.7 B ug/kg	U	Method blank contamination (8.28 ug/kg); Trip blank contamination (20 ug/l); High surrogate spike recovery (140%)
460-80009-7	BF-ORI-UT-1g-07-20140724	N-BUTYLBENZENE	1.3 U ug/kg	UJ	Low internal standard response (49.8%)
460-80009-7	BF-ORI-UT-1g-07-20140724	N-PROPYLBENZENE	1.3 U ug/kg	UJ	Low internal standard response (49.8%)
460-80009-7	BF-ORI-UT-1g-07-20140724	SEC-BUTYLBENZENE	1.3 U ug/kg	UJ	Low internal standard response (49.8%)
460-80009-7	BF-ORI-UT-1g-07-20140724	T-BUTYLBENZENE	1.3 U ug/kg	UJ	Low internal standard response (49.8%)
460-80015-1	BF-ORI-WT-1g-01-20140724	1,2,4-TRIMETHYLBENZENE	1.9 U ug/kg	UJ	Low internal standard response (45.8%)
460-80015-1	BF-ORI-WT-1g-01-20140724	1,2-DICHLOROBENZENE	1.9 U ug/kg	UJ	Low internal standard response (45.8%)
460-80015-1	BF-ORI-WT-1g-01-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.9 U ug/kg	UJ	Low internal standard response (45.8%)
460-80015-1	BF-ORI-WT-1g-01-20140724	1,3-DICHLOROBENZENE	1.9 U ug/kg	UJ	Low internal standard response (45.8%)
460-80015-1	BF-ORI-WT-1g-01-20140724	1,4-DICHLOROBENZENE	1.9 U ug/kg	UJ	Low internal standard response (45.8%)
460-80015-1	BF-ORI-WT-1g-01-20140724	1,4-DIOXANE (P-DIOXANE)	37 U ug/kg	UJ	Low internal standard response (34.3%)
460-80015-1	BF-ORI-WT-1g-01-20140724	N-BUTYLBENZENE	1.9 U ug/kg	UJ	Low internal standard response (45.8%)
460-80015-1	BF-ORI-WT-1g-01-20140724	N-PROPYLBENZENE	1.9 U ug/kg	UJ	Low internal standard response (45.8%)
460-80015-1	BF-ORI-WT-1g-01-20140724	SEC-BUTYLBENZENE	1.9 U ug/kg	UJ	Low internal standard response (45.8%)
460-80015-1	BF-ORI-WT-1g-01-20140724	T-BUTYLBENZENE	1.9 U ug/kg	UJ	Low internal standard response (45.8%)
460-80015-2	BF-ORI-WT-1g-02-20140724	1,2,4-TRIMETHYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.8%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-80015-2	BF-ORI-WT-1g-02-20140724	1,2-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.8%)
460-80015-2	BF-ORI-WT-1g-02-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.8 U ug/kg	UJ	Low internal standard response (42.8%)
460-80015-2	BF-ORI-WT-1g-02-20140724	1,3-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.8%)
460-80015-2	BF-ORI-WT-1g-02-20140724	1,4-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.8%)
460-80015-2	BF-ORI-WT-1g-02-20140724	1,4-DIOXANE (P-DIOXANE)	36 U ug/kg	UJ	Low internal standard response (41.3%)
460-80015-2	BF-ORI-WT-1g-02-20140724	N-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.8%)
460-80015-2	BF-ORI-WT-1g-02-20140724	N-PROPYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.8%)
460-80015-2	BF-ORI-WT-1g-02-20140724	SEC-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.8%)
460-80015-2	BF-ORI-WT-1g-02-20140724	T-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.8%)
460-80015-3	BF-ORI-WT-1g-03-20140724	1,2,4-TRIMETHYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.6%)
460-80015-3	BF-ORI-WT-1g-03-20140724	1,2-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.6%)
460-80015-3	BF-ORI-WT-1g-03-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.8 U ug/kg	UJ	Low internal standard response (42.6%)
460-80015-3	BF-ORI-WT-1g-03-20140724	1,3-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.6%)
460-80015-3	BF-ORI-WT-1g-03-20140724	1,4-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.6%)
460-80015-3	BF-ORI-WT-1g-03-20140724	1,4-DIOXANE (P-DIOXANE)	36 U ug/kg	UJ	Low internal standard response (41.1%)
460-80015-3	BF-ORI-WT-1g-03-20140724	N-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.6%)
460-80015-3	BF-ORI-WT-1g-03-20140724	N-PROPYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.6%)
460-80015-3	BF-ORI-WT-1g-03-20140724	SEC-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.6%)
460-80015-3	BF-ORI-WT-1g-03-20140724	T-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.6%)
460-80015-4	BF-ORI-WT-1g-04-20140724	1,2,4-TRIMETHYLBENZENE	1.9 U ug/kg	UJ	Low internal standard response (46%)
460-80015-4	BF-ORI-WT-1g-04-20140724	1,2-DICHLOROBENZENE	1.9 U ug/kg	UJ	Low internal standard response (46%)
460-80015-4	BF-ORI-WT-1g-04-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.9 U ug/kg	UJ	Low internal standard response (46%)
460-80015-4	BF-ORI-WT-1g-04-20140724	1,3-DICHLOROBENZENE	1.9 U ug/kg	UJ	Low internal standard response (46%)
460-80015-4	BF-ORI-WT-1g-04-20140724	1,4-DICHLOROBENZENE	1.9 U ug/kg	UJ	Low internal standard response (46%)
460-80015-4	BF-ORI-WT-1g-04-20140724	1,4-DIOXANE (P-DIOXANE)	38 U ug/kg	UJ	Low internal standard response (40.8%)
460-80015-4	BF-ORI-WT-1g-04-20140724	N-BUTYLBENZENE	1.9 U ug/kg	UJ	Low internal standard response (46%)
460-80015-4	BF-ORI-WT-1g-04-20140724	N-PROPYLBENZENE	1.9 U ug/kg	UJ	Low internal standard response (46%)
460-80015-4	BF-ORI-WT-1g-04-20140724	SEC-BUTYLBENZENE	1.9 U ug/kg	UJ	Low internal standard response (46%)
460-80015-4	BF-ORI-WT-1g-04-20140724	T-BUTYLBENZENE	1.9 U ug/kg	UJ	Low internal standard response (46%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-80015-5	BF-ORI-WT-1g-05-20140724	1,2,4-TRIMETHYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.3%)
460-80015-5	BF-ORI-WT-1g-05-20140724	1,2-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.3%)
460-80015-5	BF-ORI-WT-1g-05-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.8 U ug/kg	UJ	Low internal standard response (42.3%)
460-80015-5	BF-ORI-WT-1g-05-20140724	1,3-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.3%)
460-80015-5	BF-ORI-WT-1g-05-20140724	1,4-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.3%)
460-80015-5	BF-ORI-WT-1g-05-20140724	1,4-DIOXANE (P-DIOXANE)	35 U ug/kg	UJ	Low internal standard response (38.9%)
460-80015-5	BF-ORI-WT-1g-05-20140724	N-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.3%)
460-80015-5	BF-ORI-WT-1g-05-20140724	N-PROPYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.3%)
460-80015-5	BF-ORI-WT-1g-05-20140724	SEC-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.3%)
460-80015-5	BF-ORI-WT-1g-05-20140724	T-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (42.3%)
460-80015-6	BF-ORI-WT-1g-06-20140724	1,2,4-TRIMETHYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (39.5%)
460-80015-6	BF-ORI-WT-1g-06-20140724	1,2-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (39.5%)
460-80015-6	BF-ORI-WT-1g-06-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.8 U ug/kg	UJ	Low internal standard response (39.5%)
460-80015-6	BF-ORI-WT-1g-06-20140724	1,3-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (39.5%)
460-80015-6	BF-ORI-WT-1g-06-20140724	1,4-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (39.5%)
460-80015-6	BF-ORI-WT-1g-06-20140724	1,4-DIOXANE (P-DIOXANE)	37 U ug/kg	UJ	Low internal standard response (40.3%)
460-80015-6	BF-ORI-WT-1g-06-20140724	N-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (39.5%)
460-80015-6	BF-ORI-WT-1g-06-20140724	N-PROPYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (39.5%)
460-80015-6	BF-ORI-WT-1g-06-20140724	SEC-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (39.5%)
460-80015-6	BF-ORI-WT-1g-06-20140724	T-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (39.5%)
460-80015-7	BF-ORI-WT-1g-07-20140724	1,2,4-TRIMETHYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (38.5%)
460-80015-7	BF-ORI-WT-1g-07-20140724	1,2-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (38.5%)
460-80015-7	BF-ORI-WT-1g-07-20140724	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.8 U ug/kg	UJ	Low internal standard response (38.5%)
460-80015-7	BF-ORI-WT-1g-07-20140724	1,3-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (38.5%)
460-80015-7	BF-ORI-WT-1g-07-20140724	1,4-DICHLOROBENZENE	1.8 U ug/kg	UJ	Low internal standard response (38.5%)
460-80015-7	BF-ORI-WT-1g-07-20140724	1,4-DIOXANE (P-DIOXANE)	36 U ug/kg	UJ	Low internal standard response (34.9%)
460-80015-7	BF-ORI-WT-1g-07-20140724	N-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (38.5%)
460-80015-7	BF-ORI-WT-1g-07-20140724	N-PROPYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (38.5%)
460-80015-7	BF-ORI-WT-1g-07-20140724	SEC-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (38.5%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-80015-7	BF-ORI-WT-1g-07-20140724	T-BUTYLBENZENE	1.8 U ug/kg	UJ	Low internal standard response (38.5%)
460-80767-2	BF-ORI-HS-2g-02-20140807	1,4-DIOXANE (P-DIOXANE)	26 U ug/kg	UJ	Low internal standard response (47.6%)
460-80768-1	BF-ETETZ-CF-1g-01-20140807	1,2,4-TRIMETHYLBENZENE	0.13 J ug/kg	J	Result between MDL and RL
460-80768-6	BF-ETETZ-CF-1g-06-20140807	METHYLENE CHLORIDE	1.8 ug/kg	U	Trip blank contamination (1.2 ug/l)
460-80768-7	BF-ETETZ-CF-1g-07-20140807	METHYLENE CHLORIDE	1.3 ug/kg	U	Trip blank contamination (1.2 ug/l)
460-81552-2	BF-5L-UT-1g-02-20140821	METHYLENE CHLORIDE	3.8 ug/kg	U	Trip blank contamination (1.2 ug/l)
460-81552-3	BF-5L-UT-1g-03-20140821	METHYLENE CHLORIDE	1.3 J ug/kg	U	Trip blank contamination (1.2 ug/l)
460-81552-4	BF-5L-UT-1g-04-20140821	METHYLENE CHLORIDE	2.6 ug/kg	U	Trip blank contamination (1.2 ug/l)
460-81552-5	BF-5L-UT-1g-05-20140821	1,4-DIOXANE (P-DIOXANE)	25 U ug/kg	UJ	Low internal standard response (42.8%)
460-81552-6	BF-5L-UT-1g-06-20140821	METHYLENE CHLORIDE	2.6 ug/kg	U	Trip blank contamination (1.2 ug/l)
460-81552-7	BF-5L-UT-1g-07-20140821	METHYLENE CHLORIDE	1.8 ug/kg	U	Trip blank contamination (1.2 ug/l)
460-82155-1	BF-5L-WT-1g-01-20140903	1,4-DIOXANE (P-DIOXANE)	31 U ug/kg	UJ	Low internal standard response (25.6%)
460-82155-2	BF-5L-WT-1g-02-20140903	1,4-DIOXANE (P-DIOXANE)	28 U ug/kg	UJ	Low internal standard response (39.6%)
460-82584-1	BF-ORI-WT-2g-01-20140910	1,2,4-TRIMETHYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (40.2%)
460-82584-1	BF-ORI-WT-2g-01-20140910	1,2-DICHLOROBENZENE	1.5 U ug/kg	UJ	Low internal standard response (40.2%)
460-82584-1	BF-ORI-WT-2g-01-20140910	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.5 U ug/kg	UJ	Low internal standard response (40.2%)
460-82584-1	BF-ORI-WT-2g-01-20140910	1,3-DICHLOROBENZENE	1.5 U ug/kg	UJ	Low internal standard response (40.2%)
460-82584-1	BF-ORI-WT-2g-01-20140910	1,4-DICHLOROBENZENE	1.5 U ug/kg	UJ	Low internal standard response (40.2%)
460-82584-1	BF-ORI-WT-2g-01-20140910	1,4-DIOXANE (P-DIOXANE)	30 U ug/kg	UJ	Low internal standard response (37.7%)
460-82584-1	BF-ORI-WT-2g-01-20140910	N-BUTYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (40.2%)
460-82584-1	BF-ORI-WT-2g-01-20140910	N-PROPYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (40.2%)
460-82584-1	BF-ORI-WT-2g-01-20140910	SEC-BUTYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (40.2%)
460-82584-1	BF-ORI-WT-2g-01-20140910	T-BUTYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (40.2%)
460-82584-2	BF-ORI-WT-2g-02-20140910	1,2,4-TRIMETHYLBENZENE	1.7 U ug/kg	UJ	Low internal standard response (41.8%)
460-82584-2	BF-ORI-WT-2g-02-20140910	1,2-DICHLOROBENZENE	1.7 U ug/kg	UJ	Low internal standard response (41.8%)
460-82584-2	BF-ORI-WT-2g-02-20140910	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.7 U ug/kg	UJ	Low internal standard response (41.8%)
460-82584-2	BF-ORI-WT-2g-02-20140910	1,3-DICHLOROBENZENE	1.7 U ug/kg	UJ	Low internal standard response (41.8%)
460-82584-2	BF-ORI-WT-2g-02-20140910	1,4-DICHLOROBENZENE	1.7 U ug/kg	UJ	Low internal standard response (41.8%)
460-82584-2	BF-ORI-WT-2g-02-20140910	N-BUTYLBENZENE	1.7 U ug/kg	UJ	Low internal standard response (41.8%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-82584-2	BF-ORI-WT-2g-02-20140910	N-PROPYLBENZENE	1.7	U	ug/kg	UJ	Low internal standard response (41.8%)
460-82584-2	BF-ORI-WT-2g-02-20140910	SEC-BUTYLBENZENE	1.7	U	ug/kg	UJ	Low internal standard response (41.8%)
460-82584-2	BF-ORI-WT-2g-02-20140910	T-BUTYLBENZENE	1.7	U	ug/kg	UJ	Low internal standard response (41.8%)
460-82585-2	BF-5L-UT-2g-02-20140910	1,4-DIOXANE (P-DIOXANE)	21	U	ug/kg	UJ	Low internal standard response (49.1%)
460-82585-4	BF-5L-UT-3g-01-20140910	1,4-DIOXANE (P-DIOXANE)	20	U	ug/kg	UJ	Low internal standard response (49.9%)
460-82585-5	BF-5L-UT-3g-02-20140910	1,4-DIOXANE (P-DIOXANE)	19	U	ug/kg	UJ	Low internal standard response (49.8%)
460-82730-1	BF-5L-UT-4g-01-20140912	ACETONE	4.8	U	ug/kg	UJ	Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate
460-82730-2	BF-5L-UT-4g-01X-20140912	1,2,4-TRIMETHYLBENZENE	1.2	U	ug/kg	UJ	Low internal standard response (37.3%)
460-82730-2	BF-5L-UT-4g-01X-20140912	1,2-DICHLOROBENZENE	1.2	U	ug/kg	UJ	Low internal standard response (37.3%)
460-82730-2	BF-5L-UT-4g-01X-20140912	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.2	U	ug/kg	UJ	Low internal standard response (37.3%)
460-82730-2	BF-5L-UT-4g-01X-20140912	1,3-DICHLOROBENZENE	1.2	U	ug/kg	UJ	Low internal standard response (37.3%)
460-82730-2	BF-5L-UT-4g-01X-20140912	1,4-DICHLOROBENZENE	1.2	U	ug/kg	UJ	Low internal standard response (37.3%)
460-82730-2	BF-5L-UT-4g-01X-20140912	1,4-DIOXANE (P-DIOXANE)	23	U	ug/kg	UJ	Low internal standard response (47.6%)
460-82730-2	BF-5L-UT-4g-01X-20140912	ACETONE	18	B	ug/kg	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from field duplicate; High surrogate spike recovery (148%)
460-82730-2	BF-5L-UT-4g-01X-20140912	N-BUTYLBENZENE	1.2	U	ug/kg	UJ	Low internal standard response (37.3%)
460-82730-2	BF-5L-UT-4g-01X-20140912	N-PROPYLBENZENE	1.2	U	ug/kg	UJ	Low internal standard response (37.3%)
460-82730-2	BF-5L-UT-4g-01X-20140912	SEC-BUTYLBENZENE	1.2	U	ug/kg	UJ	Low internal standard response (37.3%)
460-82730-2	BF-5L-UT-4g-01X-20140912	T-BUTYLBENZENE	1.2	U	ug/kg	UJ	Low internal standard response (37.3%)
460-82730-3	BF-5L-UT-4g-02-20140912	1,2,4-TRIMETHYLBENZENE	1.3	J	ug/kg	J	Extremely low internal standard response (14.8%); High surrogate spike recovery (137%, 169% and 147%); Result between MDL and RL
460-82730-3	BF-5L-UT-4g-02-20140912	1,2-DICHLOROBENZENE	1.5	U	ug/kg	R	Extremely low internal standard response (14.8%)
460-82730-3	BF-5L-UT-4g-02-20140912	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.5	U	ug/kg	R	Extremely low internal standard response (14.8%)
460-82730-3	BF-5L-UT-4g-02-20140912	1,3-DICHLOROBENZENE	1.5	U	ug/kg	R	Extremely low internal standard response (14.8%)
460-82730-3	BF-5L-UT-4g-02-20140912	1,4-DICHLOROBENZENE	1.5	U	ug/kg	R	Extremely low internal standard response (14.8%)
460-82730-3	BF-5L-UT-4g-02-20140912	ACETONE	53	B	ug/kg	J+	High surrogate spike recovery (137%, 169% and 147%)
460-82730-3	BF-5L-UT-4g-02-20140912	BENZENE	1.5	U	ug/kg	UJ	Low internal standard response (34.2%)
460-82730-3	BF-5L-UT-4g-02-20140912	CHLOROBENZENE	1.5	U	ug/kg	UJ	Low internal standard response (34.2%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-82730-3	BF-5L-UT-4g-02-20140912	ETHYLBENZENE	1.5	U	ug/kg	UJ	Low internal standard response (34.2%)
460-82730-3	BF-5L-UT-4g-02-20140912	N-BUTYLBENZENE	1.5	U	ug/kg	R	Extremely low internal standard response (14.8%)
460-82730-3	BF-5L-UT-4g-02-20140912	N-PROPYLBENZENE	1.5	U	ug/kg	R	Extremely low internal standard response (14.8%)
460-82730-3	BF-5L-UT-4g-02-20140912	SEC-BUTYLBENZENE	1.5	U	ug/kg	R	Extremely low internal standard response (14.8%)
460-82730-3	BF-5L-UT-4g-02-20140912	T-BUTYLBENZENE	1.5	U	ug/kg	R	Extremely low internal standard response (14.8%)
460-82730-3	BF-5L-UT-4g-02-20140912	TETRACHLORO ETHYLENE(PCE)	1.5	U	ug/kg	UJ	Low internal standard response (34.2%)
460-82730-3	BF-5L-UT-4g-02-20140912	TOLUENE	1.5		ug/kg	J+	High surrogate spike recovery (137%, 169% and 147%); Low internal standard response (34.2%)
460-82730-3	BF-5L-UT-4g-02-20140912	XYLENES, TOTAL	3.0	U	ug/kg	UJ	Low internal standard response (34.2%)
460-82735-1	BF-ORI-WT-3g-01-20140912	1,2,4-TRIMETHYLBENZENE	1.7	U	ug/kg	R	Extremely low internal standard response (14.6%)
460-82735-1	BF-ORI-WT-3g-01-20140912	1,2-DICHLOROBENZENE	1.7	U	ug/kg	R	Extremely low internal standard response (14.6%)
460-82735-1	BF-ORI-WT-3g-01-20140912	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.7	U	ug/kg	R	Extremely low internal standard response (14.6%)
460-82735-1	BF-ORI-WT-3g-01-20140912	1,3-DICHLOROBENZENE	1.7	U	ug/kg	R	Extremely low internal standard response (14.6%)
460-82735-1	BF-ORI-WT-3g-01-20140912	1,4-DICHLOROBENZENE	1.7	U	ug/kg	R	Extremely low internal standard response (14.6%)
460-82735-1	BF-ORI-WT-3g-01-20140912	1,4-DIOXANE (P-DIOXANE)	33	U	ug/kg	UJ	Low internal standard response (45.2%)
460-82735-1	BF-ORI-WT-3g-01-20140912	ACETONE	46	B	ug/kg	J+	High surrogate spike recovery (137%, 177% and 162%)
460-82735-1	BF-ORI-WT-3g-01-20140912	BENZENE	1.7	U	ug/kg	UJ	Low internal standard response (32.4%)
460-82735-1	BF-ORI-WT-3g-01-20140912	CHLOROBENZENE	1.7	U	ug/kg	UJ	Low internal standard response (32.4%)
460-82735-1	BF-ORI-WT-3g-01-20140912	ETHYLBENZENE	1.7	U	ug/kg	UJ	Low internal standard response (32.4%)
460-82735-1	BF-ORI-WT-3g-01-20140912	N-BUTYLBENZENE	1.7	U	ug/kg	R	Extremely low internal standard response (14.6%)
460-82735-1	BF-ORI-WT-3g-01-20140912	N-PROPYLBENZENE	1.7	U	ug/kg	R	Extremely low internal standard response (14.6%)
460-82735-1	BF-ORI-WT-3g-01-20140912	SEC-BUTYLBENZENE	1.7	U	ug/kg	R	Extremely low internal standard response (14.6%)
460-82735-1	BF-ORI-WT-3g-01-20140912	T-BUTYLBENZENE	1.7	U	ug/kg	R	Extremely low internal standard response (14.6%)
460-82735-1	BF-ORI-WT-3g-01-20140912	TETRACHLORO ETHYLENE(PCE)	1.7	U	ug/kg	UJ	Low internal standard response (32.4%)
460-82735-1	BF-ORI-WT-3g-01-20140912	TOLUENE	1.4	J	ug/kg	J	High surrogate spike recovery (137%, 177% and 162%); Low internal standard response (32.4%); Result between MDL and RL
460-82735-1	BF-ORI-WT-3g-01-20140912	XYLENES, TOTAL	3.3	U	ug/kg	UJ	Low internal standard response (32.4%)
460-82735-2	BF-ORI-WT-3g-02-20140912	1,2,4-TRIMETHYLBENZENE	1.4	J	ug/kg	J	Extremely low internal standard response (16.3%); High surrogate spike recovery (142% and 138%); Result between MDL and RL
460-82735-2	BF-ORI-WT-3g-02-20140912	1,2-DICHLOROBENZENE	1.7	U	ug/kg	R	Extremely low internal standard response (16.3%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-82735-2	BF-ORI-WT-3g-02-20140912	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.7 U ug/kg	R	Extremely low internal standard response (16.3%)
460-82735-2	BF-ORI-WT-3g-02-20140912	1,3-DICHLOROBENZENE	1.7 U ug/kg	R	Extremely low internal standard response (16.3%)
460-82735-2	BF-ORI-WT-3g-02-20140912	1,4-DICHLOROBENZENE	1.7 U ug/kg	R	Extremely low internal standard response (16.3%)
460-82735-2	BF-ORI-WT-3g-02-20140912	1,4-DIOXANE (P-DIOXANE)	34 U ug/kg	UJ	Low internal standard response (46.8%)
460-82735-2	BF-ORI-WT-3g-02-20140912	ACETONE	46 B ug/kg	J	Poor field duplicate precision (49 RPD), use higher result from original sample; High surrogate spike recovery (142% and 138%)
460-82735-2	BF-ORI-WT-3g-02-20140912	BENZENE	1.7 U ug/kg	UJ	Low internal standard response (37%)
460-82735-2	BF-ORI-WT-3g-02-20140912	CHLOROBENZENE	1.7 U ug/kg	UJ	Low internal standard response (37%)
460-82735-2	BF-ORI-WT-3g-02-20140912	ETHYLBENZENE	1.7 U ug/kg	UJ	Low internal standard response (37%)
460-82735-2	BF-ORI-WT-3g-02-20140912	N-BUTYLBENZENE	1.7 U ug/kg	R	Extremely low internal standard response (16.3%)
460-82735-2	BF-ORI-WT-3g-02-20140912	N-PROPYLBENZENE	1.7 U ug/kg	R	Extremely low internal standard response (16.3%)
460-82735-2	BF-ORI-WT-3g-02-20140912	SEC-BUTYLBENZENE	1.7 U ug/kg	R	Extremely low internal standard response (16.3%)
460-82735-2	BF-ORI-WT-3g-02-20140912	T-BUTYLBENZENE	1.7 U ug/kg	R	Extremely low internal standard response (16.3%)
460-82735-2	BF-ORI-WT-3g-02-20140912	TETRACHLORO ETHYLENE(PCE)	1.7 U ug/kg	UJ	Low internal standard response (37%)
460-82735-2	BF-ORI-WT-3g-02-20140912	TOLUENE	1.7 U ug/kg	UJ	Low internal standard response (37%)
460-82735-2	BF-ORI-WT-3g-02-20140912	XYLENES, TOTAL	3.4 U ug/kg	UJ	Low internal standard response (37%)
460-82735-3	BF-ORI-WT-3g-02-X-20140912	1,2,4-TRIMETHYLBENZENE	1.0 U ug/kg	UJ	Low internal standard response (38.1%)
460-82735-3	BF-ORI-WT-3g-02-X-20140912	1,2-DICHLOROBENZENE	1.0 U ug/kg	UJ	Low internal standard response (38.1%)
460-82735-3	BF-ORI-WT-3g-02-X-20140912	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.0 U ug/kg	UJ	Low internal standard response (38.1%)
460-82735-3	BF-ORI-WT-3g-02-X-20140912	1,3-DICHLOROBENZENE	1.0 U ug/kg	UJ	Low internal standard response (38.1%)
460-82735-3	BF-ORI-WT-3g-02-X-20140912	1,4-DICHLOROBENZENE	1.0 U ug/kg	UJ	Low internal standard response (38.1%)
460-82735-3	BF-ORI-WT-3g-02-X-20140912	ACETONE	28 B ug/kg	J	Poor field duplicate precision (49 RPD), use higher result from original sample
460-82735-3	BF-ORI-WT-3g-02-X-20140912	N-BUTYLBENZENE	1.0 U ug/kg	UJ	Low internal standard response (38.1%)
460-82735-3	BF-ORI-WT-3g-02-X-20140912	N-PROPYLBENZENE	1.0 U ug/kg	UJ	Low internal standard response (38.1%)
460-82735-3	BF-ORI-WT-3g-02-X-20140912	SEC-BUTYLBENZENE	1.0 U ug/kg	UJ	Low internal standard response (38.1%)
460-82735-3	BF-ORI-WT-3g-02-X-20140912	T-BUTYLBENZENE	1.0 U ug/kg	UJ	Low internal standard response (38.1%)
460-83311-1	BF-ORI-HS-4g-01-20140923	METHYLENE CHLORIDE	0.52 J ug/kg	J	Result between MDL and RL
460-83312-1	BF-5L-WT-2g-01-20140923	1,2,4-TRIMETHYLBENZENE	1.7 U ug/kg	UJ	Low internal standard response (38.5%)
460-83312-1	BF-5L-WT-2g-01-20140923	1,2-DICHLOROBENZENE	1.7 U ug/kg	UJ	Low internal standard response (38.5%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)	DVQ	QC Issue
460-83312-1	BF-5L-WT-2g-01-20140923	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.7 U ug/kg	UJ	Low internal standard response (38.5%)
460-83312-1	BF-5L-WT-2g-01-20140923	1,3-DICHLOROBENZENE	1.7 U ug/kg	UJ	Low internal standard response (38.5%)
460-83312-1	BF-5L-WT-2g-01-20140923	1,4-DICHLOROBENZENE	1.7 U ug/kg	UJ	Low internal standard response (38.5%)
460-83312-1	BF-5L-WT-2g-01-20140923	N-BUTYLBENZENE	1.7 U ug/kg	UJ	Low internal standard response (38.5%)
460-83312-1	BF-5L-WT-2g-01-20140923	N-PROPYLBENZENE	1.7 U ug/kg	UJ	Low internal standard response (38.5%)
460-83312-1	BF-5L-WT-2g-01-20140923	SEC-BUTYLBENZENE	1.7 U ug/kg	UJ	Low internal standard response (38.5%)
460-83312-1	BF-5L-WT-2g-01-20140923	T-BUTYLBENZENE	1.7 U ug/kg	UJ	Low internal standard response (38.5%)
460-83312-2	BF-5L-WT-2g-02-20140923	1,2,4-TRIMETHYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (46%)
460-83312-2	BF-5L-WT-2g-02-20140923	1,2-DICHLOROBENZENE	1.5 U ug/kg	UJ	Low internal standard response (46%)
460-83312-2	BF-5L-WT-2g-02-20140923	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.5 U ug/kg	UJ	Low internal standard response (46%)
460-83312-2	BF-5L-WT-2g-02-20140923	1,3-DICHLOROBENZENE	1.5 U ug/kg	UJ	Low internal standard response (46%)
460-83312-2	BF-5L-WT-2g-02-20140923	1,4-DICHLOROBENZENE	1.5 U ug/kg	UJ	Low internal standard response (46%)
460-83312-2	BF-5L-WT-2g-02-20140923	1,4-DIOXANE (P-DIOXANE)	29 U ug/kg	UJ	Low internal standard response (45%)
460-83312-2	BF-5L-WT-2g-02-20140923	N-BUTYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (46%)
460-83312-2	BF-5L-WT-2g-02-20140923	N-PROPYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (46%)
460-83312-2	BF-5L-WT-2g-02-20140923	SEC-BUTYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (46%)
460-83312-2	BF-5L-WT-2g-02-20140923	T-BUTYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (46%)
460-83312-4	BF-5L-WT-3g-01-20140923	1,4-DIOXANE (P-DIOXANE)	29 U ug/kg	UJ	Low internal standard response (46%)
460-83312-5	BF-5L-WT-3g-02-20140923	1,2,4-TRIMETHYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (45.1%)
460-83312-5	BF-5L-WT-3g-02-20140923	1,2-DICHLOROBENZENE	1.5 U ug/kg	UJ	Low internal standard response (45.1%)
460-83312-5	BF-5L-WT-3g-02-20140923	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.5 U ug/kg	UJ	Low internal standard response (45.1%)
460-83312-5	BF-5L-WT-3g-02-20140923	1,3-DICHLOROBENZENE	1.5 U ug/kg	UJ	Low internal standard response (45.1%)
460-83312-5	BF-5L-WT-3g-02-20140923	1,4-DICHLOROBENZENE	1.5 U ug/kg	UJ	Low internal standard response (45.1%)
460-83312-5	BF-5L-WT-3g-02-20140923	1,4-DIOXANE (P-DIOXANE)	31 U ug/kg	UJ	Low internal standard response (49%)
460-83312-5	BF-5L-WT-3g-02-20140923	N-BUTYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (45.1%)
460-83312-5	BF-5L-WT-3g-02-20140923	N-PROPYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (45.1%)
460-83312-5	BF-5L-WT-3g-02-20140923	SEC-BUTYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (45.1%)
460-83312-5	BF-5L-WT-3g-02-20140923	T-BUTYLBENZENE	1.5 U ug/kg	UJ	Low internal standard response (45.1%)
460-83781-1	BF-5L-UT-5g-01-20141001	ACETONE	21 ug/kg	J-	Calibration drift (%D= -28.4%)
460-83781-2	BF-5L-UT-5g-02-20141001	ACETONE	17 ug/kg	J-	Calibration drift (%D= -28.4%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-83781-4	BF-5L-UT-6g-01-20141001	ACETONE	26		ug/kg	J-	Calibration drift (%D= -28.4%)
460-83781-5	BF-5L-UT-6g-02-20141001	ACETONE	26		ug/kg	J-	Calibration drift (%D= -28.4%)
SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)							
460-76301-3	BF-SER-RAMPD-DD-15c-001-20140516	ACENAPHTHENE	120	J	ug/kg	J	Result between MDL and RL
460-76301-3	BF-SER-RAMPD-DD-15c-001-20140516	ANTHRACENE	250	J	ug/kg	J	Result between MDL and RL
460-76301-3	BF-SER-RAMPD-DD-15c-001-20140516	BENZO(G,H,I) PERYLENE	240	J	ug/kg	J	Calibration drift (%D= +22.8%); Result between MDL and RL
460-76301-3	BF-SER-RAMPD-DD-15c-001-20140516	DIBENZ(A,H) ANTHRACENE	25	J	ug/kg	J	Result between MDL and RL
460-76301-3	BF-SER-RAMPD-DD-15c-001-20140516	DIBENZOFURAN	62	J	ug/kg	J	Result between MDL and RL
460-76301-3	BF-SER-RAMPD-DD-15c-001-20140516	FLUORENE	140	J	ug/kg	J	Result between MDL and RL
460-76301-6	BF-SER-RAMPD-DD-16c-001-20140516	ANTHRACENE	94	J	ug/kg	J	Result between MDL and RL
460-76301-6	BF-SER-RAMPD-DD-16c-001-20140516	BENZO(G,H,I) PERYLENE	150	J	ug/kg	J	Calibration drift (%D= +22.8%); Result between MDL and RL
460-76301-6	BF-SER-RAMPD-DD-16c-001-20140516	CHRYSENE	350	J	ug/kg	J	Result between MDL and RL
460-76301-6	BF-SER-RAMPD-DD-16c-001-20140516	DIBENZ(A,H) ANTHRACENE	16	J	ug/kg	J	Result between MDL and RL
460-76301-9	BF-SER-RAMPD-DD-17c-001-20140516	BENZO(G,H,I) PERYLENE	150	J	ug/kg	J	Calibration drift (%D= +22.8%); Result between MDL and RL
460-76301-9	BF-SER-RAMPD-DD-17c-001-20140516	CHRYSENE	270	J	ug/kg	J	Result between MDL and RL
460-76301-9	BF-SER-RAMPD-DD-17c-001-20140516	DIBENZ(A,H) ANTHRACENE	21	J	ug/kg	J	Result between MDL and RL
460-76301-9	BF-SER-RAMPD-DD-17c-001-20140516	FLUORANTHENE	310	J	ug/kg	J	Result between MDL and RL
460-76301-9	BF-SER-RAMPD-DD-17c-001-20140516	PHENANTHRENE	140	J	ug/kg	J	Result between MDL and RL
460-76301-12	BF-SER-RAMPD-DD-18c-001-20140516	BENZO(G,H,I) PERYLENE	69	J	ug/kg	J	Calibration drift (%D= +22.8%); Result between MDL and RL
460-76301-12	BF-SER-RAMPD-DD-18c-001-20140516	CHRYSENE	97	J	ug/kg	J	Result between MDL and RL
460-76301-12	BF-SER-RAMPD-DD-18c-001-20140516	DIBENZ(A,H) ANTHRACENE	25	J	ug/kg	J	Result between MDL and RL
460-76301-12	BF-SER-RAMPD-DD-18c-001-20140516	FLUORANTHENE	92	J	ug/kg	J	Result between MDL and RL
460-76301-12	BF-SER-RAMPD-DD-18c-001-20140516	PYRENE	110	J	ug/kg	J	Result between MDL and RL
460-76301-15	BF-SER-RAMPD-DD-19c-001-20140516	BENZO(G,H,I) PERYLENE	53	J	ug/kg	J	Calibration drift (%D= +22.8%); Result between MDL and RL
460-76301-15	BF-SER-RAMPD-DD-19c-001-20140516	CHRYSENE	110	J	ug/kg	J	Result between MDL and RL
460-76301-15	BF-SER-RAMPD-DD-19c-001-20140516	DIBENZ(A,H) ANTHRACENE	17	J	ug/kg	J	Result between MDL and RL
460-76301-15	BF-SER-RAMPD-DD-19c-001-20140516	FLUORANTHENE	180	J	ug/kg	J	Result between MDL and RL
460-76301-15	BF-SER-RAMPD-DD-19c-001-20140516	PHENANTHRENE	120	J	ug/kg	J	Result between MDL and RL
460-76301-15	BF-SER-RAMPD-DD-19c-001-20140516	PYRENE	180	J	ug/kg	J	Result between MDL and RL
460-78812-8	BF-ORI-HS-1C-01-20140702	BENZO(A) ANTHRACENE	24	J	ug/kg	J	Result between MDL and RL
460-78812-8	BF-ORI-HS-1C-01-20140702	BENZO(A)PYRENE	19	J	ug/kg	J	Result between MDL and RL
460-78812-8	BF-ORI-HS-1C-01-20140702	BENZO(B) FLUORANTHENE	27	J	ug/kg	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-78812-8	BF-ORI-HS-1C-01-20140702	INDENO(1,2,3-C,D) PYRENE	15	J	ug/kg	J	Calibration drift (%D= +26%); Result between MDL and RL
460-78812-9	BF-ORI-HS-1C-02-20140702	BENZO(A) ANTHRACENE	22	J	ug/kg	J	Result between MDL and RL
460-78812-9	BF-ORI-HS-1C-02-20140702	BENZO(A)PYRENE	20	J	ug/kg	J	Result between MDL and RL
460-78812-9	BF-ORI-HS-1C-02-20140702	BENZO(B) FLUORANTHENE	31	J	ug/kg	J	Result between MDL and RL
460-78812-9	BF-ORI-HS-1C-02-20140702	BENZO(K) FLUORANTHENE	9.3	J	ug/kg	J	Result between MDL and RL
460-80009-8	BF-ORI-UT-1c-01-20140724	BENZO(G,H,I) PERYLENE	220	J	ug/kg	J	Result between MDL and RL
460-80009-8	BF-ORI-UT-1c-01-20140724	PHENANTHRENE	93	J	ug/kg	J	Result between MDL and RL
460-80009-8	BF-ORI-UT-1c-01-20140724	PYRENE	430	J	ug/kg	J	Result between MDL and RL
460-80009-9	BF-ORI-UT-1c-02-20140724	ACENAPHTHYLENE	59	J	ug/kg	J	Result between MDL and RL
460-80009-9	BF-ORI-UT-1c-02-20140724	ANTHRACENE	140	J	ug/kg	J	Result between MDL and RL
460-80009-9	BF-ORI-UT-1c-02-20140724	BENZO(G,H,I) PERYLENE	150	J	ug/kg	J	Result between MDL and RL
460-80009-9	BF-ORI-UT-1c-02-20140724	CHRYSENE	420	J	ug/kg	J	Result between MDL and RL
460-80009-9	BF-ORI-UT-1c-02-20140724	FLUORANTHENE	260	J	ug/kg	J	Result between MDL and RL
460-80009-9	BF-ORI-UT-1c-02-20140724	PHENANTHRENE	76	J	ug/kg	J	Result between MDL and RL
460-80009-9	BF-ORI-UT-1c-02-20140724	PYRENE	230	J	ug/kg	J	Result between MDL and RL
460-80015-8	BF-ORI-WT-1c-01-20140724	BENZO(G,H,I) PERYLENE	190	J	ug/kg	J	Result between MDL and RL
460-80015-8	BF-ORI-WT-1c-01-20140724	CHRYSENE	340	J	ug/kg	J	Result between MDL and RL
460-80015-8	BF-ORI-WT-1c-01-20140724	FLUORANTHENE	250	J	ug/kg	J	Result between MDL and RL
460-80015-8	BF-ORI-WT-1c-01-20140724	PYRENE	140	J	ug/kg	J	Result between MDL and RL
460-80015-9	BF-ORI-WT-1c-02-20140724	BENZO(G,H,I) PERYLENE	91	J	ug/kg	J	Result between MDL and RL
460-80015-9	BF-ORI-WT-1c-02-20140724	CHRYSENE	190	J	ug/kg	J	Result between MDL and RL
460-80015-9	BF-ORI-WT-1c-02-20140724	DIBENZ(A,H) ANTHRACENE	28	J	ug/kg	J	Result between MDL and RL
460-80015-9	BF-ORI-WT-1c-02-20140724	FLUORANTHENE	220	J	ug/kg	J	Result between MDL and RL
460-80015-9	BF-ORI-WT-1c-02-20140724	PYRENE	99	J	ug/kg	J	Result between MDL and RL
460-80767-3	BF-ORI-HS-2c-01-20140807	BENZO(G,H,I) PERYLENE	74	J	ug/kg	J	Calibration drift (%D= +22%); Result between MDL and RL
460-80767-3	BF-ORI-HS-2c-01-20140807	BENZO(K) FLUORANTHENE	31	J	ug/kg	J	Result between MDL and RL
460-80767-3	BF-ORI-HS-2c-01-20140807	CHRYSENE	78	J	ug/kg	J	Result between MDL and RL
460-80767-3	BF-ORI-HS-2c-01-20140807	CRESOLS, M & P	410	U	ug/kg	UJ	Calibration drift (%D= -22.5%)
460-80767-3	BF-ORI-HS-2c-01-20140807	DIBENZ(A,H) ANTHRACENE	36	J	ug/kg	J	Calibration drift (%D= +20.5%); Result between MDL and RL
460-80767-3	BF-ORI-HS-2c-01-20140807	FLUORANTHENE	73	J	ug/kg	J	Result between MDL and RL
460-80767-3	BF-ORI-HS-2c-01-20140807	PENTACHLORO-PHENOL	830	U	ug/kg	UJ	Low matrix spike recovery (33%), Low matrix spike duplicate recovery (40%)
460-80767-3	BF-ORI-HS-2c-01-20140807	PYRENE	47	J	ug/kg	J	Result between MDL and RL
460-80768-8	BF-ETETZ-CF-1c-01-20140807	BENZO(A)PYRENE	8.6	J	ug/kg	J	Result between MDL and RL
460-80768-8	BF-ETETZ-CF-1c-01-20140807	CRESOLS, M & P	340	U	ug/kg	UJ	Calibration drift (%D= -22.5%)
460-80768-9	BF-ETETZ-CF-1c-02-20140807	CRESOLS, M & P	340	U	ug/kg	UJ	Calibration drift (%D= -22.5%)
460-81552-8	BF-5L-UT-1c-01-20140821	ACENAPHTHENE	220	J	ug/kg	J	Result between MDL and RL
460-81552-8	BF-5L-UT-1c-01-20140821	BENZO(A)PYRENE	32	J	ug/kg	J	Result between MDL and RL
460-81552-8	BF-5L-UT-1c-01-20140821	BENZO(G,H,I) PERYLENE	32	J	ug/kg	J	Result between MDL and RL
460-81552-8	BF-5L-UT-1c-01-20140821	FLUORANTHENE	67	J	ug/kg	J	Result between MDL and RL
460-81552-8	BF-5L-UT-1c-01-20140821	FLUORENE	130	J	ug/kg	J	Result between MDL and RL
460-81552-8	BF-5L-UT-1c-01-20140821	INDENO(1,2,3-C,D) PYRENE	32	J	ug/kg	J	Result between MDL and RL
460-81552-8	BF-5L-UT-1c-01-20140821	PHENANTHRENE	180	J	ug/kg	J	Result between MDL and RL
460-81552-8	BF-5L-UT-1c-01-20140821	PYRENE	82	J	ug/kg	J	Result between MDL and RL
460-81552-9	BF-5L-UT-1c-02-20140821	ACENAPHTHENE	280	J	ug/kg	J	Result between MDL and RL
460-81552-9	BF-5L-UT-1c-02-20140821	ANTHRACENE	180	J	ug/kg	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-81552-9	BF-5L-UT-1c-02-20140821	BENZO(G,H,I) PERYLENE	71	J	ug/kg	J	Result between MDL and RL
460-81552-9	BF-5L-UT-1c-02-20140821	CHRYSENE	100	J	ug/kg	J	Result between MDL and RL
460-81552-9	BF-5L-UT-1c-02-20140821	FLUORANTHENE	170	J	ug/kg	J	Result between MDL and RL
460-81552-9	BF-5L-UT-1c-02-20140821	FLUORENE	290	J	ug/kg	J	Result between MDL and RL
460-81552-9	BF-5L-UT-1c-02-20140821	NAPHTHALENE	100	J	ug/kg	J	Result between MDL and RL
460-81552-9	BF-5L-UT-1c-02-20140821	PYRENE	280	J	ug/kg	J	Result between MDL and RL
460-81561-3	BF-ORI-HS-3c-01-20140821	BENZO(G,H,I) PERYLENE	70	J	ug/kg	J	Calibration drift (%D= +26.2%); Result between MDL and RL
460-81561-3	BF-ORI-HS-3c-01-20140821	CHRYSENE	69	J	ug/kg	J	Result between MDL and RL
460-81561-3	BF-ORI-HS-3c-01-20140821	FLUORANTHENE	96	J	ug/kg	J	Result between MDL and RL
460-81561-3	BF-ORI-HS-3c-01-20140821	INDENO(1,2,3-C,D) PYRENE	73		ug/kg	J+	Calibration drift (%D= +53.9%)
460-81561-3	BF-ORI-HS-3c-01-20140821	PYRENE	87	J	ug/kg	J	Result between MDL and RL
460-82155-8	BF-5L-WT-1c-01-20140903	BENZO(G,H,I) PERYLENE	71	J	ug/kg	J	Result between MDL and RL
460-82155-8	BF-5L-WT-1c-01-20140903	BENZO(K) FLUORANTHENE	75	J	ug/kg	J	Result between MDL and RL
460-82155-8	BF-5L-WT-1c-01-20140903	CHRYSENE	150	J	ug/kg	J	Result between MDL and RL
460-82155-8	BF-5L-WT-1c-01-20140903	DIBENZ(A,H) ANTHRACENE	21	J	ug/kg	J	Result between MDL and RL
460-82155-8	BF-5L-WT-1c-01-20140903	FLUORANTHENE	140	J	ug/kg	J	Result between MDL and RL
460-82155-8	BF-5L-WT-1c-01-20140903	PYRENE	81	J	ug/kg	J	Result between MDL and RL
460-82155-9	BF-5L-WT-1c-02-20140903	BENZO(G,H,I) PERYLENE	72	J	ug/kg	J	Result between MDL and RL
460-82155-9	BF-5L-WT-1c-02-20140903	BENZO(K) FLUORANTHENE	60	J	ug/kg	J	Result between MDL and RL
460-82155-9	BF-5L-WT-1c-02-20140903	CHRYSENE	130	J	ug/kg	J	Result between MDL and RL
460-82155-9	BF-5L-WT-1c-02-20140903	DIBENZ(A,H) ANTHRACENE	20	J	ug/kg	J	Result between MDL and RL
460-82155-9	BF-5L-WT-1c-02-20140903	FLUORANTHENE	140	J	ug/kg	J	Result between MDL and RL
460-82155-9	BF-5L-WT-1c-02-20140903	INDENO(1,2,3-C,D) PYRENE	81	J	ug/kg	J	Result between MDL and RL
460-82155-9	BF-5L-WT-1c-02-20140903	PYRENE	100	J	ug/kg	J	Result between MDL and RL
460-82584-3	BF-ORI-WT-2c-01-20140910	BENZO(A) ANTHRACENE	1600		ug/kg	J-	Extremely low matrix spike recovery (12%), Extremely low matrix spike duplicate recovery (4%)
460-82584-3	BF-ORI-WT-2c-01-20140910	BENZO(A)PYRENE	1600		ug/kg	J-	Extremely low matrix spike recovery (9%), Extremely low matrix spike duplicate recovery (4%)
460-82584-3	BF-ORI-WT-2c-01-20140910	BENZO(B) FLUORANTHENE	2300		ug/kg	J-	Extremely low matrix spike recovery (-7%), Extremely low matrix spike duplicate recovery (-17%)
460-82584-3	BF-ORI-WT-2c-01-20140910	BENZO(G,H,I) PERYLENE	1200		ug/kg	J-	Low matrix spike recovery (33%), Low matrix spike duplicate recovery (26%)
460-82584-3	BF-ORI-WT-2c-01-20140910	BENZO(K) FLUORANTHENE	770		ug/kg	J-	Low matrix spike recovery (32%), Low matrix spike duplicate recovery (31%)
460-82584-3	BF-ORI-WT-2c-01-20140910	CHRYSENE	1600		ug/kg	J-	Extremely low matrix spike recovery (5%), Extremely low matrix spike duplicate recovery (-1%)
460-82584-3	BF-ORI-WT-2c-01-20140910	INDENO(1,2,3-C,D) PYRENE	1100		ug/kg	J-	Low matrix spike recovery (35%), Low matrix spike duplicate recovery (30%)

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-82584-3	BF-ORI-WT-2c-01-20140910	PENTACHLORO-PHENOL	1300	U	ug/kg	UJ	Low matrix spike recovery (39%), Low matrix spike duplicate recovery (40%)
460-82584-3	BF-ORI-WT-2c-01-20140910	PHENANTHRENE	990		ug/kg	J-	Low matrix spike recovery (32%), Low matrix spike duplicate recovery (25%)
460-82584-3	BF-ORI-WT-2c-01-20140910	PYRENE	2300		ug/kg	J-	Extremely low matrix spike recovery (-18%), Extremely low matrix spike duplicate recovery (-23%)
460-82585-3	BF-5L-UT-2c-01-20140910	BENZO(B) FLUORANTHENE	41	J	ug/kg	J	Result between MDL and RL
460-82585-3	BF-5L-UT-2c-01-20140910	FLUORANTHENE	51	J	ug/kg	J	Result between MDL and RL
460-82585-3	BF-5L-UT-2c-01-20140910	PHENANTHRENE	67	J	ug/kg	J	Result between MDL and RL
460-82585-3	BF-5L-UT-2c-01-20140910	PYRENE	50	J	ug/kg	J	Result between MDL and RL
460-82585-6	BF-5L-UT-3c-01-20140910	FLUORANTHENE	49	J	ug/kg	J	Result between MDL and RL
460-82730-5	BF-5L-UT-4c-01X-20140912	FLUORANTHENE	44	J	ug/kg	J	Result between MDL and RL
460-82730-5	BF-5L-UT-4c-01X-20140912	PYRENE	42	J	ug/kg	J	Result between MDL and RL
460-83311-3	BF-ORI-HS-4c-01-20140923	BENZO(B) FLUORANTHENE	120		ug/kg	J+	Calibration drift (%D= +21.4%)
460-83311-3	BF-ORI-HS-4c-01-20140923	BENZO(K) FLUORANTHENE	40	J	ug/kg	J	Result between MDL and RL
460-83311-3	BF-ORI-HS-4c-01-20140923	CHRYSENE	86	J	ug/kg	J	Result between MDL and RL
460-83311-3	BF-ORI-HS-4c-01-20140923	FLUORANTHENE	140	J	ug/kg	J	Result between MDL and RL
460-83311-3	BF-ORI-HS-4c-01-20140923	INDENO(1,2,3-C,D) PYRENE	110		ug/kg	J+	Calibration drift (%D= +26%)
460-83311-3	BF-ORI-HS-4c-01-20140923	PHENANTHRENE	82	J	ug/kg	J	Result between MDL and RL
460-83311-3	BF-ORI-HS-4c-01-20140923	PYRENE	93	J	ug/kg	J	Result between MDL and RL
460-83312-3	BF-5L-WT-2c-01-20140923	BENZO(B) FLUORANTHENE	280		ug/kg	J+	Calibration drift (%D= +21.4%)
460-83312-3	BF-5L-WT-2c-01-20140923	BENZO(G,H,I) PERYLENE	210	J	ug/kg	J	Result between MDL and RL
460-83312-3	BF-5L-WT-2c-01-20140923	CHRYSENE	170	J	ug/kg	J	Result between MDL and RL
460-83312-3	BF-5L-WT-2c-01-20140923	DIBENZ(A,H) ANTHRACENE	54		ug/kg	J+	Calibration drift (%D= +23.4%)
460-83312-3	BF-5L-WT-2c-01-20140923	FLUORANTHENE	270	J	ug/kg	J	Result between MDL and RL
460-83312-3	BF-5L-WT-2c-01-20140923	INDENO(1,2,3-C,D) PYRENE	230		ug/kg	J+	Calibration drift (%D= +26%)
460-83312-3	BF-5L-WT-2c-01-20140923	PHENANTHRENE	100	J	ug/kg	J	Result between MDL and RL
460-83312-3	BF-5L-WT-2c-01-20140923	PYRENE	210	J	ug/kg	J	Result between MDL and RL
460-83312-6	BF-5L-WT-3c-01-20140923	BENZO(B) FLUORANTHENE	1100		ug/kg	J+	Calibration drift (%D= +21.4%)
460-83312-6	BF-5L-WT-3c-01-20140923	BENZO(G,H,I) PERYLENE	330	J	ug/kg	J	Result between MDL and RL
460-83312-6	BF-5L-WT-3c-01-20140923	DIBENZ(A,H) ANTHRACENE	120		ug/kg	J+	Calibration drift (%D= +23.4%)
460-83312-6	BF-5L-WT-3c-01-20140923	FLUORANTHENE	330	J	ug/kg	J	Result between MDL and RL
460-83312-6	BF-5L-WT-3c-01-20140923	INDENO(1,2,3-C,D) PYRENE	420		ug/kg	J+	Calibration drift (%D= +26%)
460-83312-6	BF-5L-WT-3c-01-20140923	PHENANTHRENE	75	J	ug/kg	J	Result between MDL and RL
460-83312-6	BF-5L-WT-3c-01-20140923	PYRENE	330	J	ug/kg	J	Result between MDL and RL
460-83312-9	BF-5L-WT-4c-01-20140923	BENZO(B) FLUORANTHENE	120		ug/kg	J+	Calibration drift (%D= +21.4%)
460-83312-9	BF-5L-WT-4c-01-20140923	BENZO(G,H,I) PERYLENE	110	J	ug/kg	J	Result between MDL and RL
460-83312-9	BF-5L-WT-4c-01-20140923	CHRYSENE	90	J	ug/kg	J	Result between MDL and RL
460-83312-9	BF-5L-WT-4c-01-20140923	FLUORANTHENE	130	J	ug/kg	J	Result between MDL and RL
460-83312-9	BF-5L-WT-4c-01-20140923	INDENO(1,2,3-C,D) PYRENE	90		ug/kg	J+	Calibration drift (%D= +26%)
460-83312-9	BF-5L-WT-4c-01-20140923	PHENANTHRENE	80	J	ug/kg	J	Result between MDL and RL
460-83312-9	BF-5L-WT-4c-01-20140923	PYRENE	82	J	ug/kg	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result (1)			DVQ	QC Issue
460-83781-3	BF-5L-UT-5c-01-20141001	FLUORANTHENE	15	J	ug/kg	J	Result between MDL and RL
460-83781-3	BF-5L-UT-5c-01-20141001	PYRENE	19	J	ug/kg	J	Result between MDL and RL
460-83781-6	BF-5L-UT-6c-01-20141001	BENZO(B) FLUORANTHENE	17	J	ug/kg	J	Result between MDL and RL
460-83781-6	BF-5L-UT-6c-01-20141001	FLUORANTHENE	18	J	ug/kg	J	Result between MDL and RL
460-83781-6	BF-5L-UT-6c-01-20141001	PYRENE	24	J	ug/kg	J	Result between MDL and RL
460-83792-3	BF-ORI-HS-5c-01-20141001	BENZO(G,H,I) PERYLENE	28	J	ug/kg	J	Result between MDL and RL
460-83792-3	BF-ORI-HS-5c-01-20141001	CHRYSENE	110	J	ug/kg	J	Result between MDL and RL
460-83792-3	BF-ORI-HS-5c-01-20141001	FLUORANTHENE	190	J	ug/kg	J	Result between MDL and RL
460-83792-3	BF-ORI-HS-5c-01-20141001	FLUORENE	17	J	ug/kg	J	Result between MDL and RL
460-83792-3	BF-ORI-HS-5c-01-20141001	INDENO(1,2,3-C,D) PYRENE	35	J	ug/kg	J	Result between MDL and RL
460-83792-3	BF-ORI-HS-5c-01-20141001	PHENANTHRENE	94	J	ug/kg	J	Result between MDL and RL
460-83792-3	BF-ORI-HS-5c-01-20141001	PYRENE	120	J	ug/kg	J	Result between MDL and RL
460-84428-3	BF-ORI-HS-6c-01-20141013	BENZO(A)PYRENE	30	J	ug/kg	J	Result between MDL and RL
460-84428-3	BF-ORI-HS-6c-01-20141013	BENZO(K) FLUORANTHENE	23	J	ug/kg	J	Result between MDL and RL
460-84428-3	BF-ORI-HS-6c-01-20141013	CHRYSENE	44	J	ug/kg	J	Result between MDL and RL
460-84428-3	BF-ORI-HS-6c-01-20141013	FLUORANTHENE	33	J	ug/kg	J	Calibration drift (%D= -22.9%); Result between MDL and RL
460-84428-3	BF-ORI-HS-6c-01-20141013	PYRENE	29	J	ug/kg	J	Result between MDL and RL
460-84432-3	BF-5L-WT-5c-01-20141013	BENZO(G,H,I) PERYLENE	46	J	ug/kg	J	Result between MDL and RL
460-84432-3	BF-5L-WT-5c-01-20141013	BENZO(K) FLUORANTHENE	32	J	ug/kg	J	Result between MDL and RL
460-84432-3	BF-5L-WT-5c-01-20141013	CHRYSENE	65	J	ug/kg	J	Result between MDL and RL
460-84432-3	BF-5L-WT-5c-01-20141013	FLUORANTHENE	110	J	ug/kg	J	Calibration drift (%D= -22.9%); Result between MDL and RL
460-84432-3	BF-5L-WT-5c-01-20141013	PHENANTHRENE	53	J	ug/kg	J	Result between MDL and RL
460-84432-3	BF-5L-WT-5c-01-20141013	PYRENE	110	J	ug/kg	J	Result between MDL and RL
460-84432-6	BF-5L-WT-6c-01-20141013	BENZO(G,H,I) PERYLENE	23	J	ug/kg	J	Result between MDL and RL
460-84432-6	BF-5L-WT-6c-01-20141013	CHRYSENE	100	J	ug/kg	J	Result between MDL and RL
460-84432-6	BF-5L-WT-6c-01-20141013	CRESOLS, M & P	49	J	ug/kg	J	Result between MDL and RL
460-84432-6	BF-5L-WT-6c-01-20141013	FLUORANTHENE	170	J	ug/kg	J	Result between MDL and RL
460-84432-6	BF-5L-WT-6c-01-20141013	FLUORENE	10	J	ug/kg	J	Result between MDL and RL
460-84432-6	BF-5L-WT-6c-01-20141013	INDENO(1,2,3-C,D) PYRENE	31	J	ug/kg	J	Result between MDL and RL
460-84432-6	BF-5L-WT-6c-01-20141013	PHENANTHRENE	76	J	ug/kg	J	Result between MDL and RL
460-84432-6	BF-5L-WT-6c-01-20141013	PYRENE	110	J	ug/kg	J	Result between MDL and RL
CYANIDE							
460-78812-8	BF-ORI-HS-1C-01-20140702	CYANIDE	0.10	J	mg/kg	J	Result between MDL and RL
460-78812-9	BF-ORI-HS-1C-02-20140702	CYANIDE	0.093	J	mg/kg	J	Result between MDL and RL
460-80767-3	BF-ORI-HS-2c-01-20140807	CYANIDE	0.083	J	mg/kg	J	Result between MDL and RL
460-83781-6	BF-5L-UT-6c-01-20141001	CYANIDE	0.11	J	mg/kg	J	Result between MDL and RL

1) Results in red have been elevated to the reporting limit per the NFG. The laboratory reported a detect between the MDL and RL for this analyte, but the result has been qualified (U flag) and raised to the reporting limit due to laboratory or field contamination.

TABLE 5

REVERE SMELTING AND REFINING SITE OPERABLE UNIT 1

Phase II-B Remedial Design/ Remedial Action

Backfill and Post-Excavation Confirmation Samples

May 2014 to October 2014

FIELD DUPLICATE RESULTS

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-81232-2	460-81232-3	ECS-AREA 11-G5-F-20140815	ARSENIC	6.2		mg/kg	4		mg/kg	2.2	7.4	NA	y
460-81232-2	460-81232-3	ECS-AREA 11-G5-F-20140815	LEAD	92.1		mg/kg	61.6		mg/kg	30.5	5	40	NO
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	1,1,1-TRICHLOROETHANE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	1,1-DICHLOROETHANE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	1,1-DICHLOROETHENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	1,2,4-TRIMETHYLBENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	1,2-DICHLOROBENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	1,2-DICHLOROETHANE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	1,3-DICHLOROBENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	1,4-DICHLOROBENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	1,4-DIOXANE (P-DIOXANE)	19	U	ug/kg	23	U	ug/kg	4	46	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	ACETONE	4.8	U	ug/kg	18	B	ug/kg	13.2	11.6	NA	NO
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	BENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	CARBON TETRACHLORIDE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	CHLOROBENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	CHLOROFORM	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	CIS-1,2-DICHLOROETHYLENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	ETHYLBENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	METHYL ETHYL KETONE (2-BUTANONE)	4.8	U	ug/kg	5.8	U	ug/kg	1	11.6	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	METHYLENE CHLORIDE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	N-BUTYLBENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	N-PROPYLBENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	SEC-BUTYLBENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	T-BUTYLBENZENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	TERT-BUTYL METHYL ETHER	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	TETRACHLOROETHYLENE(PCE)	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	TOLUENE	0.97	U	ug/kg	1.2	U	ug/kg	0.23	2.4	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	TRANS-1,2-DICHLOROETHENE	0.97 U ug/kg	1.2 U ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	TRICHLOROETHYLENE (TCE)	0.97 U ug/kg	1.2 U ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	VINYL CHLORIDE	0.97 U ug/kg	1.2 U ug/kg	0.23	2.4	NA	y
460-82730-1	460-82730-2	BF-5L-UT-4g-01-20140912	XYLENES, TOTAL	1.9 U ug/kg	2.3 U ug/kg	0.4	4.6	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ARSENIC	5.5 mg/kg	4.4 mg/kg	1.1	5.8	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	BARIUM	82.6 mg/kg	70.5 mg/kg	12.1	76.6	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	BERYLLIUM	0.62 mg/kg	0.52 mg/kg	0.1	0.76	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	CADMIUM	0.77 U mg/kg	0.74 U mg/kg	0.03	1.54	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	CHROMIUM, TOTAL	19.5 mg/kg	19 mg/kg	0.5	3.8	2.6	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	COPPER	22 mg/kg	18.8 mg/kg	3.2	9.6	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	LEAD	22.2 mg/kg	17.4 mg/kg	4.8	3.8	24	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	MANGANESE	719 mg/kg	551 mg/kg	168	5.8	26	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	NICKEL	22.3 mg/kg	22.3 mg/kg	0	15.4	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	SELENIUM	3.8 U mg/kg	3.7 U mg/kg	0.1	7.6	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	SILVER	0.38 J mg/kg	1.9 U mg/kg	1.52	3.8	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ZINC	80.5 mg/kg	72.2 mg/kg	8.3	11.6	11	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	CHROMIUM, HEXAVALENT	2.6 U mg/kg	2.4 U mg/kg	0.2	5.2	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	CHROMIUM III	19.5 mg/kg	19 mg/kg	0.5	4	2.6	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	MERCURY	0.057 mg/kg	0.053 mg/kg	0.004	0.04	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ALDRIN	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ALPHA ENDOSULFAN	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	BETA ENDOSULFAN	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	CHLORDANE	85 U ug/kg	79 U ug/kg	6	170	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	DIELDRIN	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ENDOSULFAN SULFATE	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ENDRIN	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ENDRIN ALDEHYDE	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ENDRIN KETONE	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	GAMMA BHC (LINDANE)	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	HEPTACHLOR	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	HEPTACHLOR EPOXIDE	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	METHOXYCHLOR	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	P,P'-DDD	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	P,P'-DDE	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	P,P'-DDT	8.5 U ug/kg	7.9 U ug/kg	0.6	17	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	TOXAPHENE	85 U ug/kg	79 U ug/kg	6	170	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PCB-1016 (AROCLOR 1016)	85 U ug/kg	79 U ug/kg	6	170	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PCB-1221 (AROCLOR 1221)	85 U ug/kg	79 U ug/kg	6	170	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PCB-1232 (AROCLOR 1232)	85 U ug/kg	79 U ug/kg	6	170	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PCB-1242 (AROCLOR 1242)	85 U ug/kg	79 U ug/kg	6	170	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PCB-1248 (AROCLOR 1248)	85 U ug/kg	79 U ug/kg	6	170	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PCB-1254 (AROCLOR 1254)	85 U ug/kg	79 U ug/kg	6	170	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PCB-1260 (AROCLOR 1260)	85 U ug/kg	79 U ug/kg	6	170	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	SILVEX (2,4,5-TP)	22 U ug/kg	20 U ug/kg	2	44	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	2-METHYLPHENOL (O-CRESOL)	420 U ug/kg	390 U ug/kg	30	840	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ACENAPHTHENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ACENAPHTHYLENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	ANTHRACENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	BENZO(A)ANTHRACENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	BENZO(A)PYRENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	BENZO(B)FLUORANTHENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	BENZO(G,H,I)PERYLENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	BENZO(K)FLUORANTHENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	CHRYSENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	CRESOLS, M & P	420 U ug/kg	390 U ug/kg	30	840	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	DIBENZ(A,H)ANTHRACENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	DIBENZOFURAN	420 U ug/kg	390 U ug/kg	30	840	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	FLUORANTHENE	84 U ug/kg	44 J ug/kg	40	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	FLUORENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	HEXACHLOROBENZENE	420 U ug/kg	390 U ug/kg	30	840	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	INDENO(1,2,3-C,D)PYRENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	NAPHTHALENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PENTACHLOROPHENOL	1000 U ug/kg	980 U ug/kg	20	2000	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PHENANTHRENE	84 U ug/kg	79 U ug/kg	5	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PHENOL	420 U ug/kg	390 U ug/kg	30	840	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	PYRENE	84 U ug/kg	42 J ug/kg	42	168	NA	y
460-82730-4	460-82730-5	BF-5L-UT-4c-01-20140912	CYANIDE	0.16 mg/kg	0.13 mg/kg	0.03	0.26	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	1,1,1-TRICHLOROETHANE	1.7 U ug/kg	1 U ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	1,1-DICHLOROETHANE	1.7 U ug/kg	1 U ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	1,1-DICHLOROETHENE	1.7 U ug/kg	1 U ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	1,2,4-TRIMETHYLBENZENE	1.4 J ug/kg	1 U ug/kg	0.4	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	1,2-DICHLOROBENZENE	1.7 U ug/kg	1 U ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	1,2-DICHLOROETHANE	1.7 U ug/kg	1 U ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.7 U ug/kg	1 U ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	1,3-DICHLOROBENZENE	1.7 U ug/kg	1 U ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	1,4-DICHLOROBENZENE	1.7 U ug/kg	1 U ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	1,4-DIOXANE (P-DIOXANE)	34 U ug/kg	20 U ug/kg	14	68	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	ACETONE	46	B	ug/kg	28	B	ug/kg	18	17.2	49	NO
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	BENZENE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	CARBON TETRACHLORIDE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	CHLOROBENZENE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	CHLOROFORM	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	CIS-1,2-DICHLOROETHYLENE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	ETHYLBENZENE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	METHYL ETHYL KETONE (2-BUTANONE)	8.6	U	ug/kg	5.1	U	ug/kg	3.5	17.2	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	METHYLENE CHLORIDE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	N-BUTYLBENZENE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	N-PROPYLBENZENE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	SEC-BUTYLBENZENE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	T-BUTYLBENZENE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	TERT-BUTYL METHYL ETHER	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	TETRACHLOROETHYLENE(PCE)	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	TOLUENE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	TRANS-1,2-DICHLOROETHENE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	TRICHLOROETHYLENE (TCE)	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	VINYL CHLORIDE	1.7	U	ug/kg	1	U	ug/kg	0.7	3.4	NA	y
460-82735-2	460-82735-3	BF-ORI-WT-3g-02-20140912	XYLENES, TOTAL	3.4	U	ug/kg	2	U	ug/kg	1.4	6.8	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ARSENIC	4.9		mg/kg	4.6		mg/kg	0.3	9	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	BARIUM	76.6		mg/kg	84.8		mg/kg	8.2	121.2	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	BERYLLIUM	0.61	U	mg/kg	0.34	J	mg/kg	0.27	1.22	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	CADMIUM	1.2	U	mg/kg	0.95	U	mg/kg	0.25	2.4	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	CHROMIUM, TOTAL	12.3		mg/kg	15.4		mg/kg	3.1	6	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	COPPER	36.6		mg/kg	27.3		mg/kg	9.3	15.2	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	LEAD	27.8		mg/kg	26.1		mg/kg	1.7	6	6.3	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	MANGANESE	570		mg/kg	575		mg/kg	5	9	0.87	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	NICKEL	15.6		mg/kg	16.5		mg/kg	0.9	24.2	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	SELENIUM	6.1	U	mg/kg	4.8	U	mg/kg	1.3	12.2	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	SILVER	3	U	mg/kg	2.4	U	mg/kg	0.6	6	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ZINC	106		mg/kg	97.3		mg/kg	8.7	18.2	8.6	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	CHROMIUM, HEXAVALENT	3.8	U	mg/kg	3.2	U	mg/kg	0.6	7.6	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	CHROMIUM III	12.3		mg/kg	15.4		mg/kg	3.1	4	22	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	MERCURY	0.047		mg/kg	0.043		mg/kg	0.004	0.058	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ALDRIN	13	U	ug/kg	11	U	ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	13	U	ug/kg	11	U	ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ALPHA ENDOSULFAN	13	U	ug/kg	11	U	ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	13	U	ug/kg	11	U	ug/kg	2	26	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	BETA ENDOSULFAN	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	CHLORDANE	130 U ug/kg	110 U ug/kg	20	260	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	DIELDRIN	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ENDOSULFAN SULFATE	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ENDRIN	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ENDRIN ALDEHYDE	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ENDRIN KETONE	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	GAMMA BHC (LINDANE)	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	HEPTACHLOR	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	HEPTACHLOR EPOXIDE	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	METHOXYCHLOR	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	P,P'-DDD	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	P,P'-DDE	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	P,P'-DDT	13 U ug/kg	11 U ug/kg	2	26	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	TOXAPHENE	130 U ug/kg	110 U ug/kg	20	260	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PCB-1016 (AROCLOR 1016)	130 U ug/kg	110 U ug/kg	20	260	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PCB-1221 (AROCLOR 1221)	130 U ug/kg	110 U ug/kg	20	260	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PCB-1232 (AROCLOR 1232)	130 U ug/kg	110 U ug/kg	20	260	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PCB-1242 (AROCLOR 1242)	130 U ug/kg	110 U ug/kg	20	260	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PCB-1248 (AROCLOR 1248)	130 U ug/kg	110 U ug/kg	20	260	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PCB-1254 (AROCLOR 1254)	130 U ug/kg	110 U ug/kg	20	260	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PCB-1260 (AROCLOR 1260)	130 U ug/kg	110 U ug/kg	20	260	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	SILVEX (2,4,5-TP)	32 U ug/kg	27 U ug/kg	5	64	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	2-METHYLPHENOL (O-CRESOL)	620 U ug/kg	2600 U ug/kg	1980	5200	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ACENAPHTHENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ACENAPHTHYLENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	ANTHRACENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	BENZO(A)ANTHRACENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	BENZO(A)PYRENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	BENZO(B)FLUORANTHENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	BENZO(G,H,I)PERYLENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	BENZO(K)FLUORANTHENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	CHRYSENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	CRESOLS, M & P	620 U ug/kg	2600 U ug/kg	1980	5200	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	DIBENZ(A,H)ANTHRACENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	DIBENZOFURAN	620 U ug/kg	2600 U ug/kg	1980	5200	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	FLUORANTHENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	FLUORENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	HEXACHLOROBENZENE	620 U ug/kg	2600 U ug/kg	1980	5200	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	INDENO(1,2,3-C,D)PYRENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	NAPHTHALENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PENTACHLOROPHENOL	1600 U ug/kg	6500 U ug/kg	4900	13000	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PHENANTHRENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PHENOL	620 U ug/kg	2600 U ug/kg	1980	5200	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	PYRENE	130 U ug/kg	520 U ug/kg	390	1040	NA	y
460-82735-4	460-82735-5	BF-ORI-WT-3c-01-20140912	CYANIDE	0.22 mg/kg	0.22 mg/kg	0	0.38	NA	y
460-82904-2	460-82904-3	ECS-AREA 3-V16-F-20140916	ARSENIC	4 mg/kg	3.9 mg/kg	0.1	6.4	NA	y
460-82904-2	460-82904-3	ECS-AREA 3-V16-F-20140916	LEAD	13.3 mg/kg	14.2 mg/kg	0.9	4.2	6.5	y
460-84379-1	460-84379-2	ECS-AREA2-R15-F-20141010	ARSENIC	11.3 mg/kg	12.4 mg/kg	1.1	7.2	NA	y
460-84379-1	460-84379-2	ECS-AREA2-R15-F-20141010	LEAD	15.5 mg/kg	14.4 mg/kg	1.1	4.8	7.4	y

Note: The RPD test ($\leq$35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test ($\leq$ 2x RL) applies.

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact		Project Number/ Manager: E7976G/ Jenny Self		
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC 2014)		QC Level: IV		
Laboratory: TestAmerica (Edison, Buffalo, Nashville)		Laboratory Job No: see below		
Reviewer: Taryn Scholz		Date Checked: 11/5/14		
Parameters: TCLP Pb, Metals, CrIII/VI, Pesticide, PCB, Herbicide, VOC, SVOC, CN		Methods: 1311/6010C, 6010C/7471B, 7196A, 8081B, 8082A, 8151A, 5035/8260C, 8270D, 9012B		
ITEM	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
Laboratory NELAP/ELAP accredited?	x			#11452 for Edison, 10026 for Buffalo and 11342 for Nashville
Signed Narrative included?	x			see Comment no. 1
Narrative issues noted by lab?	x			See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			see Comment no. 1 A
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required); see Comment no. 1B
COCs properly executed and seals used?		x		see Comment no. 2
Samples received within 2 days?		x		(DER10 - recommended) 460-82849-1 & 460-84379-1 rec'd day 3
Analytical Results				
All requested analyses reported?		x		see Comment no. 2A, 2B
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL) see Comment no. 3
RLs acceptable?		x		(ASP Exh C Part III and/or DER-10 App 5) see Comment no. 4
No elevated RLs for NDs?		x		Two TALBUFF 8081 sx at 20x (460-78812-8 & 9); two 8270 sx at 2x (460-82155-8 & -9) and one at 5x (460-82735-5) Note: 4x std dilution for total metals in soil (TALED), 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D); (5035 used for VOC soils this phase) see Comment no. 5
If analytical cleanup used, method ref included and approved?	x			(ASP Exh D) see Comment no. 6
Sample matrix included?	x			see Comment no. 7
Soils on dry weight basis?	x*			
Correct and consistent units?	x			Organics in ug/L (TBs) and ug/kg for rest exc 8270 SU 2-FP for TALNASH in mg/kg; Inorganics in mg/kg or ug/L (TCLP)
Holding time to analysis not expired?	x**			(Workplan Table 2, SW846 for those not in table per ASP Exh I, which gives only aq HTs) Hg 28-d, Herb 14/40-d, Cr VI 30/7-d, CN 14-d
Holding time to preparation not expired?	x**			same as above
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory		x		No trip blank for BF samples in 460-80767-1, 460-81561-1, 460-82584-1, 460-82585-1, 460-82735-1, 460-83311-1, 460-83792-1, 460-84432-1
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)		x		Total samples = 59 confirmation (20/44 TCLP/Total) + 35 BF comp + 88 BF grab = 182; Total FD = 7 (0/3 conf + 2 comp + 2 grab) -> Low for BF grab 8260
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible		x		MS/LR used for metals (ICP, Hg, Cr VI - %R not reported for calc Cr III); only 2 field MS/MSD (conf for Total As/Pb) - met for all with lab MS/MSD except TAL Metals and VOCs each with no MS/MSD
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 5638/5666=99.5%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-75773-1, 460-76301-1, 460-78812-1, 460-79992-1, 460-80009-1, 460-80015-1, 460-80075-1, 460-80130-1, 460-80767-1 , 460-80768-1, 460-80888-1, 460-80971-1, 460-81078-1, 460-81232-1, 460-81552-1, 460-81561-1, 460-81634-1, 460-81749-1, 460-81828-1, 460-82155-1, 460-82246-1, 460-82461-1, 460-82584-1, 460-82585-1, 460-82657-1, 460-82730-1, 460-82735-1, 460-82849-1, 460-82904-1, 460-82981-1, 460-83056-1, 460-83311-1, 460-83312-1, 460-83693-1, 460-83781-1, 460-83792-1, 460-83871-1, 460-84043-1, 460-84193-1, 460-84379-1, 460-84428-1, 460-84432-1, 460-84593-1

*For the 7196A analyses, Cr III is shown as not dry-weight corrected. However, Cr III is calculated from the results for Cr VI and Total Cr, which are dry-weight corrected, and thus the Cr III is not directly dry-weight corrected but is on a dry-weight basis.

** The holding time was calculated using dates only without regard to the time of day since all holding times are greater than 24 hours. Also, note that Cr III is a calculated result and the holding time check does not apply for this analyte.

1. Signature is on the cover page with certification statement. Some work orders also include separate signed certification page. Language is similar on both so no further action taken.

1A. For work order 460-83792-1, sample BF-ORI-HS-5c-01 is reported with a sample collection time of 13:05. The actual time as shown on the custody record is 15:05. The sample collection date is correctly reported as 10/1/2014 and the pass/fail status for the holding time checks is not affected, and thus no further action was taken.

1B. For work orders 460-80075-1 and 460-82461-1, some containers were received broken. Samples were transferred to new containers upon receipt. Analyses performed for metals and non-volatile organics, and thus this is not considered to significantly affect data quality and no further action was taken. For work order 460-82730-1, the VOC vial containing methanol was received broken for sample BF-5L-UT-4g-01. Low-level VOC analysis was performed using remaining vials. For work order 460-81828-1, one of the two 8-ounce jars collected on 8/27/14 was received broken with contents emptied into cooler. A second aliquot was collected on 9/3/14 and sent to the laboratory to be used as needed. All analyses were performed using the remaining container from 8/27/14.

2. Issues for custody records:

For work orders 460-75773-1, 460-79992-1, 460-80009-1, 460-80015-1, 460-80075-1, and 460-80130-1, the documentation indicates that no custody seals were used for the transfer of the samples from the field to the laboratory. The samples were transferred by commercial, overnight courier and were received in good condition, and thus no further action was taken.

For work order 460-80015-1, the sampler did not sign and date the custody record upon release of the samples to the overnight courier. The laboratory signed upon receipt from the courier and the samples were received in good condition, and thus no further action was taken.

For work order 460-80075-1, the sampler entered 7/24/14 as the relinquished date on the custody record. The actual date is 7/25/14 per the sample collection and laboratory receipt dates. For work order 460-80130-1, the sampler entered 7/24/14 as the relinquished date on the custody record. The actual date is 7/28/14 per the sample collection and laboratory receipt dates.

For work order 460-81232-1, the laboratory entered 8/15/14 as the received date on the custody record. The actual date is 8/16/14 per the sample collection and relinquish dates and as shown in the laboratory report. For work orders 460-82584-1 and 460-82585-1, the laboratory entered 9/10/14 as the received date on the custody record. The actual date is 9/11/14 per the sample collection and relinquish dates and as shown in the laboratory report.

For work orders 460-82461-1, 460-82584-1, 460-82585-1, 460-82730-1, and 460-82735-1, the documentation indicates that no custody seals were used for the transfer of the SVOC sample aliquots from TestAmerica-Edison to TestAmerica-Nashville. The samples were transferred by commercial, overnight courier and were received in good condition, and thus no further action was taken.

For work order 460-84428-1, the sample IDs on the custody record do not match those on the sample labels. The sampler revised the custody record to include the correct IDs as shown on the labels.

2A. For work order 460-82585-1, a trip blank is listed on the custody record but was not received and thus not logged in or analyzed. For work orders 460-79992-1, 460-80075-1, and 460-80130-1, results for the post stabilization verification (PSV) samples that appear on the custody record are reported separately per ENTACT's request.

2B. For work order 460-78812-1, the 8081B Pesticide analyses were performed by TestAmerica-Buffalo in Amherst, NY. For work orders 460-82461-1, 460-82584-1, 460-82585-1, 460-82730-1, and 460-82735-1, the 8270D SVOC analyses were performed by TestAmerica-Nashville. TestAmerica-Nashville also performed the 6010C ICP Metals analyses for work order 460-82849-1.

3. Analyte List:

P1 WP Table 3, P2A/B WP Table 2/4, and DER10 App5 list m-cresol, o-cresol, and p-cresol separately. The laboratory reported m,p-cresol and o-cresol as it is not possible to separate m-cresol and p-cresol using method 8270D. P1 WP Table 3, which only lists RLs for the DER-10 metals and not the 23 TAL metals, also mistakenly lists Antimony. This metal does not appear in DER10 Appendix 5 and was not reported by the laboratory for the backfill samples.

For all BF samples (and the associated QC), the laboratory reported technical Chlordane rather than Chlordane (alpha) as listed in the workplan and DER10 Appendix 5.

For all BF samples (and the associated QC), the laboratory inadvertently reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of just the DER-10 analytes as requested. Note: These extra analytes are all ND in the samples.

For the LB/BS/BD - the lab reported m,p-Xylene and o-Xylene. For the LB, Xylenes (total) is also reported.

Note: The analyte names in the hardcopy report differ from those in the EDD for some analytes.

4. The MQL (Unadj) for several DER-10 analytes is above the CRQL, but in each case, it is below the Allowable Constituent Level in DER10 App 5 except for Pentachlorophenol for the TALNASH samples. The actual lab RL is above the CRQL and the ACL in DER10 App5 for this analyte/lab. The MDL is < 1/6 the ACL and J-values are reported, so NDs for undiluted samples may show conformance.. Additionally, the MQL (Unadj) for the TAL metal Iron is above the CRQL (for TALED and TALNASH). There are no action levels for this analyte.

5. Update IV methods (6010C, 7471B, 8260C, 8270D) used instead of Update III as in WP. Prep method for 6010C total metals in soils shown as SW3020B in EDD, validator changed all to SW3050B per the pdf report and as confirmed correct by the laboratory.
6. Per laboratory, Florisil cleanup (SW3620C) used for Pesticide analyses and sulfuric acid cleanup (SW3665A) used for PCB analyses (not indicated in package exc on prep log nor in EDD). Hg cleanup also used for 8081 samples in 460-80009-1. No cleanup used for SVOC or Herbicides.
7. For laboratory work order 460-82155-1, the results for the trip blank are reported in mg/Kg and the matrix is shown as solid in the pdf report. Two MeOH containers were received for this blank with no low level (DI water) containers and thus was analyzed as a high level soil with results reported in soil units.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	Total Metals	All samples	Required 4x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
EN419	460-75773-1	TCLP Metals	NA	'4' qualifier indicates conc in unspiked sample > 4x spiking amount	NA
		TCLP Metals	2,3,4,5	Required 50-100x dilution prior to analysis; RLs adjusted accordingly	NA - result is not non-detect
EN420	460-76301-1	VOCs	225920 &226094	Blank contains Acetone >RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOCs	225818	CCV %R out for Acetone, samples ND, data reported	none required (applies for trip blank only)
		SVOCs	225114	LCS/MS/MSD did not come from same source as calibration standards	none required (sample results not affected)
		Herbicides	225594/3	SU %R hi on 1° column for MS, samples ND, data reported	none required (sample results not affected)
		Herbicides	15	SU %R hi, sample ND so no RE	see QC Deficiencies
		Herbicides	9,12	SU %R hi on 2° column, sample ND so no RE	see QC Deficiencies
EN421	460-78812-1	Pesticides	All samples	All 1° data reported from RTX-CLPI	NA
		Pesticides	192314/CCV-12	CCV %R low for SU (DCB) on 1° column indicating low bias	none required (sample TA results not affected)
		Pesticides?	8,8MS,8MSD,9	Required 3620C Florisil cleanup to reduce matrix interferences	noted in QA report narrative
		Pesticides	8,8MS,8MSD,9	Required 20x dilution prior to analysis due to matrix effect; RLs adjusted accordingly	noted in QA report narrative
		Pesticides	8,8MS,8MSD,9	SU %R low	see QC Deficiencies
		Pesticides	8,8MS,8MSD,9	SU recoveries not reported or not representative due to dilution	see QC Deficiencies
		Pesticides	192314/8	MS/MSD %R low for Endrin aldehyde	see QC Deficiencies
		Pesticides	192314/8	MSD RPD high for beta-BHC	see QC Deficiencies
		Pesticides	192314/8	MS/MSD recoveries not reported or not representative due to dilution	see QC Deficiencies
		Pesticides	NA	'4' qualifier indicates conc in unspiked sample > 4x spiking amount	NA
		VOCs	235888/CCVIS-3	CCV %R out for Acetone, samples flagged and reported	see QC Deficiencies
		VOCs	235888	LCSD %R high for Acetone, data flagged and reported	see QC Deficiencies
		VOCs	235888	Blank contains Acetone >RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		SVOCs	235836	CCV %R out for Indeno(1,2,3-cd)pyrene and PCP, CCVLL in control, samples analyzed per method, detects should be considered estimated	see QC Deficiencies (CCVLL not reported)
		Herbicides	8,9	SU %R hi, sample ND so no RE	see QC Deficiencies
		Total Metals	234891/9	MS %R low for Mn	see QC Deficiencies
EN422	460-79992-1	Total Metals	NA	nothing noted	NA
EN423	460-80009-1	VOCs	239196	CCV %R out for sec-Butylbenzene, n-Butylbenzene and 2-Butanone, samples ND, data reported	none required (applies for trip blank only)
		VOCs	239196	LCS/LCSD %R hi for sec-Butylbenzene and n-Butylbenzene, samples ND, data reported	none required (QC for trip blank only)
		VOCs	1,2,3,4,6,7	IS response and SU recovery out, sample re-analyzed with concurring results	see QC Deficiencies
		Pesticides	8,9	Required Hg cleanup to reduce matrix interference caused by sulfur	noted in QA report narrative
		Pesticides	239119	LCS %R hi for multiple analytes, samples ND, data reported	see QC Deficiencies
		Pesticides	239119	LB and LCS %R hi for SU (TCMX), samples ND, data reported	none required (sample TA results not affected)
		Pesticides	239208/CCV-45	CCV %R hi for Endrin ketone on 2° column, samples all ND, data qualified and reported	none required (%D=20.2, no significant effect)
		Herbicides	239096	LB, LCS and MS/MSD %R hi for SU, samples ND, data reported	none required (sample TA results not affected)
		Herbicides	239303/CCV-4 & 13	CCV %R hi for PCP on 1° column, samples ND, data reported	NA (analyte not reported for 8151 samples)
		Herbicides	239416/CCV-20	CCV %R hi for Silvex on 1° column, 2° column passes, samples ND, data reported	see QC Deficiencies (actually low)
		Herbicides	8,9	SU %R hi on 1° column, sample ND so no RE	see QC Deficiencies
EN424	460-80015-1	VOCs	1-7	IS response out, sample ND so no RE	see QC Deficiencies
		VOCs	240045	CCV %R out for Acetone, samples flagged and reported	none required (applies for trip blank only)
		VOCs	240045	LCS %R high for Acetone, data flagged and reported	none required (QC for trip blank only)
		VOCs	240050	LCS %R high for MeCl2, samples ND, data reported	see QC Deficiencies
		VOCs	240050	Blank contains Acetone >RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOCs	240050	Blank contains MeCl2 >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		Pesticides	239119	LCS %R hi for multiple analytes, samples ND, data reported	see QC Deficiencies
		Pesticides	239119	LB and LCS %R hi for SU (TCMX), samples ND, data reported	none required (sample TA results not affected)
		Pesticides	239208/CCV-45	CCV %R hi for Endrin ketone on 2° column, samples all ND, data qualified and reported	none required (%D=20.2, no significant effect)
		Herbicides	239096	LB, LCS and MS/MSD %R hi for SU, samples ND, data reported	none required (sample TA results not affected)
		Herbicides	239303/CCV-4 & 13	CCV %R hi for PCP on 1° column, samples ND, data reported	NA (analyte not reported for 8151 samples)

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
		Herbicides	9	SU %R hi on 1° column, sample ND so no RE	see QC Deficiencies
EN425	460-80075-1	Total Metals	NA	nothing noted	NA
EN426	460-80130-1	Total Metals	NA	nothing noted	NA
EN427	460-80767-1	VOCs	2	IS (1,4-Dioxane-d8) response out, only assoc TA (1,4-Dioxane) ND, data reported	see QC Deficiencies
		SVOCs	242005	CCV %R out for Benzo(g,h,i)perylene,3&4Methylphenol and Dibenz(a,h)anthracene, CCVLL in control, samples analyzed per method, detects/NDs should be considered estimated	see QC Deficiencies (CCVLL not reported)
		SVOCs	242005/3	MS %R low for PCP	see QC Deficiencies
		Pesticides	242165/CCV-22	CCV %R hi for End sulfate, samples ND, data reported	see QC Deficiencies
		Pesticides	242175/CCV-22	CCV %R hi for End sulfate and DDD on 1° column, samples ND, data reported	see QC Deficiencies (DDD actually passes)
		Pesticides	242175/CCV-45	CCV %R hi for End sulfate on both column, samples ND, data reported	see QC Deficiencies
EN428	460-80768-1	SVOCs	242005	CCV %R out for Benzo(g,h,i)perylene,3&4Methylphenol and Dibenz(a,h)anthracene, CCVLL in control, samples analyzed per method, detects/NDs should be considered estimated	see QC Deficiencies (CCVLL not reported)
		SVOCs	242005/80767-3	MS %R low for PCP	see QC Deficiencies
		Pesticides	242175/CCV-22	CCV %R hi for End sulfate and DDD on 1° column, samples ND, data reported	see QC Deficiencies (DDD actually passes)
		Pesticides	242175/CCV-45	CCV %R hi for End sulfate on both column, samples ND, data reported	see QC Deficiencies
EN429	460-80888-1	TCLP Metals	5	Required 50x dilution prior to analysis; RLs adjusted accordingly	NA - result is not non-detect
EN430	460-80971-1	TCLP Metals	NA	nothing noted	NA
EN431	460-81078-1	TCLP Metals	1	Required 25x dilution prior to analysis; RLs adjusted accordingly	NA - result is not non-detect
EN432	460-81232-1	Total Metals	NA	nothing noted	NA
EN433	460-81552-1	VOCs	5	IS (1,4-Dioxane-d8) response out, only assoc TA (1,4-Dioxane) ND, data reported	see QC Deficiencies
		VOCs	244893	LCS %R hi for trans-1,2-DCE, samples ND, data reported	none required (QC for trip blank only)
		Herbicides	8	SU %R hi, sample ND so no RE	see QC Deficiencies
		Herbicides	245178	SU %R hi for LB	none required (sample TA results not affected)
EN434	460-81561-1	SVOCs	246255	CCV %R out for Benzo(g,h,i)perylene, Dibenz(a,h)anthracene and Indeno(1,2,3-cd)perylene, samples analyzed per method, detects should be considered estimated	see QC Deficiencies
		Herbicides	245178	SU %R hi for LB	none required (sample TA results not affected)
EN435	460-81634-1	Total Metals	NA	nothing noted	NA
EN436	460-81749-1	Total Metals	NA	nothing noted	NA
EN461	460-81828-1	VOCs	246625	Blank contains MeCl2 >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOCs	246625/CCVIS-2	CCV %R out for CCl4, samples ND, data reported	see QC Deficiencies
		VOCs	246250	LCS %R high for MeCl2, samples ND, data reported	none required (QC for trip blank only)
		SVOCs	246423	CCV %R out for Dibenz(a,h)anthracene and Indeno(1,2,3-cd)perylene, samples analyzed per method, detects should be considered estimated	see QC Deficiencies
		Herbicides	8	SU %R hi on both columns, sample ND so no RE	see QC Deficiencies
EN437	460-82155-1	VOCs	10	Two MeOH containers rec'd for this trip blank, no low level (DI water) containers	noted in QA report narrative
		VOCs	247296/CCVIS-2	CCV %R out for CCl4, samples ND, data reported	see QC Deficiencies
		VOCs	1,2	IS (1,4-Dioxane-d8) response out, only assoc TA (1,4-Dioxane) ND, data reported	see QC Deficiencies
		VOCs	7	SU %R hi, sample ND so no RE	see QC Deficiencies
		SVOCs	247919	CCV %R out for Indeno(1,2,3-cd)perylene, samples analyzed per method, detects should be considered estimated	see QC Deficiencies
		SVOCs	8,9	Required 2x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
		Total Metals	247272/8	MS %R low for Mn	see QC Deficiencies
		HexCr	247078	Batch re-prepped due to low MSS %R	none required (MS is non-project)
		HexCr	247330	MSS/MSI %R low, re-prep of 247078, LCSS/LCSI pass, both data sets reported	noted in QA report narrative
EN438	460-82246-1	Total Metals	NA	nothing noted	NA
EN439	460-82461-1	VOCs	248229	CCV %R out for CCl4, samples ND, data reported	see QC Deficiencies
		Pesticides	248337/CCV-13	CCV %R hi for Endrin ketone and delta-BHC on 2° column, samples ND, data reported	see QC Deficiencies
		Pesticides	248337/CCV-33	CCV %R hi for multiple TAs, samples ND, data reported	see QC Deficiencies
		Herbicides	3	SU %R hi	see QC Deficiencies
		Herbicides	248194	SU %R hi for LB	none required (sample TA results not affected)

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
EN440	460-82584-1	VOCs	249005	Blank contains Acetone >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOCs	1,2	IS response out, sample re-analyzed with concurring results, original run reported	see QC Deficiencies
		SVOCs	190624/3	MS/MSD %R low for several analytes, matrix interference and/or non-homog since LCS within limits	see QC Deficiencies
		Pesticides	249363/CCV-53	CCV %R hi for a-BHC, d-BHC, Endrin ketone and Endrin aldehyde, samples ND, data reported	see QC Deficiencies (actually just Endosulfan sulfate and Endrin ketone)
		Herbicides	248899/CCV-16	CCV %R hi for Silvex (and non-TA 2,4,5-T) on 1° column, 2° column passes, samples ND, data reported	see QC Deficiencies (actually low)
EN441	460-82585-1	VOCs	249005	Blank contains Acetone >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOCs	2,4,5	IS (1,4-Dioxane-d8) response out, only assoc TA (1,4-Dioxane) ND, data reported	see QC Deficiencies
		SVOCs	190624/82584-3	MS/MSD %R low for several analytes, matrix interference and/or non-homog since LCS within limits	see QC Deficiencies
		Pesticides	249363/CCV-53	CCV %R hi for a-BHC, d-BHC, Endrin ketone and Endrin aldehyde, samples ND, data reported	see QC Deficiencies (actually just Endosulfan sulfate and Endrin ketone)
		Herbicides	248899/CCV-16	CCV %R hi for Silvex (and non-TA 2,4,5-T) on 1° column, 2° column passes, samples ND, data reported	see QC Deficiencies (actually low)
EN442	460-82657-1	Total Metals	NA	nothing noted	NA
EN443	460-82730-1	VOCs	249896	Blank contains Acetone >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOCs	2,3	IS response out, sample re-analyzed with concurring results, original run reported	see QC Deficiencies
		VOCs	1,2,3	SU %R hi for 1-3 surrogates	see QC Deficiencies
		Pesticides	249358	LCS %R hi for Endrin ketone on 2° column, samples ND, data reported	see QC Deficiencies
EN444	460-82735-1	VOCs	249896	Blank contains Acetone >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOCs	3	IS response out, sample re-analyzed with concurring results, original run reported	see QC Deficiencies
		VOCs	1,2	IS response out and SU recovery hi, sample re-analyzed with concurring results, original run reported	see QC Deficiencies
		SVOCs	5	Required 5x dilution prior to analysis due to nature of sample; RLs adjusted accordingly	noted in QA report narrative
		Pesticides	249358	LCS %R hi for Endrin ketone on 2° column, samples ND, data reported	see QC Deficiencies
		Herbicides	4,5	SU %R hi, sample ND so no RE	see QC Deficiencies
EN445	460-82849-1	Total Metals	192308	Blank contains Mn > RL, samples >10x blank value so no RE	see QC Deficiencies
		Total Metals	192308	Blank contains Pb >MDL but <RL so no RE	see QC Deficiencies
		Total Metals	192308	Blank contains Mn, Na >RL and Pb, Se >MDL; samples >MDL or >RL B-flagged	see QC Deficiencies
EN446	460-82904-1	Total Metals	NA	nothing noted	NA
EN447	460-82981-1	Total Metals	NA	nothing noted	NA
EN448	460-83056-1	Total Metals	NA	nothing noted	NA
EN449	460-83311-1	VOCs	252053	CCV %R hi for 2-Butanone, samples ND, data reported	see QC Deficiencies
		VOCs	252053	LCS %R hi for 2-Butanone, samples ND, data reported	see QC Deficiencies
		SVOCs	251895	CCV %R out for Indeno(1,2,3-cd)perylene, Benzo(b)fluoranthene and Dibenz(a,h)anthracene, CCVLL in control, samples analyzed per method, detects should be considered estimated	see QC Deficiencies
		HexCr	251851	Batch re-prepped due to low MSS %R, LCSS/LCSI pass	none required (MS is non-project)
		HexCr	252007	MSS %R low, re-prep of 251851, LCSS/LCSI pass, both data sets reported	noted in QA report narrative
EN450	460-83312-1	VOCs	252160	Blank contains Acetone >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOCs	252390	LCS %R hi for 1,4-Dioxane, samples ND, data reported	none required (QC for trip blank only)
		VOCs	252390	CCV %R out for Acetone and 1,4-Dioxane, samples ND, data reported	none required (applies for trip blank only)
		VOCs	1,2,5	IS response out, sample re-analyzed with concurring results, original run reported	see QC Deficiencies
		VOCs	4	IS (1,4-Dioxane-d8) response out, only assoc TA (1,4-Dioxane) ND, data reported	see QC Deficiencies
		VOCs	252160	CCV %R hi for 2-Butanone, samples ND, data reported	see QC Deficiencies
		SVOCs	251895	CCV %R out for Indeno(1,2,3-cd)perylene, Benzo(b)fluoranthene and Dibenz(a,h)anthracene, CCVLL in control, samples analyzed per method, detects should be considered estimated	see QC Deficiencies
		Herbicides	3	SU %R hi, sample ND so no RE	see QC Deficiencies
EN451	460-83693-1	Total Metals	NA	nothing noted	NA

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
EN452	460-83781-1	VOCs	254055	CCV %R out for Acetone, samples 1-5 impacted	see QC Deficiencies
		Herbicides	253511	SU %R hi for LB on both columns, samples ND, data reported	none required (sample TA results not affected)
		Herbicides	253511	SU %R hi for LCS on 1° column, samples ND, data reported	none required (sample TA results not affected)
		Herbicides	3,6	SU %R hi, sample ND so no RE	see QC Deficiencies
EN453	460-83792-1	VOCs	2	SU %R hi for 1 surrogate, other 3 pass so no RE	see QC Deficiencies
		Herbicides	253511	SU %R hi for LB on both columns, samples ND, data reported	none required (sample TA results not affected)
		Herbicides	253511	SU %R hi for LCS on 1° column, samples ND, data reported	none required (sample TA results not affected)
		Herbicides	3	SU %R hi, sample ND so no RE	see QC Deficiencies
		HexCr	254731	Batch re-prepped due to low MS %R	none required (MS is non-project)
		HexCr	254857	MSS %R out, re-prep of 254731, LCSS/LCSI pass, both data sets reported	noted in QA report narrative
EN454	460-83871-1	Total Metals	NA	nothing noted	NA
EN455	460-84043-1	Total Metals	NA	nothing noted	NA
EN456	460-84193-1	Total Metals	NA	nothing noted	NA
EN457	460-84379-1	Total Metals	NA	nothing noted	NA
EN458	460-84428-1	VOCs	256419	Blank contains Acetone >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOCs	256419	CCV %R hi for 2-Butanone and 1,4-Dioxane, samples ND, data reported	see QC Deficiencies
		VOCs	256519	LCS/D %R hi for TCE, samples ND, data reported	none required (QC for trip blank only)
		Pesticides	256369/CCV-67	CCV %R out for multiple analytes due to sample matrix, results confirmed by RE, data reported	see QC Deficiencies
		Pesticides	256369/84432-6	MS/D %R low for beta-BHC	see QC Deficiencies
		Herbicides	256456	SU %R hi for LB, LCS on 1° column, samples ND, data reported	none required (sample TA results not affected)
		Herbicides	256684/CCV-1	CCV %R hi for Silvex (and non-TA 2,4,5-T) on 1° column, samples ND, data reported	see QC Deficiencies
		Herbicides	256684/CCV-1	CCV %R hi for SU on 1° column, 2° column passes, data reported	none required (sample TA results not affected)
EN459	460-84432-1	VOCs	256419	Blank contains Acetone >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOCs	256419	CCV %R hi for 2-Butanone and 1,4-Dioxane, samples ND, data reported	see QC Deficiencies
		Pesticides	256369/CCV-67	CCV %R out for multiple analytes due to sample matrix, results confirmed by RE, data reported	see QC Deficiencies
		Pesticides	256369/6	MS/D %R low for beta-BHC	see QC Deficiencies
		Herbicides	256456	SU %R hi for LB, LCS on 1° column, samples ND, data reported	none required (sample TA results not affected)
		Herbicides	256684/CCV-1	CCV %R hi for Silvex (and non-TA 2,4,5-T) on 1° column, samples ND, data reported	see QC Deficiencies
		Herbicides	256684/CCV-1	CCV %R hi for SU on 1° column, 2° column passes, data reported	none required (sample TA results not affected)
		SVOCs	256915	CCV %R out for Fluoranthene, CCVLL in control, samples analyzed per method, detects should be considered estimated	see QC Deficiencies
		SVOCs	257258	LCS %R out for Benzo(a)pyrene, lab SOP allows up to 5 out for this full list spike	see QC Deficiencies
EN460	460-84593-1	Total Metals	NA	nothing noted	NA

Data Validation Checklist: Metals (Update IV)/Wet Chem

Client Name: Entact	Project Number/ Manager: E7976G/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC 2014)	QC Level: IV
Laboratory: TestAmerica (Edison, Buffalo, Nashville)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 11/5/14
Parameters: TCLP Pb, Metals, CrIII/VI, CN	Methods: 1311/3010A/6010C, 3050B**/6010C, 7471B, 3060A/7196A,

%PERFORMED/	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x*			
100	Criteria met? (< MDL, ≥ -RL)		x		see QC Deficiencies
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x*			
	All project COCs or TAs included?	x*			
100	%R criteria met?		x		method (lab*** but within 50-200%) see QC Def
	Matrix spike data included in lab package?	x*			
100	%R criteria met?		x		method (75-125%) see QC Deficiencies
	Sample duplicate data included in lab package?	x*			as LR
100	RPD criteria met?		x		method (20% if >10xMDL) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL) see QC Deficiencies
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	correl coeff criteria met? (r > 0.998 ICP, r > 0.995 AA/Hg)		x		see QC Deficiencies
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?		x		method (75-125%) see QC Deficiencies
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)		x		2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	*Intensities within limits (within ≥ 70% of calib std)?*			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

* No QC reported for Chromium III, which is calculated from the Total Chromium and Chromium VI result.

**TALNASH used prep method 3051 for 6010C total metals analyses.

***For SRMs (solid LCS), the manufacturer's established limits as reported by the lab are used. For aqueous LCS, method limit is 80-120%.

TOTAL METALS VS LEACHED - all leach results < max possible

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976G/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC 2014)	QC Level: IV
Laboratory: TestAmerica (Edison, Buffalo, Nashville)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 11/5/14
Parameters: TCLP Pb	Methods: 1311/3010A/6010C

%PERFORMED/	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			pH of fluid not reported but pH of LB leachate 4.89-4.92
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)		x		see Comment no. 1
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

1. Batch 239576 (EN422), 238946 (EN425), and 239690 (EN426) max temp 25.8 C - ok, no effect
   Batch 242210 (EN429), 242507 (EN430), and 242988 (EN431) min temp 19.5 C - ok, no effect

Data Validation Checklist: GC (Update IV)

Client Name: Entact	Project Number/ Manager: E7976G/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC 2014)	QC Level: IV
Laboratory: TestAmerica (Edison, Buffalo, Nashville)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 11/5/14
Parameters: Pesticide, PCB, Herbicide	Methods: 3546*/8081B, 3546/8082A, 8151A

%PERFORMED/ ITEM			YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)		x			
100	Criteria met for field blanks? (<MDL)				x	
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			With the exception of multi-component pesticides Chlordane (technical) and Toxaphene; only two multi-component Aroclors (1016 and 1260) spiked per method recommendations
	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?				x	
	Matrix spike data included in lab package?		x			
	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?			x		method (lab but within 40%) see QC Deficiencies
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?			x		method (lab but within 10-200%) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)		x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Initial calibration documentation included in lab package?		x			5 peaks used for all multi-comp Pest/PCB
	All target analytes included?		x			
100	%RSD criteria met? (≤20%RSD or r ≥ 0.995 **or COD ≥ 0.990**)		x			
100	DDT/Endrin %breakdown max 15%?		x			
	Calibration verification data included in lab package?		x			
100	**%D criteria met? (<20%)**			x		see Comment no. 1 and QC Deficiencies
100	Dual column/detector confirmation data incl in lab package?		x			
100	%Difference criteria met? (<40%)			x		see QC Deficiencies
10	Analyte qualitative ID criteria met?		x			
10	Analyte quantitation/RLs correct?		x			
10	QC parameters calculated correctly?		x			
	Surrogate	**Control Limits**				
PEST/ PCB	Decachlorobiphenyl	**76-149/53-150**				bold updated from P2B 2013 (32-136 for TALBUFF)
PEST/ PCB	Tetrachloro-m-xylene	**72-136**				bold updated from P2B 2013 (30-124 for TALBUFF)
HERB	2,4-DCPA	**69**-150				

COMMENTS

*TALBUFF used prep method 3550C for 8081B Pest analyses.

1. The validator did not delineate cases where the surrogate has a %D outside the criteria since surrogate recoveries for each analysis are evaluated separately.

Data Validation Checklist: GC/MS (Update IV)

Client Name: Entact			Project Number/ Manager: E7976G/ Jenny Self			
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC 2014)			QC Level: IV			
Laboratory: TestAmerica (Edison, Buffalo, Nashville)			Laboratory Job No: see DURC			
Reviewer: Taryn Scholz			Date Checked: 11/5/14			
Parameters: VOC, SVOC			Methods: 5035/8260C, 3541*/8270D			
	%PERFORMED/ ITEM		**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)			x		see QC Deficiencies
100	Criteria met for field blanks? (<MDL)			x		see QC Deficiencies
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			
100	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?		x			method (lab but within 40%)
	Matrix spike data included in lab package?		x			
100	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?		x			method (lab but within 40%)
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?			x		method (lab but within 10-200% extr, 20-200% purg)
100	Field dup RPD criteria met? (individual, mean, and overall)			x		20% aq, 35% solid (+/-2RL aq, +/-3RL sol if either≤5RL)
	Instrument Tune (12-hr) for GC/MS included in lab package?		x			
100	Instrument Tune method criteria met?		x			
	Initial calibration documentation included in lab package?		x			
	All target analytes included at min 5 levels w low≤ RL?		x			
	RRF met (Table 4)? Reject for RRF<0.05 or Table 4, whichever lower			x		see QC Deficiencies
100	**%RSD criteria met? (≤20%RSD or r ≥ 0.995 or COD ≥ 0.990)**		x			
	Calibration verification data included in lab package?		x			
	RRF met (Table 4)? Reject for RRF<0.05 or Table 4, whichever lower		x			
100	%D criteria met for CCC/TAs? (20% max)			x		see QC Deficiencies
100	Internal standard data included in lab package?		x			
100	Areas within limits (within -50/+100% of last calib check)?			x		for samples; see QC deficiencies
100	**RTs within limits (<10/30(8270) s diff from ICAL midlevel)?**		x			
10	Analyte qualitative ID criteria met?		x			
10	Analyte quantitation/RLs correct?		x			
10	IS Areas within limits (within -50/+100% of ICAL midlevel)?		x			for CCVs
10	QC parameters calculated correctly?		x			
	Surrogate	**Control Limits**				
VOC	1,2-Dichloroethane-d4	70-130				
	Toluene-d8	70-130				
	Bromofluorobenzene	70-130				
	Dibromofluoromethane	70-130				
SVOC	2,4,6-Tribromophenol	**19-114 (Oct 2014 10-120**]				Bold updated from P2B 2013 (10-120 TALNASH)
	Terphenyl-d14	**41-145 (Oct 2014 16-151**]				(13-120 TALNASH)
	2-Fluorobiphenyl	**49-112 (Oct 2014 40-109**]				(29-120 TALNASH)
	Nitrobenzene-d5	**40-106 (Oct 2014 38-105**]				(27-120 TALNASH)
	2-Fluorophenol	**39-103 (Oct 2014 37-125**]				(10-120 TALNASH)
	Phenol-d5	**44-104 (Oct 2014 41-118**]				(10-120 TALNASH)

COMMENTS

*TALNASH used prep method 3550C for 8270D SVOC analyses and TALED used 3546 beginning in October 201

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Post-Excavation Confirmation Samples

October 2014 to December 2014

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

February 13, 2015

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 4

3.0 DATA VALIDATION RESULTS 5

3.1 PRECISION 5
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 5
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 5
3.1.3 Field Duplicate (FD) Precision 5
3.2 ACCURACY 5
3.2.1 Laboratory Control Spike (LCS) Accuracy 6
3.2.2 Matrix Spike (MS) Accuracy 6
3.2.3 Serial Dilution (SD) %Difference 6
3.3 REPRESENTATIVENESS 6
3.3.1 Chain-of-Custody and Analysis Requests 6
3.3.2 Sample Preservation and Holding Time 7
3.3.3 Laboratory and Method Selection 7
3.3.4 Blanks (Laboratory and Field) 8
3.3.5 Analytical Procedures 8
3.4 COMPLETENESS 8
3.4.1 Laboratory Deliverables Completeness 8
3.4.2 EDD Correctness 8
3.4.3 Analytical Completeness 9
3.5 COMPARABILITY 9

LIST OF TABLES

Table 1 – Sample Summary
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – QC Deficiencies and Data Qualification Actions
Table 4 – Qualified Results for Field Samples
Table 5 – Field Duplicate Results

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The independent data review was completed in accord with the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 134 investigative soil samples plus the associated field QC samples, which were collected by ENTACT in October 2014 through December 2014 with the intended use of confirming that remedial goals have been achieved in excavated grids. A complete listing of the samples collected and tests performed is shown in Table 1. QAA performed a full validation of the data and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) as specified in Section 5.9 of the Workplan. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (October 2013), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The Workplan stipulates that the precision control limits will be dictated by the analytical method. The validator assessed precision using the laboratory and field duplicates, and the limits are 20-35 RPD depending upon the test. The laboratory prepared eight unspiked matrix duplicates (MD) using a sample from the site for total Arsenic/Lead and three MD using a sample from the site for TCLP Lead. The RPDs for the matrix duplicates are within the limits, which indicates good precision for the analytical technique on the given sample matrix. Additionally, the sampler collected six field duplicates (FD) for total Arsenic/Lead and two FD for TCLP Lead and the RPDs are within the limits, which indicates good precision for the sampling and analytical technique on the given matrix, or the validator qualified the results for the original and duplicate sample. Two (both for Total Lead) of the 14 pairs of results are qualified as estimated (J) based on field duplicate precision.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The Workplan stipulates that the accuracy control limits will be dictated by the analytical method. The validator assessed accuracy using the laboratory spikes and matrix spike, and the limits are either 75-125%, 80-120%, or the manufacturer's established control limit for solid reference materials (which range from 0%-209.5% for this data set). In order to better assess data usability, limits of 50-200% were employed where the method limits for a spiked analyte falls outside these values. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with each analytical batch and reported the recovery for every analyte. The recoveries for the LCS are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects, with one exception. As a result, one non-detect for Antimony is qualified as estimated (UJ) due to low laboratory spike recovery. Note that the recovery is within the laboratory limits and thus the laboratory did not take any corrective action. Additionally, the laboratory prepared eight matrix spikes (MS), post digestion spikes (PDS) and serial dilutions (SD) for total Arsenic/Lead and three MS/PDS/SD for TCLP Lead plus three PDS/SD for TAL Metals using a sample from the site. All SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy

of metals results that are substantially above the reporting limit. The MS/MSD/PDS recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the spike samples. Of the 431 total results for field samples, 31 results are qualified as estimated based on matrix spike or post digestion spike recovery. The qualification includes the expected direction of bias where known (i.e., J+ for high MS/PDS recovery and J- for low MS/PDS recovery with no other non-directional QC issues).

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, investigative samples were collected as required in the approved sampling and analysis plans. (Note that sampling is an on-going process at the site and all samples may not be reflected in this validation batch.) Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory blanks, and analytical instrument setup (i.e., calibration, interference correction, etc.). For all samples, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a preparation blank with each analytical batch and a leachate blank with each TCLP batch, and the blanks show no contamination, which indicates the samples were not affected by laboratory procedures. Additionally, proper analytical procedures were used and calibration results met the method requirements.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results (i.e., not qualified or qualified as estimated but not rejected) to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. All analyses produced valid analytical measurements, which gives a completeness of 100%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results for all field samples are reported in mg/kg with dry-weight correction for total metals and in µg/L for TCLP metals.

DATA USABILITY

All sample results are acceptable for use with the qualifications shown in Table 4. One Antimony result is qualified with a UJ and should be considered not present above the reporting limit; however the reporting limit is an estimated value. One Manganese result is qualified with a J- (biased low) and can be used for determining the presence of the analyte and as an indication that the concentration of the analyte exceeds a given criterion. However, the concentration reported for this detect may be low. Results that are qualified with a J (estimated) may be either low or high. Thirty detects for total Lead have a J flag due to low MS recovery (53-74%) with passing PDS recovery (92-93%). For those flagged due to 53% MS recovery and 93% PDS recovery (which indicates a maximum potential 2x low bias), the concentrations (21.1-196 mg/kg) are more than 2x below the 400 mg/kg remedial goal, and thus there is negligible effect on data usabillity. For those flagged due to 74%

MS recovery and 92% PDS recovery (which indicates a maximum potential 1.5x low bias), there is one concentration (537 mg/kg) above the 400 mg/kg remedial goal while the remaining concentrations (24.4-228 mg/kg) are more than 1.5x below the 400 mg/kg remedial goal, and thus there is negligible effect on data usability. Additionally, four detects for total Lead have a J flag due to poor FD precision. For results qualified due to FD precision, the higher result (i.e., from either the original or duplicate sample) should be used for project decisions. This gives a conservative approach relative to protection of the environment. (For field duplicate pairs that pass the precision criteria, the value should be selected based on accepted convention for the site and/or agency requirements, e.g., select the value reported for the original sample, the average of the two values, etc.). The remaining results with J flags are qualified solely because the concentration is between the MDL and RL. The actual value is not expected to exceed the sample RL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD), and
- Field Duplicates (FD).

Additionally, the validator examined the raw data for 10% of the sample batches (randomly selected by the validator across the various analysis dates and tests) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are 80-120% for laboratory accuracy (or the manufacturer's established control limit for solid reference materials but not less than 50% lower limit or greater than 200% upper limit) and 75-125% for matrix accuracy for metals analyses.
- Laboratory Precision – the control limit (20 RPD) as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD.
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. A data rejection limit of 30% was used for these inorganic analyses. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

No LCSD were analyzed (or required) with the samples.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every analytical batch (maximum 20 samples) and reported RPDs for all analytes. Nine project samples from the site (five of which were designated by the sampler on the custody record) were used to prepare an MD for one or more tests (with eight analyzed for total Arsenic/Lead and three analyzed for TCLP Lead). With a total of 134 investigative samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix. The validator did not evaluate MD prepared with non-project samples, since they do not reflect data quality for the site. Note that non-project MD results are included in the data packages (but not in the EDD).

All project MD RPDs are at or below the control limit.

3.1.3 FIELD DUPLICATE (FD) PRECISION

The samplers collected six FD with the 134 investigative samples, which is slightly below the Workplan requirement of one per 20 or fewer samples per sample matrix. All six FD were analyzed for total Arsenic/Lead and two were analyzed for TCLP Lead. Results for the field duplicates are summarized in Table 5.

Two pairs of results are outside the field precision criteria for Total-Pb and the validator qualified the data as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the remaining 14 pairs of FD results meet the criteria, which indicates good overall precision, and thus the validator only qualified the original and duplicate sample for the three FD deficiencies.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD), matrix spikes including post digestion spikes (MS/MSD/PDS), and serial dilutions (SD). LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD/PDS are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample

and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS for every analytical batch (maximum 20 samples) as required and reported recoveries for all analytes, with one exception:

- For the TCLP Lead analysis of 460-87286-1 (ECS-AREA2-N17-F), results for the LCS are not reported in the laboratory report, EDD, or raw data. Results in the laboratory report for a non-project MS/PDS prepared and analyzed with this sample (QC batch 268510) indicate good recovery (115% and 113%) for this non-reagent matrix, and thus laboratory performance is considered validated and no further action was taken.

For the remaining LCS, one recovery is outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS/PDS for every analytical batch (maximum 20 samples) and reported recoveries for all analytes. Nine project samples from the site (five of which were designated by the sampler on the custody record) were used to prepare an MS/PDS for one or more tests (with eight analyzed for total Arsenic/Lead and three analyzed for TCLP Lead). With a total of 134 investigative samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Additionally, three project samples from the site were used to prepare a PDS for TAL Metals. The validator did not evaluate MS/PDS prepared with non-project samples, since they do not reflect data quality for the site. Note that non-project MS/PDS results are included in the data packages (but not in the EDD).

Some MS/PDS recoveries are outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals PDS, the laboratory analyzed a SD and reported the %difference for all metals detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records and custody seals, which confirms that sample integrity was maintained. The validator noted the following regarding sample log-in at the laboratory:

- All samples were received within two days of collection as recommended in DER-10 except those in laboratory job number 460- 86780-1, which were received three days after collection in good condition.
- For laboratory job number 460-86144-1, one of two containers was received broken for sample ECS-AREA2-017-F. The aliquot was transferred to a new container upon receipt and then used for the MS and DUP metals analysis, and thus there is no effect on data quality.

The information on the custody record is correct and agrees with that reported by the laboratory except as follows:

- For laboratory job number 460-85130-1, the custody record shows an incorrect sample ID of ECS-ESTREAM-73+00-EB-R2 for sample 14. The correct sample ID (ECS-ESTREAM-73+00-WB-R2) is shown in the laboratory report per ENTACT's request.
- For laboratory job number 460-85130-1, the laboratory report shows a sample receipt time of 10:18 while the custody record shows 08:05. The sample receipt date (10/25/14) is in agreement. No action is required.
- For laboratory job number 460-85194-1, the custody record shows each of the sample IDs without the 'F' designation at the end. The correct sample IDs are shown in the laboratory report per ENTACT's request.
- For laboratory job number 460-88006-1, the analytical results, sample summary, and EDD show a sample receipt date of 12/18/14 while the custody record and laboratory narrative show 12/17/14. The validator corrected the EDD. No action was taken regarding the pdf data package.

All samples were analyzed for the tests requested on the chain-of-custody except as follows:

- For laboratory job numbers 460-85194-1, 460-85279-1, and 460-85426-1, all samples were activated for TCLP Lead analysis per ENTACT's request on 11/4/14. This analysis was not originally requested on the custody record. Results are reported separately under a -2 job number.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

The samples were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. (In some cases, the method update number used by the laboratory may differ from that in the Workplan. For example, method 6010C was used rather than 6010B for the ICP metals analysis.)

For these excavation confirmation samples, the target analyte list includes total Arsenic, total Lead, and/or TCLP Lead as requested and all Contract Laboratory Program (CLP) metals for the TAL metals. The nominal reporting limits are below the levels of concern (i.e., the remedial goals) for total Arsenic, total Lead, and TCLP Lead. There are no established levels of concern for TAL metals. The nominal reporting limits comply with the requirements in the ASP for TAL metals with the exception of Iron with a nominal reporting limit of 30 mg/kg, which is above the ASP reporting limit of 20 mg/kg.

None of the excavation confirmation samples have elevated reporting limits for a non-detect result. (Note: The laboratory dilutes all total metals samples 2-4x before analysis as standard practice. All Revere samples were diluted 4x and thus nominal reporting limits were determined at this dilution rate. The laboratory also dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate. Note that one TCLP Lead sample (ECS-AREA2-017-F) was analyzed undiluted (1x) for this event.

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation blank (and leachate blank for TCLP) for every analytical batch (maximum 20 samples) and a calibration blank for every 10 metals analyses as required per the analytical methodology. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used. No analytes were detected in the laboratory blanks.

3.3.5 ANALYTICAL PROCEDURES

The analytical procedures (initial calibration, continuing calibration verification, and interference correction), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method.

Additionally, no issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes 34 analytical batches and the validator re-calculated sample results and QC check parameters for three batches including one for total Lead, one for TCLP Lead and one for Mercury.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The NYSDEC Category B packages and EDD contain all necessary information or the laboratory submitted a revision upon request as detailed in the case narratives.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	Sample(s)	EDD Field(s)	Action
All	all laboratory QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.

Laboratory Job No.	Sample(s)	EDD Field(s)	Action
All	all 6010C total metals samples	prep_method	The validator changed the method reference from SW3020B to SW3050B based on the pdf analytical results and as confirmed by the laboratory.
460-88006-1	all field samples	sample_receipt_date	The validator changed the date of sample receipt from 12/18/14 to 12/17/14 based on the custody record and laboratory narrative.

3.4.3 ANALYTICAL COMPLETENESS

The validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. The method detection limit corresponds to the lowest concentration at which an analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which an analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results are reported in mg/kg with dry-weight correction for total metals and in µg/L for TCLP metals.

The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Excavation Confirmation Samples
October 2014 to December 2014

SAMPLE SUMMARY

Lab ID	Field ID	Date	Type	Media	Matrix	Total As/Pb	Total TAL Metals	Total Hg	TCLP Pb
460-84508-1	ECS-ESTREAM-70+00-F	10/14/14	INV	ECS	Soil	x			
460-84508-2	ECS-ESTREAM-70+00-EB	10/14/14	INV	ECS	Soil	x			
460-84508-3	ECS-ESTREAM-70+00-WB	10/14/14	INV	ECS	Soil	x			
460-84508-4	ECS-ESTREAM-70+50-F	10/14/14	INV	ECS	Soil	x			
460-84508-5	ECS-ESTREAM-70+50-EB	10/14/14	INV	ECS	Soil	x			
460-84508-6	ECS-ESTREAM-70+50-WB	10/14/14	INV	ECS	Soil	x			
460-84508-7	ECS-ESTREAM-71+00-F	10/14/14	INV	ECS	Soil	x			
460-84508-8	ECS-ESTREAM-71+00-EB	10/14/14	INV	ECS	Soil	x			
460-84508-9	ECS-ESTREAM-71+00-WB	10/14/14	INV	ECS	Soil	x			
460-84508-10	ECS-ESTREAM-71+50-F	10/14/14	INV	ECS	Soil	x			
460-84508-11	ECS-ESTREAM-71+50-EB	10/14/14	INV	ECS	Soil	x			
460-84508-12	ECS-ESTREAM-71+50-WB	10/14/14	INV	ECS	Soil	x			
460-84508-13	ECS-ESTREAM-72+00-F	10/14/14	INV	ECS	Soil	x			
460-84508-14	ECS-ESTREAM-72+00-EB	10/14/14	INV	ECS	Soil	x			
460-84508-15	ECS-ESTREAM-72+00-WB	10/14/14	INV	ECS	Soil	x			
460-84508-16	ECS-ESTREAM-72+50-F	10/14/14	INV	ECS	Soil	x			
460-84508-17	ECS-ESTREAM-72+50-EB	10/14/14	INV	ECS	Soil	x			
460-84508-18	ECS-ESTREAM-73+00-F	10/14/14	INV	ECS	Soil		x	x	
460-84508-19	ECS-ESTREAM-72+50-WB	10/14/14	INV	ECS	Soil	x			
460-84508-20	ECS-ESTREAM-73+00-EB	10/14/14	INV	ECS	Soil	x			
460-84508-21	ECS-ESTREAM-73+00-WB	10/14/14	INV	ECS	Soil	x			
460-84508-22	ECS-ESTREAM-72+50-F-X	10/14/14	FD	ECS	Soil	x			
460-84818-1	ECS-ESTREAM-70+00-FR	10/21/14	INV	ECS	Soil	x			
460-84818-2	ECS-ESTREAM-73+00 WB-R	10/21/14	INV	ECS	Soil	x			
460-85130-1	ECS-ESTREAM-70+00-EB-R	10/24/14	INV	ECS	Soil	x			
460-85130-2	ECS-ESTREAM-70+00-WB-R	10/24/14	INV	ECS	Soil	x			
460-85130-3	ECS-ESTREAM-70+50-EB-R	10/24/14	INV	ECS	Soil	x			
460-85130-4	ECS-ESTREAM-70+50-WB-R	10/24/14	INV	ECS	Soil	x			
460-85130-5	ECS-ESTREAM-71+00-EB-R	10/24/14	INV	ECS	Soil	x			
460-85130-6	ECS-ESTREAM-71+00-WB-R	10/24/14	INV	ECS	Soil	x			
460-85130-7	ECS-ESTREAM-71+50-EB-R	10/24/14	INV	ECS	Soil	x			
460-85130-8	ECS-ESTREAM-71+50-WB-R	10/24/14	INV	ECS	Soil	x			
460-85130-9	ECS-ESTREAM-72+00-EB-R	10/24/14	INV	ECS	Soil	x			
460-85130-10	ECS-ESTREAM-72+00-WB-R	10/24/14	INV	ECS	Soil	x			
460-85130-11	ECS-ESTREAM-72+50-EB-R	10/24/14	INV	ECS	Soil	x			
460-85130-12	ECS-ESTREAM-72+50-WB-R	10/24/14	INV	ECS	Soil	x			
460-85130-13	ECS-ESTREAM-73+00-EB-R	10/24/14	INV	ECS	Soil	x			
460-85130-14	ECS-ESTREAM-73+00-WB-R2	10/24/14	INV	ECS	Soil	x			
460-85194-1	ECS-AREA2-S16/17-F	10/27/14	INV	ECS	Soil	x			x
460-85194-1LR	ECS-AREA2-S16/17-FLR	10/27/14	MD	ECS	Soil	x			
460-85194-1MS	ECS-AREA2-S16/17-FMS	10/27/14	MS	ECS	Soil	x			

Lab ID	Field ID	Date	Type	Media	Matrix	Total As/Pb	Total TAL Metals	Total Hg	TCLP Pb
460-85194-2	ECS-AREA2-S18-F	10/27/14	INV	ECS	Soil	x			x
460-85194-3	ECS-AREA2-R17-F	10/27/14	INV	ECS	Soil	x			x
460-85194-4	ECS-AREA2-R18-F	10/27/14	INV	ECS	Soil	x			x
460-85194-5	ECS-AREA2-R19-F	10/27/14	INV	ECS	Soil	x			x
460-85194-6	ECS-AREA2-Q19-F	10/27/14	INV	ECS	Soil	x			x
460-85279-1	ECS-AREA2-Q18-F	10/28/14	INV	ECS	Soil	x			x
460-85426-1	ECS-AREA2-Q20-F	10/30/14	INV	ECS	Soil	x			x
460-85426-1LR	ECS-AREA2-Q20-FLR	10/30/14	MD	ECS	Soil	x			x
460-85426-1MS	ECS-AREA2-Q20-FMS	10/30/14	MS	ECS	Soil	x			x
460-85426-2	ECS-AREA2-P20-F	10/30/14	INV	ECS	Soil		x	x	x
460-85426-3	ECS-AREA2-Q20-SS	10/30/14	INV	ECS	Soil	x			x
460-85426-4	ECS-AREA2-P20-SS	10/30/14	INV	ECS	Soil	x			x
460-85426-5	ECS-AREA2-O20-F	10/30/14	INV	ECS	Soil	x			x
460-85426-6	ECS-AREA2-O20-F-X	10/30/14	FD	ECS	Soil	x			x
460-85426-7	ECS-AREA2-R19-SS	10/30/14	INV	ECS	Soil	x			x
460-85426-8	ECS-AREA2-S18-SS	10/30/14	INV	ECS	Soil	x			x
460-85480-1	ECS-ESTREAM-70+00-EB-R2	10/31/14	INV	ECS	Soil	x			
460-85480-2	ECS-ESTREAM-70+00-WB-R2	10/31/14	INV	ECS	Soil	x			
460-85480-3	ECS-ESTREAM-70+50-EB-R2	10/31/14	INV	ECS	Soil	x			
460-85480-4	ECS-ESTREAM-71+00-EB-R2	10/31/14	INV	ECS	Soil	x			
460-85480-5	ECS-ESTREAM-71+50-EB-R2	10/31/14	INV	ECS	Soil	x			
460-85480-6	ECS-ESTREAM-71+50-WB-R2	10/31/14	INV	ECS	Soil	x			
460-85480-7	ECS-ESTREAM-72+00-EB-R2	10/31/14	INV	ECS	Soil	x			
460-85480-8	ECS-ESTREAM-72+50-WB-R2	10/31/14	INV	ECS	Soil	x			
460-85480-9	ECS-ESTREAM-73+00-EB-R2	10/31/14	INV	ECS	Soil	x			
460-85553-1	ECS-AREA 2-Q17-F	11/03/14	INV	ECS	Soil	x			x
460-85633-1	ECS-ESTREAM-70+50-EB-R3	11/04/14	INV	ECS	Soil		x	x	
460-85633-2	ECS-ESTREAM-70+00-EB-R3	11/04/14	INV	ECS	Soil	x			
460-85633-3	ECS-ESTREAM-72+00-EB-R3	11/04/14	INV	ECS	Soil	x			
460-86060-1	ECS-Area2-P17-F	11/11/14	INV	ECS	Soil	x			x
460-86060-2	ECS-Area2-P17-F-X	11/11/14	FD	ECS	Soil	x			x
460-86060-3	ECS-Area2-P18-F	11/11/14	INV	ECS	Soil	x			x
460-86060-4	ECS-Area2-P19-F	11/11/14	INV	ECS	Soil	x			x
460-86144-1	ECS-AREA2-017-F	11/12/14	INV	ECS	Soil	x			x
460-86144-1LR	ECS-AREA2-017-FLR	11/12/14	MD	ECS	Soil	x			x
460-86144-1MS	ECS-AREA2-017-FMS	11/12/14	MS	ECS	Soil	x			x
460-86780-1	ECS-AREA2-019-F	11/22/14	INV	ECS	Soil	x			x
460-86780-1LR	ECS-AREA2-019-FLR	11/22/14	MD	ECS	Soil				x
460-86780-1MS	ECS-AREA2-019-FMS	11/22/14	MS	ECS	Soil				x
460-86780-2	ECS-AREA2-018-F	11/22/14	INV	ECS	Soil	x			x
460-87286-1	ECS-AREA2-N17-F	12/04/14	INV	ECS	Soil	x			x
460-87490-1	ECS-AREA2-NI8-F	12/09/14	INV	ECS	Soil	x			x
460-87659-1	ECS-Area 12-H11-SS	12/11/14	INV	ECS	Soil	x			
460-87832-1	ECS-AREA13-F10-SS	12/15/14	INV	ECS	Soil	x			
460-87832-2	ECS-AREA13-G9/10-SE	12/15/14	INV	ECS	Soil	x			
460-87832-3	ECS-AREA13-F9-SW	12/15/14	INV	ECS	Soil	x			
460-87832-4	ECS-AREA13-G8/9-SN	12/15/14	INV	ECS	Soil	x			
460-87832-5	ECS-AREA12-H9-SN	12/15/14	INV	ECS	Soil	x			

Lab ID	Field ID	Date	Type	Media	Matrix	Total As/Pb	Total TAL Metals	Total Hg	TCLP Pb
460-87832-6	ECS-AREA12-H10-SW	12/15/14	INV	ECS	Soil	x			
460-87832-7	ECS-AREA11-G6-SE	12/15/14	INV	ECS	Soil	x			
460-87832-8	ECS-AREA11-G6-SW	12/15/14	INV	ECS	Soil	x			
460-87832-9	ECS-AREA11-G/F7-SS	12/15/14	INV	ECS	Soil	x			
460-87832-10	ECS-AREA11-G5-SN	12/15/14	INV	ECS	Soil	x			
460-87832-11	ECS-AREA8-H5-SS	12/15/14	INV	ECS	Soil		x	x	
460-87832-12	ECS-AREA8-G4/5-SW	12/15/14	INV	ECS	Soil	x			
460-87832-13	ECS-AREA8-G3/4-SW	12/15/14	INV	ECS	Soil	x			
460-87832-14	ECS-AREA8-G3-SN	12/15/14	INV	ECS	Soil	x			
460-87832-15	ECS-AREA8-H3-SE	12/15/14	INV	ECS	Soil	x			
460-87832-16	ECS-AREA8-I4-SE	12/15/14	INV	ECS	Soil	x			
460-87832-17	ECS-AREA7-K5-SS	12/15/14	INV	ECS	Soil	x			
460-87832-18	ECS-AREA7-L6-SS	12/15/14	INV	ECS	Soil	x			
460-87832-19	ECS-AREA7-L6-SS-X	12/15/14	FD	ECS	Soil	x			
460-87832-20	ECS-AREA7-M6-SS	12/15/14	INV	ECS	Soil	x			
460-87832-21	ECS-AREA7-N6-SS	12/15/14	INV	ECS	Soil	x			
460-87832-22	ECS-AREA7-N5/6-SE	12/15/14	INV	ECS	Soil	x			
460-87832-23	ECS-AREA7-M/N5-SN	12/15/14	INV	ECS	Soil	x			
460-87832-23LR	ECS-AREA7-M/N5-SNLR	12/15/14	MD	ECS	Soil	x			
460-87832-23MS	ECS-AREA7-M/N5-SNMS	12/15/14	MS	ECS	Soil	x			
460-87832-24	ECS-AREA7-L/M-5-SN	12/15/14	INV	ECS	Soil	x			
460-87832-25	ECS-AREA7-L5-SN	12/15/14	INV	ECS	Soil	x			
460-87832-26	ECS-AREA7-J/K-4-SW	12/15/14	INV	ECS	Soil	x			
460-88006-1	ECS-AREA 6-O7-SN	12/16/14	INV	ECS	Soil	x			
460-88006-1LR	ECS-AREA 6-O7-SNLR	12/16/14	MD	ECS	Soil	x			
460-88006-1MS	ECS-AREA 6-O7-SNMS	12/16/14	MS	ECS	Soil	x			
460-88006-2	ECS-AREA 6-P7-SN	12/16/14	INV	ECS	Soil	x			
460-88006-3	ECS-AREA 6-Q7-SE	12/16/14	INV	ECS	Soil	x			
460-88006-4	ECS-AREA 6-Q8-SE	12/16/14	INV	ECS	Soil	x			
460-88006-5	ECS-AREA 6-Q9-SS	12/16/14	INV	ECS	Soil	x			
460-88006-6	ECS-AREA 6-P8/9-SW	12/16/14	INV	ECS	Soil	x			
460-88006-7	ECS-AREA 6-P8-SS	12/16/14	INV	ECS	Soil	x			
460-88006-8	ECS-AREA 6-O8-SS	12/16/14	INV	ECS	Soil	x			
460-88006-9	ECS-AREA 5-X14-SS	12/16/14	INV	ECS	Soil	x			
460-88006-10	ECS-AREA 5-X13-SE	12/16/14	INV	ECS	Soil	x			
460-88006-11	ECS-AREA 5-X12-SN	12/16/14	INV	ECS	Soil	x			
460-88006-12	ECS-AREA 5-W12-SN	12/16/14	INV	ECS	Soil	x			
460-88006-13	ECS-AREA 5-W12-SW	12/16/14	INV	ECS	Soil		x	x	
460-88006-14	ECS-AREA 5-W12-SS	12/16/14	INV	ECS	Soil	x			
460-88006-15	ECS-AREA 5-X13-SW	12/16/14	INV	ECS	Soil	x			
460-88006-16	ECS-AREA 3-T/U-17-SS	12/16/14	INV	ECS	Soil	x			
460-88006-17	ECS-AREA 3-T/U-17-SS-X	12/16/14	FD	ECS	Soil	x			
460-88006-18	ECS-AREA 3-U/V-17-SS	12/16/14	INV	ECS	Soil	x			
460-88006-19	ECS-AREA 3-V16-SE	12/16/14	INV	ECS	Soil	x			
460-88006-20	ECS-AREA 3-U/V-15-SE	12/16/14	INV	ECS	Soil	x			
460-88006-21	ECS-AREA 3-U14/15-SN	12/16/14	INV	ECS	Soil	x			
460-88006-22	ECS-AREA 3-S18-SS	12/16/14	INV	ECS	Soil	x			
460-88006-22LR	ECS-AREA 3-S18-SSLR	12/16/14	MD	ECS	Soil	x			

Lab ID	Field ID	Date	Type	Media	Matrix	Total As/Pb	Total TAL Metals	Total Hg	TCLP Pb
460-88006-22MS	ECS-AREA 3-S18-SSMS	12/16/14	MS	ECS	Soil	x			
460-88006-23	ECS-AREA 3-T16-SN	12/16/14	INV	ECS	Soil	x			
460-88006-24	ECS-AREA 3-S16-SN	12/16/14	INV	ECS	Soil	x			
460-88006-25	ECS-AREA 3-U15/16-SW	12/16/14	INV	ECS	Soil	x			
460-88033-1	ECS-AREA2-S16-SE	12/17/14	INV	ECS	Soil	x			
460-88033-2	ECS-AREA2-S15-SE	12/17/14	INV	ECS	Soil	x			
460-88033-2LR	ECS-AREA2-S15-SELR	12/17/14	MD	ECS	Soil	x			
460-88033-2MS	ECS-AREA2-S15-SEMS	12/17/14	MS	ECS	Soil	x			
460-88033-3	ECS-AREA2-R14-SE	12/17/14	INV	ECS	Soil	x			
460-88033-4	ECS-AREA2-R13-SE	12/17/14	INV	ECS	Soil	x			
460-88033-5	ECS-AREA2-R12-SE	12/17/14	INV	ECS	Soil	x			
460-88033-6	ECS-AREA2-Q12-SN	12/17/14	INV	ECS	Soil		x	x	
460-88033-7	ECS-AREA2-P12-SN	12/17/14	INV	ECS	Soil	x			
460-88033-7LR	ECS-AREA2-P12-SNLR	12/17/14	MD	ECS	Soil	x			
460-88033-7MS	ECS-AREA2-P12-SNMS	12/17/14	MS	ECS	Soil	x			
460-88033-8	ECS-AREA2-O/P13-SW	12/17/14	INV	ECS	Soil	x			
460-88033-9	ECS-AREA2-O/P13-SW-X	12/17/14	FD	ECS	Soil	x			
460-88033-10	ECS-AREA2-O14-SW	12/17/14	INV	ECS	Soil	x			
460-88033-11	ECS-AREA2-O15-SW	12/17/14	INV	ECS	Soil	x			
460-88033-12	ECS-AREA2-O16-SW	12/17/14	INV	ECS	Soil	x			
460-88033-13	ECS-AREA12-H10-SE	12/17/14	INV	ECS	Soil	x			

ECS - Excavation Confirmation Sample
FD - Field Duplicate Sample
INV - Investigative Sample
MD – Matrix Duplicate Sample (unspiked)
MS - Matrix Spike Sample

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- Total As/Pb: 3050B/ 6010C for Arsenic and Lead in soil samples
- Total TAL Metals: 3050B/ 6010C for 22 ICP-AES Target Analyte List (TAL) Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc) in soil samples
- Total Hg: 7471B for total Mercury in soil samples
- TCLP Pb: 1311/ 3010A/ 6010C for Lead in leachates of soil samples

TABLE 2

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Excavation Confirmation Samples
October 2014 to December 2014

QC DEFICIENCIES AND DATA QUALIFICATION ACTIONS

Lab ID	Sample Code	Type	Method			Date and Time			DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy								
FIELD DUPLICATE (FD) PRECISION																
460-85426-6	ECS-AREA2-O20-F-X-20141030	N		3050B	6010C		11/01/14 16:27:00	11/03/14 12:55:00	4	LEAD				35	Poor field duplicate precision (130 RPD), use higher result from original sample	J to detects for original and duplicate sample
460-86060-2	ECS-Area2-P17-F-X-20141111	N		3050B	6010C		11/13/14 07:18:00	11/13/14 17:53:00	4	LEAD				35	Poor field duplicate precision (38 RPD), use higher result from field duplicate	J to detects for original and duplicate sample
LABORATORY CONTROL SPIKE (LCS) ACCURACY																
4602711552A	4602711552A	BS		3050B	6010C		12/22/14 19:07:00	12/23/14 16:20:00	4	ANTIMONY		50	200		Low laboratory control spike recovery (48.8%)	J-/UJ to detects/NDs for samples digested in the same batch
MATRIX SPIKE (MS) ACCURACY																
460-87832-23MS	ECS-AREA7-M/N5-SN-20141215MS	MS		3050B	6010C		12/19/14 07:08:00	12/19/14 16:46:00	4	LEAD	N	75	125		Low MS recovery (53%); Passing PDS recovery (93%)	J/UJ to detects/NDs for ECS samples digested in the same batch
460-88006-22MS	ECS-AREA 3-S18-SS-20141216MS	MS		3050B	6010C		12/22/14 07:41:00	12/23/14 01:49:00	4	LEAD	N	75	125		Low MS recovery (74%); Passing PDS recovery (92%)	J/UJ to detects/NDs for ECS samples digested in the same batch
POST DIGESTION SPIKE (PDS) ACCURACY																
460-88006-22PDS	ECS-AREA 3-S18-SS-20141216PDS	PDS		3050B	6010C		12/22/14 07:41:00	12/23/14 01:46:00	4	MANGANESE	N	80	120		Low PDS recovery (69%); MS recovery not reported since only As/Pb requested for parent sample (ECS-AREA 3-S18-SS)	J-/UJ to detects/NDs for ECS samples digested in the same batch
460-88033-7PDS	ECS-AREA2-P12-SN-20141217PDS	PDS		3050B	6010C		12/23/14 07:30:00	12/24/14 13:15:00	4	LEAD		80	120		Low PDS recovery (79%)	none (recovery only slightly below limit and 12/27/14 rerun of PDS passes at 99%)

CL – Control Limit
DF – Dilution Factor
LCL – Lower Control Limit
UCL – Upper Control Limit

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Excavation Confirmation Samples
October 2014 to December 2014

QUALIFIED RESULTS FOR FIELD SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-84508-3	ECS-ESTREAM-70+00-WB-20141014	ARSENIC	1.5 J mg/kg	J	Result between MDL and RL
460-84508-6	ECS-ESTREAM-70+50-WB-20141014	ARSENIC	1.6 J mg/kg	J	Result between MDL and RL
460-84508-7	ECS-ESTREAM-71+00-F-20141014	ARSENIC	2.5 J mg/kg	J	Result between MDL and RL
460-84508-8	ECS-ESTREAM-71+00-EB-20141014	ARSENIC	2.9 J mg/kg	J	Result between MDL and RL
460-84508-9	ECS-ESTREAM-71+00-WB-20141014	ARSENIC	1.7 J mg/kg	J	Result between MDL and RL
460-84508-16	ECS-ESTREAM-72+50-F-20141014	ARSENIC	1.5 J mg/kg	J	Result between MDL and RL
460-84508-18	ECS-ESTREAM-73+00-F-20141014	COBALT	9.1 J mg/kg	J	Result between MDL and RL
460-84508-22	ECS-ESTREAM-72+50-F-X-20141014	ARSENIC	2.4 J mg/kg	J	Result between MDL and RL
460-84818-1	ECS-ESTREAM-70+00-FR-20141021	ARSENIC	3.0 J mg/kg	J	Result between MDL and RL
460-84818-2	ECS-ESTREAM-73+00 WB-R-20141021	ARSENIC	3.2 J mg/kg	J	Result between MDL and RL
460-85130-11	ECS-ESTREAM-72+50-EB-R-20141024	ARSENIC	1.7 J mg/kg	J	Result between MDL and RL
460-85130-12	ECS-ESTREAM-72+50-WB-R-20141024	ARSENIC	1.6 J mg/kg	J	Result between MDL and RL
460-85194-2	ECS-AREA2-S18-F-20141027	ARSENIC	2.2 J mg/kg	J	Result between MDL and RL
460-85194-3	ECS-AREA2-R17-F-20141027	ARSENIC	2.2 J mg/kg	J	Result between MDL and RL
460-85194-4	ECS-AREA2-R18-F-20141027	ARSENIC	1.7 J mg/kg	J	Result between MDL and RL
460-85194-5	ECS-AREA2-R19-F-20141027	ARSENIC	2.6 J mg/kg	J	Result between MDL and RL
460-85194-6	ECS-AREA2-Q19-F-20141027	ARSENIC	2.4 J mg/kg	J	Result between MDL and RL
460-85426-2	ECS-AREA2-P20-F-20141030	BARIUM	34.7 J mg/kg	J	Result between MDL and RL
460-85426-2	ECS-AREA2-P20-F-20141030	BERYLLIUM	0.34 J mg/kg	J	Result between MDL and RL
460-85426-2	ECS-AREA2-P20-F-20141030	CALCIUM	729 J mg/kg	J	Result between MDL and RL
460-85426-2	ECS-AREA2-P20-F-20141030	COBALT	3.8 J mg/kg	J	Result between MDL and RL
460-85426-2	ECS-AREA2-P20-F-20141030	POTASSIUM	466 J mg/kg	J	Result between MDL and RL
460-85426-2	ECS-AREA2-P20-F-20141030	SODIUM	236 J mg/kg	J	Result between MDL and RL
460-85426-5	ECS-AREA2-O20-F-20141030	LEAD	179 mg/kg	J	Poor field duplicate precision (130 RPD), use higher result from original sample
460-85426-6	ECS-AREA2-O20-F-X-20141030	LEAD	40.6 mg/kg	J	Poor field duplicate precision (130 RPD), use higher result from original sample
460-85426-8	ECS-AREA2-S18-SS-20141030	1311 LEAD	48.6 J ug/l	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-85480-4	ECS-ESTREAM-71+00-EB-R2-20141031	ARSENIC	2.1 J mg/kg	J	Result between MDL and RL
460-85480-5	ECS-ESTREAM-71+50-EB-R2-20141031	ARSENIC	1.8 J mg/kg	J	Result between MDL and RL
460-85480-6	ECS-ESTREAM-71+50-WB-R2-20141031	ARSENIC	2.3 J mg/kg	J	Result between MDL and RL
460-85480-9	ECS-ESTREAM-73+00-EB-R2-20141031	ARSENIC	2.1 J mg/kg	J	Result between MDL and RL
460-85633-1	ECS-ESTREAM-70+50-EB-R3-20141104	CADMIUM	0.37 J mg/kg	J	Result between MDL and RL
460-85633-1	ECS-ESTREAM-70+50-EB-R3-20141104	MERCURY	0.018 J mg/kg	J	Result between MDL and RL
460-86060-1	ECS-Area2-P17-F-20141111	1311 LEAD	48.2 J ug/l	J	Result between MDL and RL
460-86060-1	ECS-Area2-P17-F-20141111	LEAD	15.9 mg/kg	J	Poor field duplicate precision (38 RPD), use higher result from field duplicate
460-86060-2	ECS-Area2-P17-F-X-20141111	LEAD	23.4 mg/kg	J	Poor field duplicate precision (38 RPD), use higher result from field duplicate
460-86060-3	ECS-Area2-P18-F-20141111	1311 LEAD	29.9 J ug/l	J	Result between MDL and RL
460-86060-3	ECS-Area2-P18-F-20141111	ARSENIC	2.9 J mg/kg	J	Result between MDL and RL
460-86780-1	ECS-AREA2-019-F-20141122	1311 LEAD	39.0 J ug/l	J	Result between MDL and RL
460-86780-1	ECS-AREA2-019-F-20141122	ARSENIC	3.0 J mg/kg	J	Result between MDL and RL
460-87286-1	ECS-AREA2-N17-F-20141204	1311 LEAD	47.3 J ug/l	J	Result between MDL and RL
460-87490-1	ECS-AREA2-NI8-F-20141209	1311 LEAD	31.4 J ug/l	J	Result between MDL and RL
460-87832-8	ECS-AREA11-G6-SW-20141215	ARSENIC	4.4 J mg/kg	J	Result between MDL and RL
460-87832-11	ECS-AREA8-H5-SS-20141215	CADMIUM	0.68 J mg/kg	J	Result between MDL and RL
460-87832-11	ECS-AREA8-H5-SS-20141215	COBALT	4.0 J mg/kg	J	Result between MDL and RL
460-87832-11	ECS-AREA8-H5-SS-20141215	POTASSIUM	820 J mg/kg	J	Result between MDL and RL
460-87832-11	ECS-AREA8-H5-SS-20141215	SODIUM	212 J mg/kg	J	Result between MDL and RL
460-87832-14	ECS-AREA8-G3-SN-20141215	ARSENIC	3.2 J mg/kg	J	Result between MDL and RL
460-87832-17	ECS-AREA7-K5-SS-20141215	LEAD	73.0 mg/kg	J	Low MS recovery (53%); Passing PDS recovery (93%)
460-87832-18	ECS-AREA7-L6-SS-20141215	LEAD	22.8 mg/kg	J	Low MS recovery (53%); Passing PDS recovery (93%)
460-87832-19	ECS-AREA7-L6-SS-X-20141215	LEAD	21.1 mg/kg	J	Low MS recovery (53%); Passing PDS recovery (93%)
460-87832-20	ECS-AREA7-M6-SS-20141215	LEAD	196 mg/kg	J	Low MS recovery (53%); Passing PDS recovery (93%)
460-87832-21	ECS-AREA7-N6-SS-20141215	LEAD	99.9 mg/kg	J	Low MS recovery (53%); Passing PDS recovery (93%)
460-87832-22	ECS-AREA7-N5/6-SE-20141215	LEAD	137 mg/kg	J	Low MS recovery (53%); Passing PDS recovery (93%)
460-87832-23	ECS-AREA7-M/N5-SN-20141215	LEAD	87.0 mg/kg	J	Low MS recovery (53%); Passing PDS recovery (93%)
460-87832-24	ECS-AREA7-L/M-5-SN-20141215	LEAD	46.4 mg/kg	J	Low MS recovery (53%); Passing PDS recovery (93%)
460-87832-25	ECS-AREA7-L5-SN-20141215	LEAD	119 mg/kg	J	Low MS recovery (53%); Passing PDS recovery (93%)

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-87832-26	ECS-AREA7-J/K-4-SW-20141215	LEAD	91.3 mg/kg	J	Low MS recovery (53%); Passing PDS recovery (93%)
460-88006-5	ECS-AREA 6-Q9-SS-20141216	LEAD	537 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-6	ECS-AREA 6-P8/9-SW-20141216	LEAD	62.3 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-7	ECS-AREA 6-P8-SS-20141216	LEAD	52.1 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-8	ECS-AREA 6-O8-SS-20141216	LEAD	75.1 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-9	ECS-AREA 5-X14-SS-20141216	LEAD	41.0 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-10	ECS-AREA 5-X13-SE-20141216	LEAD	193 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-11	ECS-AREA 5-X12-SN-20141216	ARSENIC	2.9 J mg/kg	J	Result between MDL and RL
460-88006-11	ECS-AREA 5-X12-SN-20141216	LEAD	24.4 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-12	ECS-AREA 5-W12-SN-20141216	ARSENIC	3.3 J mg/kg	J	Result between MDL and RL
460-88006-12	ECS-AREA 5-W12-SN-20141216	LEAD	48.7 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-13	ECS-AREA 5-W12-SW-20141216	CALCIUM	862 J mg/kg	J	Result between MDL and RL
460-88006-13	ECS-AREA 5-W12-SW-20141216	COBALT	3.8 J mg/kg	J	Result between MDL and RL
460-88006-13	ECS-AREA 5-W12-SW-20141216	LEAD	226 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-13	ECS-AREA 5-W12-SW-20141216	MANGANESE	276 mg/kg	J-	Low PDS recovery (69%); MS recovery not reported since only As/Pb requested for parent sample (ECS-AREA 3-S18-SS)
460-88006-13	ECS-AREA 5-W12-SW-20141216	NICKEL	9.4 J mg/kg	J	Result between MDL and RL
460-88006-13	ECS-AREA 5-W12-SW-20141216	POTASSIUM	412 J mg/kg	J	Result between MDL and RL
460-88006-14	ECS-AREA 5-W12-SS-20141216	ARSENIC	1.8 J mg/kg	J	Result between MDL and RL
460-88006-14	ECS-AREA 5-W12-SS-20141216	LEAD	89.0 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-15	ECS-AREA 5-X13-SW-20141216	LEAD	169 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-16	ECS-AREA 3-T/U-17-SS-20141216	LEAD	57.9 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-17	ECS-AREA 3-T/U-17-SS-X-20141216	LEAD	64.7 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-18	ECS-AREA 3-U/V-17-SS-20141216	LEAD	223 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-19	ECS-AREA 3-V16-SE-20141216	LEAD	89.7 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-20	ECS-AREA 3-U/V-15-SE-20141216	LEAD	150 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-21	ECS-AREA 3-U14/15-SN-20141216	LEAD	158 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-22	ECS-AREA 3-S18-SS-20141216	LEAD	69.8 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-88006-23	ECS-AREA 3-T16-SN-20141216	LEAD	171 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88006-24	ECS-AREA 3-S16-SN-20141216	LEAD	228 mg/kg	J	Low MS recovery (74%); Passing PDS recovery (92%)
460-88033-6	ECS-AREA2-Q12-SN-20141217	ANTIMONY	3.8 U mg/kg	UJ	Low laboratory control spike recovery (48.8%)
460-88033-6	ECS-AREA2-Q12-SN-20141217	CALCIUM	321 J mg/kg	J	Result between MDL and RL
460-88033-6	ECS-AREA2-Q12-SN-20141217	POTASSIUM	797 J mg/kg	J	Result between MDL and RL

TABLE 5
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Excavation Confirmation Samples
October 2014 to December 2014

FIELD DUPLICATE RESULTS

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	Max 2xRL	RPD	Pass
460-84508-16	460-84508-22	ECS-ESTREAM-72+50-F-20141014	ARSENIC	1.5 J mg/kg	2.4 J mg/kg	0.9	6.6	NA	Yes
460-84508-16	460-84508-22	ECS-ESTREAM-72+50-F-20141014	LEAD	11.1 mg/kg	10.1 mg/kg	NA	4.4	9.4	Yes
460-85426-5	460-85426-6	ECS-AREA2-O20-F-20141030	ARSENIC	4.6 mg/kg	4.2 mg/kg	0.4	7.4	NA	Yes
460-85426-5	460-85426-6	ECS-AREA2-O20-F-20141030	LEAD	179 mg/kg	40.6 mg/kg	NA	5	130	NO
460-85426-5	460-85426-6	ECS-AREA2-O20-F-20141030	1311 LEAD	83.4 ug/l	50.5 ug/l	32.9	100	NA	Yes
460-86060-1	460-86060-2	ECS-Area2-P17-F-20141111	ARSENIC	3.6 mg/kg	4.2 mg/kg	0.6	6.8	NA	Yes
460-86060-1	460-86060-2	ECS-Area2-P17-F-20141111	LEAD	15.9 mg/kg	23.4 mg/kg	NA	4.6	38	NO
460-86060-1	460-86060-2	ECS-Area2-P17-F-20141111	1311 LEAD	48.2 J ug/l	64.3 ug/l	16.1	100	NA	Yes
460-87832-18	460-87832-19	ECS-AREA7-L6-SS-20141215	ARSENIC	5.5 mg/kg	5 mg/kg	0.5	7.6	NA	Yes
460-87832-18	460-87832-19	ECS-AREA7-L6-SS-20141215	LEAD	22.8 mg/kg	21.1 mg/kg	NA	5	7.7	Yes
460-88006-16	460-88006-17	ECS-AREA 3-T/U-17-SS-20141216	ARSENIC	4.5 mg/kg	5.7 mg/kg	1.2	7.4	NA	Yes
460-88006-16	460-88006-17	ECS-AREA 3-T/U-17-SS-20141216	LEAD	57.9 mg/kg	64.7 mg/kg	NA	4.8	11	Yes
460-88033-8	460-88033-9	ECS-AREA2-O/P13-SW-20141217	ARSENIC	3.6 mg/kg	4.3 mg/kg	0.7	7.2	NA	Yes
460-88033-8	460-88033-9	ECS-AREA2-O/P13-SW-20141217	LEAD	38 mg/kg	40.8 mg/kg	NA	4.8	7.1	Yes

Note: The RPD test (≤35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test (≤ 2x RL) applies.

ATTACHMENT A

VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B ECS Oct-Dec 2014)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see below
Reviewer: Taryn Scholz	Date Checked: 1/29/15
Parameters: TCLP Pb, Metals	Methods: 1311/6010C, 6010C/7471B

ITEM	YES	NO	N/A	(CRITERIA) COMMENT
Laboratory NELAP/ELAP accredited?	x			#11452
Signed Narrative included?	x			see Comment no. 1
Narrative issues noted by lab?	x			See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required); see Comment no. 1A
COCs properly executed and seals used?	x			see Comment no. 2
Samples received within 2 days?		x		(DER10 - recommended) 460-86780-1 rec'd day 3
Analytical Results				
All requested analyses reported?	x			see Comment no. 2A
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL)
RLs acceptable?	x			(ASP Exh C Part III and/or DER-10 App 5) see Comment no. 3
No elevated RLs for NDs?	x			Note: 4x std dilution for total metals in soil (TALED), 5x std dilution for TCLP (Sample 460-86144-1 reported at 1x but DF confirmed per raw data and still ND if actually at 5x.)
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D); (5035 used for VOC soils this phase) see Comment no. 4
If analytical cleanup used, method ref included and approved?	x			(ASP Exh D)
Sample matrix included?	x			
Soils on dry weight basis?	x			
Correct and consistent units?	x			Inorganics in mg/kg or ug/L (TCLP)
Holding time to analysis not expired?	x*			(Workplan Table 2, SW846 for those not in table per ASP Exh I, which gives only aq HTs) Hg 28-d, Herb 14/40-d, Cr VI 30/7-d, CN 14-d
Holding time to preparation not expired?			x	
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory			NA	
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)		x		Total samples = 134 confirmation (128 As/Pb w 23 TCLP + 6 TAL); Total FD = 6 (6 As/Pb w 2 TCLP) -> Low for Total since none for TAL
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible	x			MS/LR used for metals (ICP, Hg) - 5 field MS/LR/PDS/SD for As/Pb w 2 TCLP plus additional lab (3 As/Pb and 1 TCLP), also 3 PDS/SD for TAL
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 431/431=100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-84508-1, 460-84818-1, 460-85130-1, 460-85194-1, 460-85194-2, 460-85279-1, 460-85279-2, 460-85426-1, 460-85426-2, 460-85480-1, 460-85553-1, 460-85633-1, 460-86060-1, 460-86144-1, 460-86780-1, 460-87286-1, 460-87490-1, 460-87659-1, 460-87832-1, 460-88006-1, 460-88033-1

* The holding time was calculated using dates only without regard to the time of day since all holding times are greater than 24 hours.

1. Signature is on the cover page with certification statement. Some work orders also include separate signed certification page. Language is similar on both so no further action taken.
1A. For job number 460-86144-1, one of two containers was received broken for sample ECS-AREA2-017-F. The aliquot was transferred to a new container upon receipt. The sample was used for the MS and DUP metals analysis, and thus there is no effect on data quality.
2. Issues for custody records:
For job number 460-85130-1, the custody record shows an incorrect sample ID of ECS-ESTREAM-73+00-EB-R2 for sample 14. The correct sample ID (ECS-ESTREAM-73+00-WB-R2) is shown in the laboratory report per Entact's request.
For job number 460-85130-1, the laboratory report shows a sample receipt time of 10:18 while the custody record shows 08:05. The sample receipt date (10/25/14) is in agreement. No action is required.
For job number 460-85194-1, the custody record shows each of the sample IDs without the 'F' designation at the end. The correct sample IDs are shown in the laboratory report per Entact's request.
For job number 460-88006-1, the analytical results, sample summary, and EDD show a sample receipt date of 12/18/14 while the custody record and laboratory narrative show 12/17/14. The validator corrected the EDD. No action was taken regarding the hardcopy data package.
2A. For job numbers 460-85194-1, 460-85279-1, and 460-85426-1, all samples were activated for TCLP Pb analysis per Entact's request on 11/4/14. This analysis was not originally requested on the custody record. Results are reported separately in a -2 job number.
3. The MQL (Unadj) for As/Pb is above the WP RL, but in each case, it is below the Remedial Goal and Allowable Constituent Level in DER10 App 5. Additionally, the MQL (Unadj) for the TAL metal Iron is above the CRQL (for TALED). There are no action levels for this analyte.
4. Update IV methods (6010C, 7471B) used instead of Update III as in WP. Prep method for 6010C total metals in soils shown as SW3020B in EDD, validator changed all to SW3050B per the pdf report and as confirmed correct by the laboratory.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	Total Metals	All samples	Required 4x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
EN464	460-84508-1	Total Metals	NA	nothing noted (non-project MS/LR deficiencies)	NA
EN465	460-84818-1	Total Metals	NA	nothing noted	NA
EN466	460-85130-1	Total Metals	NA	nothing noted (non-project MS deficiencies)	NA
EN467	460-85194-1	Total Metals	NA	nothing noted	NA
EN468	460-85194-2	TCLP Metals	NA	nothing noted	NA
EN469	460-85279-1	Total Metals	NA	nothing noted	NA
EN470	460-85279-2	TCLP Metals	NA	nothing noted	NA
EN471	460-85426-1	Total Metals	NA	nothing noted	NA
EN472	460-85426-2	TCLP Metals	NA	nothing noted	NA
EN473	460-85480-1	Total Metals	NA	nothing noted	NA
EN474	460-85553-1	Total Metals	NA	nothing noted (non-project LR deficiencies)	NA
		TCLP Metals	NA	nothing noted	NA
EN475	460-85633-1	Total Metals	NA	nothing noted (non-project MS/LR deficiencies)	NA
EN476	460-86060-1	Total Metals	NA	nothing noted	NA
		TCLP Metals	NA	nothing noted	NA
EN477	460-86144-1	Total Metals	NA	nothing noted	NA
		TCLP Metals	NA	nothing noted	NA
EN478	460-86780-1	Total Metals	NA	nothing noted	NA
		TCLP Metals	NA	nothing noted	NA
EN479	460-87286-1	Total Metals	NA	nothing noted	NA
		TCLP Metals	NA	nothing noted	NA
EN480	460-87490-1	Total Metals	NA	nothing noted	NA
		TCLP Metals	NA	nothing noted	NA
EN481	460-87659-1	Total Metals	NA	nothing noted	NA
EN482	460-87832-1	Total Metals	-23	MS %R low for Pb	see QC Deficiencies
EN483	460-88006-1	Total Metals	-22	MS %R low for Pb	see QC Deficiencies
		%Solids	-22	RPD out	none (lab QC report and raw data indicate within control at 0% RPD)
EN484	460-88033-1	Total Metals	NA	nothing noted	NA

Data Validation Checklist: Metals (Update IV)

Client Name: Entact		Project Number/ Manager: E7976H/ Jenny Self			
Site Name: Revere Smelting and Refining (Phase 2B ECS Oct-Dec 2014)		QC Level: IV			
Laboratory: TestAmerica (Edison)		Laboratory Job No: see DURC			
Reviewer: Taryn Scholz		Date Checked: 1/29/15			
Parameters: TCLP Pb, Metals		Methods: 1311/6010C, 6010C/7471B			
%PERFORMED/	**ITEM**	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?		x		see Comment no. 1
	All project COCs or TAs included?	x			
100	%R criteria met?		x		method (lab* but within 50-200%) see QC Def
	Matrix spike data included in lab package?	x			
100	%R criteria met?		x		method (75-125%) see QC Deficiencies
	Sample duplicate data included in lab package?	x			as LR
100	RPD criteria met?	x			method (20% if >10xMDL)
100	Field dup RPD criteria met? (individual, mean, and overall)		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL) see QC Deficiencies
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	correl coeff criteria met? (r > 0.998 ICP, r > 0.995 AA/Hg)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?		x		method (75-125%), see QC Deficiencies
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL, ≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	*Intensities within limits (within ≥ 70% of calib std)?*			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

*For SRMs (solid LCS), the manufacturer's established limits as reported by the lab are used. For aqueous LCS, method limit is 80-120%.

1. For the TCLP-Pb analysis of 460-87286-1 (prep batch 268510), there is no BS in the HC, EDD or raw data; non-project MS/PDS passes at 115%/113% so no further action. Additionally, for the Hg analysis of 460-88006-13 (prep batch 270908), there is no LB or BS in the EDD. Results reported in the HC so no further action.

TOTAL METALS VS LEACHED - all leach results < max possible

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B ECS Oct-Dec 2014)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 1/29/15
Parameters: TCLP Pb	Methods: 1311/3010A/6010C

%PERFORMED/ ITEM		YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			pH of fluid reported as initial pH of LB
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

EN468,470 - 260332
EN472,474 - 260618
EN476 - 262352
EN477 - 263180
EN478 - 265879
EN479 - 268335
EN480 - 268905

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Post-Stabilization Verification Samples and
Stockpile Characterization Samples

October 2014 to February 2015

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

April 6, 2015

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 3

3.0 DATA VALIDATION RESULTS 4

3.1 PRECISION 4
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 4
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 4
3.1.3 Field Duplicate (FD) Precision 4
3.2 ACCURACY 4
3.2.1 Laboratory Control Spike (LCS) Accuracy 4
3.2.2 Matrix Spike (MS) Accuracy 5
3.2.3 Serial Dilution (SD) %Difference 5
3.3 REPRESENTATIVENESS 5
3.3.1 Chain-of-Custody and Analysis Requests 5
3.3.2 Sample Preservation and Holding Time 5
3.3.3 Laboratory and Method Selection 5
3.3.4 Blanks (Laboratory and Field) 6
3.3.5 Analytical Procedures 6
3.4 COMPLETENESS 7
3.4.1 Laboratory Deliverables Completeness 7
3.4.2 EDD Correctness 7
3.4.3 Analytical Completeness 8
3.5 COMPARABILITY 8

LIST OF TABLES

Table 1 – Samples Selected for Validation
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – Qualified Results for Validated Samples
Table 4 – Field Duplicate Results for Validated Samples

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The data include seven investigative soil samples plus two field duplicate samples as shown in Table 1. The samples comprise 10% of the Phase II-B post-stabilization verification (PSV) samples and 10% of the stockpile characterization samples collected during October 2014 to February 2015. (A total of 44 PSV samples and 16 stockpile characterization samples were collected during this period.) The PSV samples were collected by ENTACT from the stabilized material stockpiles and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals to ensure that the stabilized material meets the appropriate criteria for disposal in the on-site containment cell. The stockpile characterization samples were collected by ENTACT from the excavated soil stockpiles and analyzed for TCLP lead to determine if the excavated soil would require treatment to render the material non-hazardous prior to disposal in the containment cell. These soils were excavated from the ecological areas of the site where source material, which requires treatment, is not necessarily present based on the results from the remedial investigation.

Per the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, these data are considered Level 2 and require minimal data review. Per ENTACT's request, QAA performed a full validation of the selected samples and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010). QAA completed the validation using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (October 2013), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The validator assessed precision using the field duplicates. (No laboratory duplicates were prepared using one of the site samples selected for validation.) For the samples selected for validation, the sampler collected two field duplicates with the PSV investigative samples, and the RPDs are within the limits for all metals, which indicates good precision for the sampling and analytical technique on the given matrices.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The validator assessed accuracy using the laboratory spikes. (No matrix spikes were prepared using one of the site samples selected for validation.) For the samples selected for validation, the laboratory prepared a laboratory control spike (LCS) using reagent water with each analytical batch and reported the recovery for every analyte. The LCS recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a

sufficient number of investigative samples are collected. Per ENTACT, PSV and stockpile characterization samples were collected as required in the approved sampling and analysis plan. Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory blanks, and analytical instrument setup (i.e., calibration, interference correction, etc.) For the samples selected for validation, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank and leachate blank with each analytical batch and the blanks show no contamination, which indicates the samples were not affected by laboratory procedures. Additionally, proper analytical techniques were used and calibration results met the method requirements with one exception. The validator determined that the pH of the TCLP extraction fluid was below the acceptable range as stipulated in the analytical method for one of the TCLP batches containing samples that were selected for validation. The check of the TCLP leaching procedures (including extraction fluid pH, leaching time, etc.) was expanded to include 100% of the PSV and stockpile characterization samples collected over this event period, and the validator found that all other batches meet the requirements for this method-defined parameter. The validator qualified the non-detects and detects for the four PSV samples in the affected batch as estimated (UJ and J).

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. For the samples selected for validation, all analyses produced valid analytical measurements, which gives a completeness of 100%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The PSV and stockpile characterization analytical results are classified as Level 2 data with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated. Note that results are reported in µg/L for all field samples.

DATA USABILITY

All sample results are acceptable for use. As shown in Table 3, sixteen PSV results are qualified as estimated because the pH of the TCLP extraction fluid was below the method range. These results are well below the stabilization criteria (50x or more), and thus this is not considered to significantly affect data usability. Additionally, four results are qualified solely because the concentration is between the MDL and RL. The actual value is not expected to exceed the sample RL. No other data quality issues were noted.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). For the samples selected for validation, the laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD), and
- Field Duplicates (FD).

Additionally, the validator examined the raw data for one of the four sample batches (randomly selected by the validator) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are 80-120% for laboratory accuracy and 75-125% for matrix accuracy for metals analyses.
- Laboratory Precision – the control limit (20 RPD) as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. A data rejection limit of 30% was used for these inorganic analyses. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

No LCSD were analyzed (or required) with the samples selected for validation.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every analytical batch (maximum 20 samples) and reported RPDs for all analytes. All MD RPDs are at or below the control limit. For the samples selected for validation, none of the MD were prepared using a sample from the site. Note that non-project MD results are included in the data packages but not in the EDD.

3.1.3 FIELD DUPLICATE (FD) PRECISION

For the samples selected for validation, the samplers collected two FD with the seven PSV and stockpile characterization investigative samples, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Results for the field duplicates are summarized in Table 4 and are within the criteria.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD) and matrix spikes (MS/MSD) plus serial dilutions (SD). LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

For the samples selected for validation, the laboratory analyzed a LCS for every analytical batch (maximum 20 samples) as required and reported recoveries for all analytes. All LCS recoveries are within the control limits.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS for every analytical batch (maximum 20 samples) and reported recoveries for all analytes. All MS recoveries are within the control limits. For the samples selected for validation, none of the MS were prepared using a sample from the site. Note that non-project MS results are included in the data packages but not in the EDD.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all metals detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples selected for validation were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records and custody seals, which confirms that sample integrity was maintained. No issues were noted during sample log-in at the laboratory, and all field samples were analyzed for the tests requested on the chain-of-custody. The information on the custody record is correct and agrees with that reported in the analytical results except as follows:

- For work order 460-85473-1, sample PSV-346 is reported with a sample collection time of 13:15. The actual time as shown on the custody record is 13:35. Likewise, sample PSV-347 is reported with a time of 15:10 and the actual time is 17:10. The sample collection dates are correctly reported as 10/31/2014 and the pass/fail status for the holding time checks is not affected, and thus no further action was taken.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

The samples selected for validation were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. The analyte list includes TCLP Antimony, TCLP Arsenic, TCLP Cadmium, and/or TCLP Lead as requested and the nominal reporting limits are below the levels of concern (i.e., the treatment goals) for each analyte.

(Note: The laboratory dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank and leachate blank for every analytical batch (maximum 20 samples) plus a calibration blank for every 10 metals analyses as required per the analytical methodology. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used. No analytes were detected in the laboratory blanks.

3.3.5 ANALYTICAL PROCEDURES

For the samples selected for validation, the analytical procedures (initial calibration, continuing calibration verification, and interference correction), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method, except as follows:

- For work order 460-89829-1 (which includes samples PSV-380 and PSV-380X), the laboratory worksheet for the TCLP batch indicates the pH of the extraction fluid was 4.83 SU, which is outside the acceptable range per the analytical method (4.93 +/- 0.05 SU).

TCLP is a method-defined parameter, i.e., the analytical result is wholly dependant on the process used to make the measurement. As such, changes to the method may change the end result and incorrectly identify a waste as hazardous or nonhazardous. Therefore, method 1311 is not subject to the flexibility afforded in other SW-846 methods. Section 9.1.1 (Method Performance. Ruggedness. Metals) of the method 1311 provides information about the effect of the extraction fluid pH on the leaching process, as follows:

> *Of the seven method variations examined, acidity of the extraction fluid had the greatest impact on the results. Four of 13 metals from an API separator sludge/electroplating waste (API/EW) mixture and two of three metals from an ammonia lime still bottom waste were extracted at higher levels by the more acidic buffer. Because of the sensitivity to pH changes, the method requires that the extraction fluids be prepared so that the final pH is within + 0.05 units as specified.*

To verify the validity of the entire data set, the validator expanded the check of the leaching procedures to include 100% of the PSV and stockpile characterization samples as listed below:

Media	Field IDs	Sample Dates
Post-Stabilization Verification	PSV-343 through PSV-386 plus field duplicates PSV-346-X, PSV-360-X, and PSV-380-X	10/22/14 through 2/23/15
Stockpile Characterization	C-Area-2-Stockpile-12 through C-Area-2-Stockpile-17 C-Area 8,11,12,13-Stockpile 1 C-Area 22-Stockpile-1 through C-Area 22-Stockpile-4 C-Area 22/15-Stockpile-1 through C-Area 22/15-Stockpile-5	10/22/14 through 1/21/15

The validator found that two other project samples (PSV-378 and PSV-379 from work order 460-89783-1) were included in the affected batch (TCLP batch 278962) but the TCLP leaching procedures for all of the other batches were within the method requirements.

Guidelines for qualifying TCLP results are not available in EPA's NFG, NYSDEC's DER-10 or NYDEC's ASP. The reported results the four PSV samples included in TCLP batch 278962 are shown below:

TCLP BATCH 278962						
Lab ID	**Field ID**	**Sample Date**	**Laboratory Result TCLP Metals mg/L**			
			As	**Cd**	**Pb**	**Sb**
460-89783-1	PSV-378	01/28/15	0.0267 J	0.020 U	0.050 U	0.145
460-89783-2	PSV-379	01/28/15	0.0267 J	0.020 U	0.0568	0.110
460-89829-1	PSV-380	01/29/15	0.042 J	0.020 U	0.050 U	0.0839 J
460-89829-2	PSV-380-X	01/29/15	0.0435 J	0.020 U	0.050 U	0.0859 J
Stabilization Criteria (40 CFR 268.49 and 40 CFR 261.24 Table 1)			**5**	**1**	**5**	**11.5**

The above statement from SW846 suggests that the more acidic extraction fluid used for TCLP Batch 278962 may produce results that are biased high for detects while having no significant effect on non-detects. However, using professional judgment and given the complexity of soil chemistry, the validator qualified the non-detects as estimated (UJ) and the detects as estimated (J) for the four samples in TCLP batch 278962. Note that all of the results are well below (50x or more) the stabilization criteria, which further confirms that the results are usable though estimated.

No issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes four analytical batches and the validator re-calculated sample results and QC check parameters for one batch (batch 460-265879 in work order 460- 460-86705-1).

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

For the samples selected for validation, the NYSDEC Category B data packages and EDD contain all necessary information, except as follows:

- For work order 460-86705-1, analytical results for the leachate blank for batch 460-265879 are not reported in the QC section of the data package or in the EDD. However, results are included in the raw data section and confirm that the no metals were detected in the blank, and thus no further action was taken.

Note that revisions were submitted for work orders 460-87658-1 and 460-89829-1 as detailed in the case narratives. For 460-89829-1, the case narrative was revised to include a discussion regarding the pH of the extraction fluid for TCLP Batch 278962 and states that the analyst has been re-trained on proper procedure, which includes checking the pH of TCLP fluid prior to use to verify it is within the acceptable range or preparing a new TCLP fluid, if necessary.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	Sample(s)	EDD Field(s)	Action
All	all QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.

3.4.3 ANALYTICAL COMPLETENESS

For the samples selected for validation, the validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. (Note that in some cases the laboratory used a more recent version of the method specified in the Workplan, e.g. SW846 6010C was used instead of SW846 6010B.) The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which an analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which an analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J-flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results are reported in µg/L and are classified as Level 2 data for TCLP metals with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples and
Stockpile Characterization Samples
October 2014 to February 2015

SAMPLES SELECTED FOR VALIDATION

Lab ID	Field ID	Sample Date	Type	Media	Matrix	TCLP Sb, As, Cd, Pb	TCLP Pb
460-85473-1	PSV-346	10/31/14	INV	PSV	Soil	x	
460-85473-2	PSV-346-X	10/31/14	FD	PSV	Soil	x	
460-85473-3	PSV-347	10/31/14	INV	PSV	Soil	x	
460-86705-1	PSV-362	11/21/14	INV	PSV	Soil	x	
460-86705-2	PSV-363	11/21/14	INV	PSV	Soil	x	
460-87658-1	C-Area2-Stockpile-16	12/11/14	INV	SC	Soil		x
460-87658-2	C-Area2-Stockpile-17	12/11/14	INV	SC	Soil		x
460-89829-1	PSV-380	1/29/15	INV	PSV	Soil	x	
460-89829-2	PSV-380-X	1/29/15	FD	PSV	Soil	x	

FD - Field Duplicate Sample
INV - Investigative Sample
PSV – Post-Stabilization Verification Sample
SC – Stockpile Characterization Sample

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Metals: 1311/ 3010A/ 6010C for Antimony, Arsenic, Cadmium, and/or Lead in leachates of soil samples

TABLE 2

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples and
Stockpile Characterization Samples
October 2014 to February 2015

QUALIFIED RESULTS FOR VALIDATED SAMPLES*

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-85473-1	PSV-346-20141031	1311 ANTIMONY	29.3 J ug/l	J	Result between MDL and RL
460-85473-1	PSV-346-20141031	1311 ARSENIC	22.0 J ug/l	J	Result between MDL and RL
460-86705-1	PSV-362-20141121	1311 ARSENIC	61.5 J ug/l	J	Result between MDL and RL
460-86705-2	PSV-363-20141121	1311 ARSENIC	22.5 J ug/l	J	Result between MDL and RL
460-89783-1	PSV-378-20150128	1311 ANTIMONY	145 ug/l	J	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU)
460-89783-1	PSV-378-20150128	1311 ARSENIC	26.7 J ug/l	J	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU); Result between MDL and RL
460-89783-1	PSV-378-20150128	1311 CADMIUM	20.0 U ug/l	UJ	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU)
460-89783-1	PSV-378-20150128	1311 LEAD	50.0 U ug/l	UJ	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU)
460-89783-2	PSV-379-20150128	1311 ANTIMONY	110 ug/l	J	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU)
460-89783-2	PSV-379-20150128	1311 ARSENIC	26.7 J ug/l	J	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU); Result between MDL and RL
460-89783-2	PSV-379-20150128	1311 CADMIUM	20.0 U ug/l	UJ	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU)
460-89783-2	PSV-379-20150128	1311 LEAD	56.8 ug/l	J	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU)
460-89829-1	PSV-380-20150129	1311 ANTIMONY	83.9 J ug/l	J	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU); Result between MDL and RL
460-89829-1	PSV-380-20150129	1311 ARSENIC	42.0 J ug/l	J	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU); Result between MDL and RL
460-89829-1	PSV-380-20150129	1311 CADMIUM	20.0 U ug/l	UJ	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU)
460-89829-1	PSV-380-20150129	1311 LEAD	50.0 U ug/l	UJ	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU)
460-89829-2	PSV-380-X-20150129	1311 ANTIMONY	85.9 J ug/l	J	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU); Result between MDL and RL
460-89829-2	PSV-380-X-20150129	1311 ARSENIC	43.5 J ug/l	J	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU); Result between MDL and RL
460-89829-2	PSV-380-X-20150129	1311 CADMIUM	20.0 U ug/l	UJ	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU)

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-89829-2	PSV-380-X-20150129	1311 LEAD	50.0 U ug/l	UJ	TCLP extraction fluid pH (4.83 SU) below method range (4.88-4.93 SU)

*Includes qualified results for leaching procedure check, which was performed on 100% of the samples.

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples and
Stockpile Characterization Samples
October 2014 to February 2015

FIELD DUPLICATE RESULTS FOR VALIDATED SAMPLES

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-85473-1	460-85473-2	PSV-346-20141031	1311 ANTIMONY	29.3	J	ug/l	27	U	ug/l	2.3	200	NA	y
460-85473-1	460-85473-2	PSV-346-20141031	1311 ARSENIC	22	J	ug/l	21.7	U	ug/l	0.3	150	NA	y
460-85473-1	460-85473-2	PSV-346-20141031	1311 CADMIUM	5.8	U	ug/l	5.8	U	ug/l	0	40	NA	y
460-85473-1	460-85473-2	PSV-346-20141031	1311 LEAD	23.2	U	ug/l	23.2	U	ug/l	0	100	NA	y
460-89829-1	460-89829-2	PSV-380-20150129	1311 ANTIMONY	83.9	J	ug/l	85.9	J	ug/l	2	200	NA	y
460-89829-1	460-89829-2	PSV-380-20150129	1311 ARSENIC	42	J	ug/l	43.5	J	ug/l	1.5	150	NA	y
460-89829-1	460-89829-2	PSV-380-20150129	1311 CADMIUM	5.8	U	ug/l	5.8	U	ug/l	0	40	NA	y
460-89829-1	460-89829-2	PSV-380-20150129	1311 LEAD	23.2	U	ug/l	23.2	U	ug/l	0	100	NA	y

Note: The RPD test ($\leq$35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test ($\leq$ 2x RL) applies.

ATTACHMENT A

VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact			Project Number/ Manager: E7976H/ Jenny Self	
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC Oct14-Feb15)			QC Level: II	
Laboratory: TestAmerica (Edison, NJ)			Laboratory Job No: 460-85473-1, 460-86705-1, 460-87658-1, 460-89829-1	
Reviewer: Taryn Scholz			Date Checked: 3/19/15	
Parameters: TCLP Metals			Methods: 1311/3010A/6010C	
ITEM	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
Laboratory NELAP/ELAP accredited?	x			NYDOH (NELAP) #11452, NYDOH (ELAP) #11452
Signed Narrative included?	x			
No narrative issues noted by lab?	x			see Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required)
COCs properly executed and seals used?	x			see Comment no. 1
Samples received within 2 days?	x			
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			see Comment no. 2
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL)
RLs acceptable?	x			(ASP Exh C Part III and/or DER-10 App 5)
No elevated RLs for NDs?	x			Note: 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D) see no. 2
If analytical cleanup used, method ref included and approved?			x	(ASP Exh D)
Sample matrix included?	x			
Soils on dry weight basis?			x	
Correct and consistent units?	x			in ug/L
Holding time to analysis not expired?	x			(Workplan Table 2)
Holding time to preparation not expired?	x			(Workplan Table 2)
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory			NA	
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)	x			Total samples = 5 PSV, 2 SC; Total FD = 2 PSV
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible		x		**none for PSV or SC, all non-project and in HC only not EDD**
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

1. For 460-85473-1, the laboratory sample receipt checklist indicates that no custody seal was used for transfer of the samples from the field to the laboratory; however, a custody seal was used as confirmed by the seal number entered by the laboratory on the custody record.

2. For work order 460-85473-1, sample PSV-346 is reported with a sample collection time of 13:15. The actual time as shown on the custody record is 13:35. Likewise, sample PSV-347 is reported with a time of 15:10 and the actual time is 17:10. The sample collection dates are correctly reported as 10/31/2014 and the pass/fail status for the holding time checks is not affected, and thus no further action was taken.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
EN490	460-85473-1	NA	NA	no issues noted	NA
EN491	460-86705-1	NA	NA	no issues noted	NA
EN492	460-87658-1	NA	NA	no issues noted	NA
EN493	460-89829-1	NA	NA	TCLP pH outside range for 89829, analyst re-trained	Results qualified as estimated, check expanded to 100% of samples

Data Validation Checklist: Metals/Wet Chem

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC Oct14-Feb15)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 460-85473-1, 460-86705-1, 460-87658-1, 460-89829-1
Reviewer: Taryn Scholz	Date Checked: 3/19/15
Parameters: TCLP As,Cd,Pb,Sb and TCLP Pb	Methods: 1311/3010A/6010B

	%PERFORMED/ ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			
100	%R criteria met?	x			method (lab but within 50-200%)
	Matrix spike data included in lab package?	x			all non-project, only in HC not EDD
100	%R criteria met?			x	method (75-125%)
	Sample duplicate data included in lab package?	x			as LR; all non-project, only in HC not EDD
100	RPD criteria met?			x	method (20% if >10xMDL)
100	Field dup RPD criteria met? (individual, mean, and overall)	x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL, ≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	Intensities within limits? (min 30-120% of calib std)			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC Oct14-Feb15)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 460-85473-1, 460-86705-1, 460-87658-1, 460-89829-1
Reviewer: Taryn Scholz	Date Checked: 3/19/15
Parameters: TCLP As,Cd,Pb,Sb and TCLP Pb	Methods: 1311/3010A/6010C

%PERFORMED/	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)		x		see Comment no. 1
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

TCLP Batches: 11/3 17:00, 11/28 17:30, 12/15 17:30*, 1/31 12:00

*The 1311 batch worksheet in the revised package for the work order shows an incorrect end date of 12/22/14 10:12. This date is 6.5 days after the start date for the 1311 leaching and after the start date for the digestion of the leachates as shown on the 3010 batch worksheet. The correct 1311 end date is 12/16/15 9:30, which is just a few minutes before the start of the digestion. The correct date is shown on the unrevised report and thus no further action was taken.

Comment no. 1

pH of Fluid #1 for 1/31 12:00 is 4.83 -> J/UJ to samples in this batch and check expanded to include 100% of samples for this event period as follows:

Post-Stabilization Verification: PSV-343 through PSV-386 plus field duplicates PSV-346-X, PSV-360-X, and PSV-380-X, collected 10/22/14 through 2/23/15

Stockpile Characterization: C-Area-2-Stockpile-12 through C-Area-2-Stockpile-17, C-Area 8,11,12,13-Stockpile 1, C-Area 22-Stockpile-1 through C-Area 22-Stockpile-4, and C-Area 22/15-Stockpile-1 through C-Area 22/15-Stockpile-5, collected 10/22/14 through 1/21/15

No additional deficiencies found.

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples

December 2014 to February 2015

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

April 28, 2015

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 4

3.0 DATA VALIDATION RESULTS 6

3.1 PRECISION 6
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 6
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 6
3.1.3 Field Duplicate (FD) Precision 6
3.2 ACCURACY 6
3.2.1 Laboratory Control Spike (LCS) Accuracy 7
3.2.2 Matrix Spike (MS) Accuracy 7
3.2.3 Serial Dilution (SD) %Difference 7
3.2.4 Surrogate (SU) Recovery 7
3.3 REPRESENTATIVENESS 8
3.3.1 Chain-of-Custody and Analysis Requests 8
3.3.2 Sample Preservation and Holding Time 9
3.3.3 Laboratory and Method Selection 9
3.3.4 Blanks (Laboratory and Field) 9
3.3.5 Analytical Procedures 10
3.4 COMPLETENESS 10
3.4.1 Laboratory Deliverables Completeness 10
3.4.2 EDD Correctness 10
3.4.3 Analytical Completeness 11
3.5 COMPARABILITY 11

LIST OF TABLES

Table 1 – Sample Summary
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – QC Deficiencies and Data Qualification Actions
Table 4 – Qualified Results for Field Samples
Table 5 – Field Duplicate Results

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The independent data review was completed in accord with the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 65 investigative soil samples plus the associated field QC samples, which were collected by ENTACT in December 2014 through February 2015 with the intended use of confirming that backfill materials are suitable for use on-site and verifying that remediation goals have been achieved in excavated grids. A complete listing of the samples collected and tests performed is shown in Table 1. QAA performed a full validation of the data and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) as specified in Section 5.9 of the Workplan. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (August 2014) and *National Functional Guidelines for Superfund Organic Methods Data Review* (August 2014), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The Workplan stipulates that the precision control limits will be dictated by the analytical method. The validator assessed precision using the laboratory and field duplicates, and the limits are 20-35 RPD depending upon the test. The laboratory prepared a laboratory control spike duplicate (LCSD) using reagent water for the backfill VOC analytical batch plus one unspiked matrix duplicate (MD) for TCLP Lead and three MD for Total As/Pb using a sample from the site. All LCS/LCSD RPDs are within the limits, which indicates good precision for the analytical technique on a sample free of matrix effects, and all MD RPDs are within the limits, which indicates good precision for the analytical technique on the given sample matrix. Additionally, the sampler collected three field duplicates for Total As/Pb with the 65 investigative samples and the RPDs are within the limits, which indicates good precision for the sampling and analytical technique on the given matrix.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The Workplan stipulates that the accuracy control limits will be dictated by the analytical method. The validator assessed accuracy using the laboratory spikes and matrix spikes, and the limits are either 75-125%, 80-120%, or the manufacturer's established control limit for solid reference materials (which range from 0%-209.5% for this data set). In order to better assess data usability, limits of 50-200% were employed where the method limits for a spiked analyte falls outside these values. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with each analytical batch and reported the recovery for all spiked compounds, which included every target compound except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result). The laboratory also prepared a laboratory control spike duplicate (LCSD) with the backfill VOC analytical batch. The LCS/LCSD recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects, with a few exceptions. Most

of the exceedances did not result in data qualification (e.g., the recovery was above the limit indicating a potential bias for detected results and the analyte was not detected in any of the associated samples) with just one result (a detect for Antimony) being qualified as estimated with a low bias (J-) due to laboratory spike recovery. Additionally, the laboratory prepared one matrix spike (MS) along with a post digestion spike (PDS) and serial dilution (SD) for TCLP Pb and three MS/PDS/SD for Total As/Pb using a sample from the site. All SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy of metals results that are substantially above the reporting limit. The MS/MSD/PDS recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the spike samples. Of the 365 total results for field samples, nine results are qualified as estimated based on matrix spike recovery. The qualification includes the expected direction of bias where known (i.e., J+ for high MS/MSD recovery and J- for low MS/MSD recovery with no other non-directional QC issues). Additionally, the laboratory utilized one or more surrogate spikes for each organic analysis. The surrogate recoveries are within the laboratory limits for all field samples, with a few exceptions. All of the exceedances were above the limit indicating a potential bias for detected results. Two (2) detects for Acetone are qualified due to high surrogate recovery.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, investigative samples were collected as required in the approved sampling and analysis plans. (Note that sampling is an on-going process at the site and all samples may not be reflected in this validation batch.) Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory and field QC blanks, and analytical instrument setup (i.e., tuning, calibration, interference correction, etc.) For all samples, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank with each analytical batch and the sampler collected a trip blank with the VOC samples. The laboratory and field QC blanks show no contamination, which indicates the samples were not affected by laboratory or field procedures, or the validator qualified the samples associated with the blank that have a concentration similar to the blank. The detects for Acetone in both of the backfill VOC samples are qualified as potentially contaminated (U) due to laboratory blank contamination. Proper analytical procedures were used and calibration results met the method requirements or the validator qualified the affected samples. The Acetone results for both of the backfill VOC samples are qualified due to calibration drift. Additionally, the results for nine analytes (which are all non-detect) for both of the backfill VOC samples are qualified as estimated (UJ) due to low internal standard response. Note that the laboratory re-analyzed these samples due to the inadequate internal standard response and found concurring results.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. All analyses produced valid analytical measurements, which gives a completeness of 100%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The analytical

results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results for all field samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics.

DATA USABILITY

No major QC deficiencies were noted and all sample results are acceptable for use with the qualifications shown in Table 4.

Two (2) detects for Acetone are qualified with a U (potentially contaminated) and the analyte should be considered not detected at the reported concentration value.

Eighteen (18) VOC non-detects are qualified with a UJ (estimated) and the analyte should be considered not present above the reporting limit; however the reporting limit is an estimated value. In each case, the reporting limit (1.1-1.2 ug/kg) is well below the Allowable Constituent Level (ACL) for imported fill or soil from Appendix 5 of the DER-10 (1,100-12,000 ug/kg), and thus there is negligible effect on data quality.

One Antimony result is qualified with a J- (estimated low) and can be used for determining the presence of the analyte and as an indication that the concentration of the analyte exceeds a given criterion. However, the concentration reported for this detect may be low. There is no established level of concern for this analyte.

Results that are qualified with a J (estimated) may be either low or high. Nine detects for total Lead have a J flag due to low MS recovery (36%) with passing PDS recovery (81%), which indicates a maximum potential 3x low bias. Data quality is not affected for six of the results since the concentration is above the 400 mg/kg remedial goal. For the three results below the remedial goal, the concentrations are as follows:

Sample ID	Sample Date	Analyte	Laboratory Result
ECS-AREA TP-C16-F	2/7/2015	Lead	35.7 mg/kg
ECS-AREA TP-B15-SN	2/10/2015	Lead	17.4 mg/kg
ECS-AREA TP-B16-F	2/10/2015	Lead	159 mg/kg

For ECS-AREA TP-C16-F and ECS-AREA TP-B15-SN, the concentration is more than 3x below the 400 mg/kg remedial goal, and thus there is negligible effect on data usability. For ECS-AREA TP-B16-F, the qualification may render the result inconclusive. Other considerations such as sample location and evaluation of results for other samples may produce a conclusive result.

The remaining 23 results with J flags are qualified solely because the concentration is between the MDL and RL. The actual value is not expected to exceed the sample RL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include pdf data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Instrument Tuning and Initial Calibration,
- Calibration Verification,
- Interference Check Standards (ICS),
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD),
- Field Duplicates (FD),
- Dual Column Confirmation,
- Surrogates (SU), and
- Internal Standards (IS).

Additionally, the validator examined the raw data for 10% of the sample batches (randomly selected by the validator across the various analysis dates and tests) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not less than 50% lower limit or greater than 200% upper limit)
- Laboratory Precision – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not greater than 40%)
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator

considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 40% and 30% for inorganics laboratory and matrix spikes, and 30%, 20% and 10% for organics laboratory, matrix and surrogate spikes were used. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

The laboratory analyzed an LCSD and reported RPDs for all target compounds for each VOC batch (maximum 20 samples). All LCSD RPDs are at or below the criteria.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every inorganics analytical batch (maximum 20 samples) and an MSD for every organics analytical batch (maximum 20 samples) and reported RPDs for MD and MSD prepared using a sample from the site or another site. MD/MSD prepared with a sample from another site were not evaluated, since they do not reflect data quality for the site. No soil samples were designated by the sampler for MD/MSD for the backfill samples and the laboratory did not select any of the backfill samples for batch QC. Three excavation confirmation soil (ECS) samples (two of which were designated by the sampler on the custody record) were used to prepare an MD for Total As/Pb with one of these also used for TCLP Pb. With a total of 65 investigative samples, this is slightly below the Workplan requirement of one per 20 or fewer samples per sample matrix. All RPDs for MDs prepared using a sample from the site are at or below the criteria.

3.1.3 FIELD DUPLICATE (FD) PRECISION

The samplers collected three FD with the 65 investigative samples, which is slightly below the Workplan requirement of one per 20 or fewer samples per sample matrix. The three FD were collected with the ECS samples, while no FD were collected with the backfill samples. Results for the field duplicates are summarized in Table 5. All FD are within the field precision criteria.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD), matrix spikes including post digestion spikes (MS/MSD/PDS), serial dilutions (SD), and surrogate (SU) spikes. LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD/PDS are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit. Surrogates are added to each sample before preparation and analysis and provide an indication of accuracy for each individual sample analysis.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS and/or LCSD for every analytical batch (maximum 20 samples) as required and reported recoveries for all target compounds except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result).

Some LCS/LCSD recoveries are outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator did not qualify the data for cases where the LCS or LCSD recovery for an organic analyte is outside the criteria (i.e., the laboratory-derived recovery control limits based on historical performance or 50-200%, whichever is more stringent) but within 70-130% since this is considered within the inherent method error and suitable for the intended use.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS/PDS for every inorganics analytical batch (maximum 20 samples) and an MS/MSD for every organics analytical batch (maximum 20 samples) and reported recoveries for MS/PDS/MSD prepared using a sample from the site or another site. MS/PDS/MSD prepared with a sample from another site were not evaluated, since they do not reflect data quality for the site. No soil samples were designated by the sampler for MS/PDS/MSD for the backfill samples and the laboratory did not select any of the backfill samples for batch QC. Three excavation confirmation soil (ECS) samples (two of which were designated by the sampler on the custody record) were used to prepare an MS for Total As/Pb with one of these also used for TCLP Pb. With a total of 65 investigative samples, this is slightly below the Workplan requirement of one per 20 or fewer samples per sample matrix.

One of the recoveries for MS prepared using a sample from the site is outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. The validator considered samples of the same media (i.e., backfill or excavation confirmation) and source to be of similar matrix (e.g., if deficiencies were noted for a MS/MSD prepared using a backfill sample from a particular source, all backfill samples from that source in the same analytical batch were qualified).

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all target compounds detected above 50x the method detection limit (MDL). All %differences for SD prepared using a sample from the site are at or below the control limit (10%).

3.2.4 SURROGATE (SU) RECOVERY

The laboratory spiked each organic sample with one or more surrogates before preparation and analysis.

Some surrogate recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records, which confirms that sample integrity was maintained. The validator noted the following regarding the custody records and sample log-in at the laboratory:

- All samples were received within two days of collection as recommended in DER-10 except those in laboratory job number 460-90352-1, which were held by the sampler until day three and received four days after collection in good condition.
- For work orders 460-90352-1, 460-90353-1/2, and 460-90555-1/2, the documentation indicates that no custody seals were used for the transfer of the samples from the field to the laboratory. The samples were transferred by commercial, overnight courier and were received in good condition, and thus no further action was taken.

The information on the custody record is correct and agrees with that reported in the analytical results except as follows:

- For work orders 460-89357-2, 460-89531-1, 460-89608-1, 460-89694-1, 460-89761-1, 460-90555-1/2), and 460-90660-1, the sample IDs on the custody record were recorded incorrectly. The laboratory corrected the IDs per ENTACT's request before the laboratory report was released as documented in the laboratory case narratives and/or emails from the sampler.
- For work order 460-90416-1, the sample IDs on the custody record were recorded incorrectly. The laboratory corrected the IDs per ENTACT's request after the laboratory report was released under revision no. 1 as detailed in the laboratory case narrative.

All samples were analyzed for the tests requested on the chain-of-custody except as follows:

- For work order 460-89322-2, sample number 4 is marked for both Total As/Pb and TAL Metals on the custody record. Arsenic and Lead are included in the TAL list, so no additional analysis was needed or performed.
- For work orders 460-89322-2 and 460-89357-2, results for the stockpile characterization samples that appear on the custody record are reported separately per ENTACT's request. Validation of the stockpile characterization samples is covered in a separate DUSR.
- For work orders 460-90353-1, 460-90416-1, and 460-90555-1, TCLP Pb is not requested on the custody record but was added after sample receipt per ENTACT's request. Results are reported separately under the -2 work order e.g. (460-90353-2).
- For the single backfill composite sample in laboratory work order 460-87605-1, the laboratory reported an original result (12/14/14 prep date) and re-extracted/re-analyzed result (12/15/14 prep date) for Chromium (VI). The sample was re-extracted/ re-analyzed due to deficiencies for the MS/MSD, which was prepared using a sample from another site and thus does not reflect on data quality for the backfill sample. The sample results for both sets are all non-detect and the validator did not find any QC deficiencies for either set. In the EDD, the laboratory reported the original set with a reportable_result of Yes and the second set with a reportable_result of No. The validator confirmed this selection and made no changes.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

All samples were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan, and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (no. 11452).

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. (In some cases, the method update number used by the laboratory may differ from that in the Workplan. For example, method 8260C was used rather than 8260B for the VOCs for the backfill samples.)

For the backfill samples, the target analyte list includes all DER-10 analytes and the nominal reporting limits (i.e., without dry-weight correction or sample dilution and based on the standard sample weight and final volume) are at or below the levels of concern (i.e., the Allowable Constituent Levels (ACLs) for imported fill or soil from Appendix 5 of the DER-10), except as follows:

- DER-10 Appendix 5 lists m-Cresol(s), o-Cresol(s), and p-Cresol(s). The laboratory reported m & p-Cresols and o-Cresol as it is not possible to separate m-Cresol and p-Cresol using method 8270D.
- DER-10 Appendix 5 lists Chlordane (alpha). The laboratory reported technical Chlordane, which is a commercial mixture that contains alpha-Chlordane and gamma-Chlordane along with other related compounds.
- The laboratory reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) for the backfill samples instead of the DER-10 analytes as requested on the custody record.

None of the backfill samples required dilution, and thus none have elevated reporting limits.

For the excavation confirmation samples, the target analyte list includes total Arsenic, total Lead, and/or TCLP Lead as requested and all Contract Laboratory Program (CLP) metals for the TAL metals. The nominal reporting limits are below the levels of concern (i.e., the remedial goals) for total Arsenic, total Lead, and TCLP Lead. There are no established levels of concern for the TAL metals. The nominal reporting limits comply with the requirements in the ASP for TAL metals with the exception of Iron, which has a nominal reporting limit of 30 mg/kg, which is above the ASP reporting limit of 20 mg/kg.

Some of the excavation confirmation samples required dilution, but none has elevated reporting limits for a non-detect result. (Note: The laboratory dilutes all total metals samples 2-4x before analysis as standard practice. All Revere samples were diluted 4x and thus nominal reporting limits were determined at this dilution rate. The laboratory also dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank (and leachate blank for TCLP) for every analytical batch (maximum 20 samples) and a calibration blank for every 10 metals analyses as required per the analytical methodology. Additionally, a trip

blank was included with the single shipment of VOC samples, which meets the Workplan requirement of one for every cooler of VOC samples. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used.

A detect is reported in one laboratory blank and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator calculated a blank equivalent concentration taking into account the sample weight, moisture content, and dilution factor for each sample when determining if the contamination in the blank is near that in the sample, and thus if data quality is affected for that sample.

3.3.5 ANALYTICAL PROCEDURES

The analytical procedures (instrument tuning and initial calibration, calibration verification, interference check standards, dual column confirmation, and internal standards), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method with a few exceptions. The validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

No issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes 28 analytical batches and the validator re-calculated sample results and QC check parameters for three batches and made the following observations from the review of the raw data:

- The laboratory used dual column confirmation for all GC analyses (including Pesticides, PCBs, and Herbicides). For surrogates and spiked analytes, the laboratory reports the results from both columns. For target analytes in blanks and field samples, the laboratory reports the result from the column with the higher concentration (unless chromatographic performance is better on one column and it is therefore used for all analyses), provided that the RPD between the two columns is less than 40%. If the RPD is greater than 40%, the column with the lower concentration is reported with a note in the narrative and the result is reported with a P flag. The RPD did not exceed 40% for any field samples in this data set.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The Level 4 data packages and EDD contain all necessary information or the laboratory submitted a revision upon request as detailed in the case narratives.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
All	all laboratory QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.
460-87605-1	the single backfill composite sample (BF-5L-WT-7c-01)	composite_yn	The validator changed the entry from N to Y based on the custody record.
All	all 6010C Total metals samples	prep_method	The validator changed the method reference from SW3020B to SW3050B based on the pdf analytical results and as confirmed by the laboratory.

3.4.3 ANALYTICAL COMPLETENESS

The validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which a target analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which a target analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size and include dry-weight correction for all soil samples as required per Section 5.7.1 of the Workplan. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results for the investigative samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics. (For the 7196A analyses, Trivalent Chromium is shown as not dry-weight corrected. Trivalent Chromium is calculated from the results for Hexavalent Chromium and total Chromium, which are dry-weight corrected, and thus the Trivalent Chromium is not directly dry-weight corrected but is on a dry-weight basis.)

The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
December 2014 to February 2015

SAMPLE SUMMARY

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-87605-1	BF-5L-WT-7g-01	12/10/14	INV	BF	Soil										x		
460-87605-2	BF-5L-WT-7g-02	12/10/14	INV	BF	Soil										x		
460-87605-3	BF-5L-WT-7c-01	12/10/14	INV	BF	Soil				x	x	x	x	x	x		x	x
460-87605-3	BF-5L-WT-7c-01	12/10/14	INV RE	BF	Soil						x						
460-87605-4	TB-12/10/14	12/10/14	TB	TB	Water										x		
460-89322-3	ECS-Area 15-B7-F	1/16/15	INV	ECS	Soil		x										
460-89322-4	ECS-Area 15-B8-F	1/16/15	INV	ECS	Soil			x	x								
460-89357-4	ECS-AREA15-B7-SN	1/17/15	INV	ECS	Soil		x										
460-89357-5	ECS-AREA15-B8-SW	1/17/15	INV	ECS	Soil		x										
460-89357-6	ECS-AREA15-B8-SE	1/17/15	INV	ECS	Soil		x										
460-89357-7	ECS-AREA15-B9-SW	1/17/15	INV	ECS	Soil		x										
460-89357-8	ECS-AREA15-B9-F	1/17/15	INV	ECS	Soil		x										
460-89357-9	ECS-AREA15-C9-SE	1/17/15	INV	ECS	Soil		x										
460-89531-1	ECS-Area 15-C9/10-F	1/21/15	INV	ECS	Soil		x										
460-89531-2	ECS-Area 15-C10-SE	1/21/15	INV	ECS	Soil		x										
460-89608-1	ECS-AREA15-B10-F	1/22/15	INV	ECS	Soil		x										
460-89608-2	ECS-AREA15-B10-SW	1/22/15	INV	ECS	Soil		x										
460-89694-1	ECS-AREA15-B11-SS	1/23/15	INV	ECS	Soil		x										
460-89694-2	ECS-AREA15-B11-F	1/23/15	INV	ECS	Soil		x										
460-89694-2LR	ECS-AREA15-B11-F-2	1/23/15	MD	ECS	Soil		x										
460-89694-2MS	ECS-AREA15-B11-F-2	1/23/15	MS	ECS	Soil		x										
460-89694-3	ECS-AREA15-B11-SW	1/23/15	INV	ECS	Soil		x										
460-89759-1	ECS-AREA 17-D13-SE	1/27/15	INV	ECS	Soil		x										
460-89759-2	ECS-AREA 17-C14-SS	1/27/15	INV	ECS	Soil		x										
460-89759-3	ECS-AREA 17-C13-F	1/27/15	INV	ECS	Soil		x										
460-89759-4	ECS-AREA 17-C13-SN	1/27/15	INV	ECS	Soil		x										
460-89761-1	ECS-Area 40-C12-F	1/26/15	INV	ECS	Soil		x										
460-89761-2	ECS-Area 40-C12-SN	1/26/15	INV	ECS	Soil		x										
460-89761-3	ECS-Area 40-C12-SE	1/26/15	INV	ECS	Soil		x										
460-89761-4	ECS-Area 40-C12-SS	1/26/15	INV	ECS	Soil		x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-89761-5	ECS-Area 40-C12-SW	1/26/15	INV	ECS	Soil		x										
460-89784-1	ECS-Area17-C13/14-SW	1/28/15	INV	ECS	Soil		x										
460-89830-1	ECS-AREA TP-C14-SN	1/29/15	INV	ECS	Soil			x	x								
460-89830-2	ECS-AREA TP-C14-F	1/29/15	INV	ECS	Soil		x										
460-89830-3	ECS-AREA TP-C14-F-X	1/29/15	FD	ECS	Soil		x										
460-89917-1	ECS-AREA TP-D14-SE	1/30/15	INV	ECS	Soil		x										
460-89917-1LR	ECS-AREA TP-D14-SELR	1/30/15	MD	ECS	Soil		x										
460-89917-1MS	ECS-AREA TP-D14-SEMS	1/30/15	MS	ECS	Soil		x										
460-89917-2	ECS-AREA TP-C14/15-SW	1/30/15	INV	ECS	Soil			x	x								
460-89917-3	ECS-AREA TP-D15-SE	1/30/15	INV	ECS	Soil		x										
460-89917-4	ECS-AREA TP-D15-F	1/30/15	INV	ECS	Soil		x										
460-89917-5	ECS-AREA TP-D15-F-X	1/30/15	FD	ECS	Soil		x										
460-90352-1	ECS-AREA TP-C16-F	2/7/15	INV	ECS	Soil		x										
460-90352-2	ECS-AREA TP-C16-SS	2/7/15	INV	ECS	Soil		x										
460-90352-3	ECS-AREA TP-C16-SN	2/7/15	INV	ECS	Soil		x										
460-90353-1	ECS-AREA TP-B15-SN	2/10/15	INV	ECS	Soil		x										
460-90353-2	ECS-AREA TP-B15-F	2/10/15	INV	ECS	Soil			x	x								
460-90353-3	ECS-AREA TP-B16-SE	2/10/15	INV	ECS	Soil		x										
460-90353-4	ECS-AREA TP-B16-SE-X	2/10/15	FD	ECS	Soil		x										
460-90353-5	ECS-AREA TP-B16-F	2/10/15	INV	ECS	Soil	x	x										
460-90353-5LR	ECS-AREA TP-B16-FLR	2/10/15	MD	ECS	Soil	x	x										
460-90353-5MS	ECS-AREA TP-B16-FMS	2/10/15	MS	ECS	Soil	x	x										
460-90353-6	ECS-AREA TP-B16-SW	2/10/15	INV	ECS	Soil	x	x										
460-90416-1	ECS-AREA TP-D15-SW	2/11/15	INV	ECS	Soil		x										
460-90416-2	ECS-AREA TP-D16-SS	2/11/15	INV	ECS	Soil	x	x										
460-90416-3	ECS-AREA TP-D16-F	2/11/15	INV	ECS	Soil	x	x										
460-90416-4	ECS-AREA TP-D16-SN	2/11/15	INV	ECS	Soil	x	x										
460-90555-1	ECS-AREA TP2-D16-F	2/13/15	INV	ECS	Soil	x	x										
460-90555-2	ECS-AREA TP2-D16-SW	2/13/15	INV	ECS	Soil	x	x										
460-90555-3	ECS-AREA TP2-D16-SN	2/13/15	INV	ECS	Soil	x	x										
460-90555-4	ECS-AREA TP2-D16-SS	2/13/15	INV	ECS	Soil	x	x										
460-90660-1	ECS-AREA TP-B15-F-R	2/18/15	INV	ECS	Soil	x	x										
460-90660-2	ECS-AREA TP-B15-SE	2/18/15	INV	ECS	Soil	x	x										
460-90660-3	ECS-AREA TP-B15-SW	2/18/15	INV	ECS	Soil	x	x										
460-90660-4	ECS-AREA TP-B16N-SE	2/18/15	INV	ECS	Soil	x	x										
460-90660-5	ECS-AREA TP-B16N-F	2/18/15	INV	ECS	Soil	x	x										
460-90660-6	ECS-AREA TP-B16N-SW	2/18/15	INV	ECS	Soil	x	x										
460-90660-7	ECS-AREA TP-B16-SE-R	2/18/15	INV	ECS	Soil	x	x										
460-90660-8	ECS-AREA TP-B16E-F	2/18/15	INV	ECS	Soil	x	x										
460-90660-9	ECS-AREA TP-B16E-SS	2/18/15	INV	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-90660-10	ECS-AREA TP-B16E-SN	2/18/15	INV	ECS	Soil	x	x										
460-90660-11	ECS-AREA TP-C16-SN-R	2/18/15	INV	ECS	Soil	x	x										
460-90660-12	ECS-AREA TP-C16E-SN	2/18/15	INV	ECS	Soil	x	x										
460-90660-13	ECS-AREA TP-C16E-F	2/18/15	INV	ECS	Soil	x	x										
460-90660-14	ECS-AREA TP-C16E-SS	2/18/15	INV	ECS	Soil	x	x										
460-90660-15	ECS-AREA TP-D16-SE	2/18/15	INV	ECS	Soil	x	x										

BF - Backfill Sample
ECS - Excavation Confirmation Sample
FD - Field Duplicate Sample
INV - Investigative Sample
MD – Matrix Duplicate Sample (unspiked)
MS - Matrix Spike Sample
RE - Reextracted/Reanalyzed Sample
TB - Trip Blank

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Pb: 1311/ 3010A/ 6010C for Lead in leachates of soil samples
- Total As and Pb: 3050B/ 6010C for Arsenic and Lead in soil samples
- Total TAL Metals: 3050B/ 6010C for 22 ICP-AES Target Analyte List (TAL) Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc) in soil samples
- Hg: 7471B for total Mercury in soil samples
- Total DER10 Metals: 3050B/ 6010C for 12 ICP-AES NYSDEC DER-10 Appendix 5 Metals (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, Selenium, Silver, and Zinc) in soil samples
- Cr III/VI: 3060A/7196A for Trivalent Chromium and Hexavalent Chromium in soil samples
- PEST: 3546/ 3620C/ 8081B for 15 NYSDEC DER-10 Appendix 5 pesticides plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene in soil samples
- PCB: 3546/ 3665A/ 8082A for 7 Aroclors in soil samples
- HERB: 8151A for Silvex (2,4,5-TP) in soil samples
- VOC: 5035/8260C for 30 NYSDEC DER-10 Appendix 5 volatile organic compounds (VOCs) in soil samples and 5030B/ 8260C for 30 VOCs in aqueous trip blanks
- SVOC: 3545/ 8270D for 20 NYSDEC DER-10 Appendix 5 semivolatile organic compounds (SVOCs) plus Dibenzofuran and Hexachlorobenzene in soil samples
- CN: 9012B for Cyanide in soil samples

TABLE 2
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
December 2014 to February 2015

QC DEFICIENCIES AND DATA QUALIFICATION ACTIONS

Lab ID	Sample Code	Type	Method			Date and Time			GC	D	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col	F		Qual	LCL	UCL	CL		
LABORATORY CONTROL SPIKE (LCS) ACCURACY																	
4602815052A4	4602815052A4	BS		3050B	6010C		2/13/15 19:07	2/14/15 13:45	NA	4	Antimony		0	209.5		Low laboratory control spike recovery (47.2%)	J-/UJ to detects/NDs for samples digested in the same batch
4602699675	4602699675	BD			8260C			12/17/14 21:43	NA	1	1,4-Dioxane (p-Dioxane)		69	142	30	High laboratory control spike duplicate recovery (156%)	J+ to detects for samples digested in the same batch (none)
4602699675	4602699675	BD			8260C			12/17/14 21:43	NA	1	Vinyl Chloride		62	132	30	High laboratory control spike duplicate recovery (141%)	J+ to detects for samples digested in the same batch (none)
4602688652A	4602688652A	BS		3546	8270D		4/28/15 15:13	12/14/14 7:22	NA	1	Benzo(a)pyrene		36	89		High laboratory control spike recovery (91%)	None (recovery within 70-130% data qualification limits)
MATRIX SPIKE (MS) ACCURACY																	
460-90353-5MS	ECS-AREA TP-B16-F-20150210MS-20150210	MS		3050B	6010C		2/13/15 19:07	2/14/15 13:34	NA	4	Lead	N	75	125		Low matrix spike recovery (36%); Passing PDS recovery (81%)	J/UJ to detects/NDs for ECS samples digested in the same batch
SURROGATE (SU) RECOVERY																	
460-87605-3	BF-5L-WT-7c-01-20141210	N		METHOD	8151A		12/15/14 12:11	12/16/14 14:49	1C	1	2,4-Dichlorophenylacetic acid		69	150		High surrogate recovery (157%)	J+ to detects for all analytes in this sample (none)
460-87605-1	BF-5L-WT-7g-01-20141210	N		5035	8260C		4/28/15 0:01	12/18/14 6:25	NA	1	4-Bromofluorobenzene		70	130		High surrogate recovery (147%)	J+ to detects for all analytes in this sample
460-87605-2	BF-5L-WT-7g-02-20141210	N		5035	8260C		4/28/15 0:01	12/18/14 6:49	NA	1	4-Bromofluorobenzene		70	130		High surrogate recovery (139%)	J+ to detects for all analytes in this sample
LABORATORY BLANKS																	

Lab ID	Sample Code	Type	Method			Date and Time			GC	D	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col	F		Qual	LCL	UCL	CL		
4602699677	4602699677	LB			8260C			12/17/14 22:33	NA	1	Acetone	J				Method blank contamination (4.32 J ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch
CALIBRATION VERIFICATION																	
CCVIS 460-269967/3	CCVIS 460-269967/3	CCV			8260C			12/17/14 20:49	NA	1	1,4-Dioxane (p-Dioxane)		-20	+20		Calibration drift (%D= +65.0%)	J+ to detects, UJ to NDs for samples analyzed this shift (none)
CCVIS 460-269967/3	CCVIS 460-269967/3	CCV			8260C			12/17/14 20:49	NA	1	Acetone		-20	+20		Calibration drift (%D= -24.7%)	J- to detects, UJ to NDs samples analyzed this shift
INTERNAL STANDARDS																	
460-87605-1	BF-5L-WT-7g-01-20141210	N		5035	8260C		4/28/15 0:01	12/18/14 6:25	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (38%)	J+ to detects/UJ to NDs for analytes quantitated with this IS (all ND)
460-87605-2	BF-5L-WT-7g-02-20141210	N		5035	8260C		4/28/15 0:01	12/18/14 6:49	NA	1	1,4-Dichlorobenzene-d4	*	50	200		Low internal standard response (40%)	J+ to detects/UJ to NDs for analytes quantitated with this IS (all ND)

CL – Control Limit
DF – Dilution Factor
LCL – Lower Control Limit
UCL – Upper Control Limit

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
December 2014 to February 2015

QUALIFIED RESULTS FOR FIELD SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
TCLP METALS					
460-90660-12	ECS-AREA TP-C16E-SN-20150218	1311 LEAD	25.6 J ug/l	J	Result between MDL and RL
460-90660-13	ECS-AREA TP-C16E-F-20150218	1311 LEAD	26.5 J ug/l	J	Result between MDL and RL
TOTAL METALS					
460-87605-3	BF-5L-WT-7c-01-20141210	CADMIUM	0.26 J mg/kg	J	Result between MDL and RL
460-89322-4	ECS-Area 15-B8-F-20150116	ANTIMONY	1.8 J mg/kg	J	Result between MDL and RL
460-89322-4	ECS-Area 15-B8-F-20150116	CALCIUM	566 J mg/kg	J	Result between MDL and RL
460-89322-4	ECS-Area 15-B8-F-20150116	POTASSIUM	874 J mg/kg	J	Result between MDL and RL
460-89759-2	ECS-AREA 17-C14-SS-20150127	ARSENIC	2.8 J mg/kg	J	Result between MDL and RL
460-89759-4	ECS-AREA 17-C13-SN-20150127	ARSENIC	3.8 J mg/kg	J	Result between MDL and RL
460-89761-4	ECS-Area 40-C12-SS-20150126	ARSENIC	2.0 J mg/kg	J	Result between MDL and RL
460-89830-1	ECS-AREA TP-C14-SN-20150129	ANTIMONY	2.9 J mg/kg	J	Result between MDL and RL
460-89830-1	ECS-AREA TP-C14-SN-20150129	COBALT	5.4 J mg/kg	J	Result between MDL and RL
460-89830-1	ECS-AREA TP-C14-SN-20150129	POTASSIUM	589 J mg/kg	J	Result between MDL and RL
460-89917-2	ECS-AREA TP-C14/15-SW-20150130	CALCIUM	544 J mg/kg	J	Result between MDL and RL
460-89917-2	ECS-AREA TP-C14/15-SW-20150130	COBALT	5.5 J mg/kg	J	Result between MDL and RL
460-89917-2	ECS-AREA TP-C14/15-SW-20150130	POTASSIUM	400 J mg/kg	J	Result between MDL and RL
460-89917-2	ECS-AREA TP-C14/15-SW-20150130	MERCURY	0.017 J mg/kg	J	Result between MDL and RL
460-90352-1	ECS-AREA TP-C16-F-20150207	LEAD	35.7 mg/kg	J	Low matrix spike recovery (36%); Passing PDS recovery (81%)
460-90352-2	ECS-AREA TP-C16-SS-20150207	LEAD	22200 mg/kg	J	Low matrix spike recovery (36%); Passing PDS recovery (81%)
460-90352-3	ECS-AREA TP-C16-SN-20150207	LEAD	1480 mg/kg	J	Low matrix spike recovery (36%); Passing PDS recovery (81%)
460-90353-1	ECS-AREA TP-B15-SN-20150210	LEAD	17.4 mg/kg	J	Low matrix spike recovery (36%); Passing PDS recovery (81%)
460-90353-2	ECS-AREA TP-B15-F-20150210	ANTIMONY	8.7 mg/kg	J-	Low laboratory control spike recovery (47.2%)
460-90353-2	ECS-AREA TP-B15-F-20150210	COBALT	8.1 J mg/kg	J	Result between MDL and RL
460-90353-2	ECS-AREA TP-B15-F-20150210	LEAD	1330 mg/kg	J	Low matrix spike recovery (36%); Passing PDS recovery (81%)
460-90353-2	ECS-AREA TP-B15-F-20150210	SODIUM	325 J mg/kg	J	Result between MDL and RL
460-90353-3	ECS-AREA TP-B16-SE-20150210	LEAD	1160 mg/kg	J	Low matrix spike recovery (36%); Passing PDS recovery (81%)
460-90353-4	ECS-AREA TP-B16-SE-X-20150210	LEAD	891 mg/kg	J	Low matrix spike recovery (36%); Passing PDS recovery (81%)
460-90353-5	ECS-AREA TP-B16-F-20150210	LEAD	159 mg/kg	J	Low matrix spike recovery (36%); Passing PDS recovery (81%)

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-90353-6	ECS-AREA TP-B16-SW-20150210	LEAD	1740 mg/kg	J	Low matrix spike recovery (36%); Passing PDS recovery (81%)
VOLATILE ORGANIC COMPOUNDS (VOC)					
460-87605-1	BF-5L-WT-7g-01-20141210	1,2,4-TRIMETHYLBENZENE	1.1 U ug/kg	UJ	Low internal standard response (38%)
460-87605-1	BF-5L-WT-7g-01-20141210	1,2-DICHLOROBENZENE	1.1 U ug/kg	UJ	Low internal standard response (38%)
460-87605-1	BF-5L-WT-7g-01-20141210	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.1 U ug/kg	UJ	Low internal standard response (38%)
460-87605-1	BF-5L-WT-7g-01-20141210	1,3-DICHLOROBENZENE	1.1 U ug/kg	UJ	Low internal standard response (38%)
460-87605-1	BF-5L-WT-7g-01-20141210	1,4-DICHLOROBENZENE	1.1 U ug/kg	UJ	Low internal standard response (38%)
460-87605-1	BF-5L-WT-7g-01-20141210	ACETONE	9.8 B ug/kg	U	Method blank contamination (4.32 J ug/kg); Calibration drift (%D= -24.7%); High surrogate recovery (147%)
460-87605-1	BF-5L-WT-7g-01-20141210	N-BUTYLBENZENE	1.1 U ug/kg	UJ	Low internal standard response (38%)
460-87605-1	BF-5L-WT-7g-01-20141210	N-PROPYLBENZENE	1.1 U ug/kg	UJ	Low internal standard response (38%)
460-87605-1	BF-5L-WT-7g-01-20141210	SEC-BUTYLBENZENE	1.1 U ug/kg	UJ	Low internal standard response (38%)
460-87605-1	BF-5L-WT-7g-01-20141210	T-BUTYLBENZENE	1.1 U ug/kg	UJ	Low internal standard response (38%)
460-87605-2	BF-5L-WT-7g-02-20141210	1,2,4-TRIMETHYLBENZENE	1.2 U ug/kg	UJ	Low internal standard response (40%)
460-87605-2	BF-5L-WT-7g-02-20141210	1,2-DICHLOROBENZENE	1.2 U ug/kg	UJ	Low internal standard response (40%)
460-87605-2	BF-5L-WT-7g-02-20141210	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.2 U ug/kg	UJ	Low internal standard response (40%)
460-87605-2	BF-5L-WT-7g-02-20141210	1,3-DICHLOROBENZENE	1.2 U ug/kg	UJ	Low internal standard response (40%)
460-87605-2	BF-5L-WT-7g-02-20141210	1,4-DICHLOROBENZENE	1.2 U ug/kg	UJ	Low internal standard response (40%)
460-87605-2	BF-5L-WT-7g-02-20141210	ACETONE	7.6 B ug/kg	U	Method blank contamination (4.32 J ug/kg); Calibration drift (%D= -24.7%); High surrogate recovery (139%)
460-87605-2	BF-5L-WT-7g-02-20141210	N-BUTYLBENZENE	1.2 U ug/kg	UJ	Low internal standard response (40%)
460-87605-2	BF-5L-WT-7g-02-20141210	N-PROPYLBENZENE	1.2 U ug/kg	UJ	Low internal standard response (40%)
460-87605-2	BF-5L-WT-7g-02-20141210	SEC-BUTYLBENZENE	1.2 U ug/kg	UJ	Low internal standard response (40%)
460-87605-2	BF-5L-WT-7g-02-20141210	T-BUTYLBENZENE	1.2 U ug/kg	UJ	Low internal standard response (40%)
SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)					
460-87605-3	BF-5L-WT-7c-01-20141210	BENZO(G,H,I)PERYLENE	64 J ug/kg	J	Result between MDL and RL
460-87605-3	BF-5L-WT-7c-01-20141210	CHRYSENE	160 J ug/kg	J	Result between MDL and RL
460-87605-3	BF-5L-WT-7c-01-20141210	FLUORANTHENE	260 J ug/kg	J	Result between MDL and RL
460-87605-3	BF-5L-WT-7c-01-20141210	PHENANTHRENE	100 J ug/kg	J	Result between MDL and RL
460-87605-3	BF-5L-WT-7c-01-20141210	PYRENE	200 J ug/kg	J	Result between MDL and RL

TABLE 5
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
December 2014 to February 2015

FIELD DUPLICATE RESULTS

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result		Field Duplicate Lab Result		Abs Diff	2xRL	RPD	Pass
460-89830-2	460-89830-3	ECS-AREA TP-C14-F-20150129	ARSENIC	3.6	mg/kg	3.2	mg/kg	0.4	6	NA	y
460-89830-2	460-89830-3	ECS-AREA TP-C14-F-20150129	LEAD	19.1	mg/kg	22.2	mg/kg	NA	4	15	y
460-89917-4	460-89917-5	ECS-AREA TP-D15-F-20150130	ARSENIC	5.6	mg/kg	4.8	mg/kg	0.8	7.2	NA	y
460-89917-4	460-89917-5	ECS-AREA TP-D15-F-20150130	LEAD	31.9	mg/kg	34.4	mg/kg	NA	4.8	7.5	y
460-90353-3	460-90353-4	ECS-AREA TP-B16-SE-20150210	ARSENIC	8.5	mg/kg	9.3	mg/kg	0.8	5.8	NA	y
460-90353-3	460-90353-4	ECS-AREA TP-B16-SE-20150210	LEAD	1160	mg/kg	891	mg/kg	NA	3.8	26	y

Note: The RPD test ($\leq$35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test ($\leq$ 2x RL) applies.

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact		Project Number/ Manager: E7976H/ Jenny Self		
Site Name: Revere Smelting & Refining (Phase 2B BF/ECS Dec14-Feb15)		QC Level: IV		
Laboratory: TestAmerica (Edison)		Laboratory Job No: see below		
Reviewer: Taryn Scholz		Date Checked: 3/20/15		
Parameters: TCLP Pb, Metals, CrIII/VI, Pesticide, PCB, Herbicide, VOC, SVOC, CN		Methods: 1311/6010C, 6010C/7471B, 7196A, 8081B, 8082A, 8151A, 5035/8260C, 8270D, 9012B		
ITEM	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
Laboratory NELAP/ELAP accredited?	x			#11452 for Edison
Signed Narrative included?	x			see Comment no. 1
No narrative issues noted by lab?		x		See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required)
COCs properly executed and seals used?		x		see Comment no. 2
Samples received within 2 days?		x		(DER10 - recommended) 460-90352-1 held until day 3, rec'd day 4
Analytical Results				
All requested analyses reported?		x		see Comment no. 2A
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL) see Comment no. 3
RLs acceptable?		x		(ASP Exh C Part III and/or DER-10 App 5) see Comment no. 4
No elevated RLs for NDs?	x			Note: 4x std dilution for total metals in soil, 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D); (5035 used for VOC soils this phase) see Comment no. 5
If analytical cleanup used, method ref included and approved?	x			(ASP Exh D) see Comment no. 6
Sample matrix included?	x			
Soils on dry weight basis?	x*			
Correct and consistent units?	x			Organics in ug/L (TBs) and ug/kg for rest; Inorganics in mg/kg or ug/L (TCLP)
Holding time to analysis not expired?	x**			(Workplan Table 2, SW846 for those not in table per ASP Exh I, which gives only aq HTs) Hg 28-d, Herb 14/40-d, Cr VI 30/7-d, CN 14-d
Holding time to preparation not expired?	x**			same as above
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory	x			
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)	x			Total samples = 58 confirmation (24/58 TCLP/Total) + 2 BF comp + 1 BF grab = 61; Total FD = 3 (0/3 conf + 0 comp + 0 grab) -> but none for BF
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible		x		MS/LR used for metals (ICP, Hg, Cr VI - %R not reported for calc Cr III); 2 field +1 lab for conf (Total As/Pb) and 1 field for conf (TCLP) but none for BF
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 365/365=100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-87605-1, 460-89322-2, 460-89357-2, 460-89531-1, 460-89608-1, 460-89694-1, 460-89759-1, 460-89761-1, 460-89784-1, 460-89830-1, 460-89917-1, 460-90352-1, 460-90353-1, 460-90353-2, 460-90416-1, 460-90416-2, 460-90555-1, 460-90555-2, 460-90660-1

***For the 7196A analyses, Cr III is shown as not dry-weight corrected. However, Cr III is calculated from the results for Cr VI and Total Cr, which are dry-weight corrected, and thus the Cr III is not directly dry-weight corrected but is on a dry-weight basis.**

**** The holding time was calculated using dates only without regard to the time of day since all holding times are greater than 24 hours. Also, note that Cr III is a calculated result and the holding time check does not apply for this analyte.**

1. Signature is on the cover page with certification statement. Some work orders also include separate signed certification page. Language is similar on both so no further action taken.

2. Issues for custody records:

For work orders 460-90352-1, 460-90353-1 (and 460-90353-2), and 460-90555-1 (and 460-90555-2), the documentation indicates that no custody seals were used for the transfer of the samples from the field to the laboratory. The samples were transferred by commercial, overnight courier and were received in good condition, and thus no further action was taken.

For work orders 460-89357-2, 460-89531-1, 460-89608-1, 460-89694-1, 460-89761-1, 460-90555-1 (and 460-90555-2), and 460-90660-1, the sample IDs on the custody record were recorded incorrectly. The laboratory corrected the IDs per ENTACT's request before the laboratory report was released as documented in the case narratives and/or emails from the sampler.

For work orders 460-90416-1, the sample IDs on the custody record were recorded incorrectly. The laboratory corrected the IDs per ENTACT's request after the laboratory report was released under revision no. 1 as detailed in the case narratives.

2A. Requested Tests

For work order 460-89322-2, sample no. 4 is marked for Total As/Pb and TAL Metals is listed on the custody record. As/Pb included in TAL list so additional analysis not needed.

For work orders 460-89322-2 and 460-89357-2, results for the stockpile characterization samples that appear on the custody record are reported separately per ENTACT's request.

For work orders 460-90353-1, 460-90416-1, and 460-90555-1, TCLP Pb is not requested on the custody record but was added after sample receipt per ENTACT's request. Results are reported separately under -2 work order.

For work order 460-90660-1, TCLP Pb is not requested on the custody record but was added after sample receipt per ENTACT's request. Results are reported under same work order.

3. Analyte List:

P1 WP Table 3, P2A/B WP Table 2/4, and DER10 App5 list m-cresol, o-cresol, and p-cresol separately. The laboratory reported m,p-cresol and o-cresol as it is not possible to separate m-cresol and p-cresol using method 8270D. P1 WP Table 3, which only lists RLs for the DER-10 metals and not the 23 TAL metals, also mistakenly lists Antimony. This metal does not appear in DER10 Appendix 5 and was not reported by the laboratory for the backfill samples.

For all BF samples (and the associated QC), the laboratory reported technical Chlordane rather than Chlordane (alpha) as listed in the workplan and DER10 Appendix 5.

For all BF samples (and the associated QC), the laboratory reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of just the DER-10 analytes as requested. Note: These extra analytes are all ND in the samples.

For the LB/BS/BD - the lab reported m,p-Xylene and o-Xylene. For the LB, Xylenes (total) is also reported.

Note: The analyte names in the hardcopy report differ from those in the EDD for some analytes.

4. The MQL (Unadj) for several DER-10 analytes (metals) is above the CRQL, but in each case, it is below the Allowable Constituent Level in DER10 App 5. Additionally, the MQL (Unadj) for the TAL metal Iron is above the CRQL. There are no action levels for this analyte.

5. Update IV methods (6010C, 7471B, 8260C, 8270D) used instead of Update III as in WP. Prep method for 6010C total metals in soils shown as SW3020B in EDD, validator changed all to SW3050B per the pdf report and as confirmed correct by the laboratory.

6. Per laboratory, Florisil cleanup (SW3620C) used for Pesticide analyses and sulfuric acid cleanup (SW3665A) used for PCB analyses (not indicated in package exc on prep log nor in EDD). No cleanup used for SVOC or Herbicides.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	Total Metals	All samples	Required 4x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
EN494	460-87605-1	VOCs-soil	269967	Acetone in MB above MDL but below RL (J-flag); B-flag to assoc sx with detect	see QC Deficiencies
		VOCs-soil	269967	LCSD %R hi for VC, 14Dioxane; assoc sx ND	see QC Deficiencies
		VOCs-soil	1,2	IS response and SU %R (BFB) out; RE concurred, original set reported	see QC Deficiencies
		VOCs-soil	269967	CCV %R hi for 14Dioxane; assoc sx ND	see QC Deficiencies
		VOCs-water	268751	secButylBz in MB above MDL but below RL (J-flag); B-flag to assoc sx with detect	none required (for TB only and TB is ND)
		VOCs-water	268751	MS/D %R low for TCE	none required (non-project MS/D)
		VOCs-water	268751	CCV %R hi for 124TMB; assoc sx ND	none required (for TB only and TB is ND)
		Herbicides	MB, LCS	SU %R hi, sx ND	none required (sample results not affected)
		Herbicides	PS/MS/MSD	SU %R hi, sx ND	none required (non-project MS/D)
		SVOCs	268865	LCS %R out for Benzo(a)pyrene, lab SOP allows up to 5 out for this full list spike	see QC Deficiencies
		SVOCs	269077	MS/D %R low for several TAs	none required (non-project MS/D)
		SVOCs	MS/MSD	SU %R out	none required (non-project MS/D)
		Total Metals	269156	MS %R low for Mn	none required (non-project MS)
		Total Metals	269156	LR RPD out for Cu/Pb	none required (non-project LR)
		HexCr	269161	MSS %R out due to sample matrix, LCSS/LCSI pass	none required (non-project MS)
		HexCr	269370	MSS %R out due to sample matrix for this reprep, LCSS/LCSI pass; Both data sets reported	none required (non-project MS/D); original data set selected for reporting in EDD, reviewer confirmed selection based on QC/results
EN495	460-89322-2	Total Metals	276202	MS %R hi for Al/Fe, RPD out for Ba	none required (non-project MS)
EN496	460-89357-2	Total Metals	NA	nothing noted	NA
EN497	460-89531-1	Total Metals	NA	nothing noted	NA
EN498	460-89608-1	Total Metals	NA	nothing noted	NA
EN499	460-89694-1	Total Metals	NA	nothing noted	NA
EN500	460-89759-1	Total Metals	NA	nothing noted	NA
EN501	460-89761-1	Total Metals	NA	nothing noted	NA
EN502	460-89784-1	Total Metals	NA	nothing noted	NA
EN503	460-89830-1	Total Metals	279003	MS %R low for Ca/Fe, hi for Al/Ni	none required (non-project MS)
EN504	460-89917-1	Total Metals	NA	nothing noted	NA
EN505	460-90352-1	Total Metals	281614	MS %R low for Pb	see QC Deficiencies
EN506	460-90353-1	Total Metals	281614	MS %R low for Pb	see QC Deficiencies
		Mercury	281203	MS %R hi for Hg	none required (non-project MS)
EN507	460-90353-2	TCLP Metals	NA	nothing noted	NA
EN508	460-90416-1	Total Metals	NA	MD RPD out for As	none required (non-project MS)
EN509	460-90416-2	TCLP Metals	NA	nothing noted	NA
EN510	460-90555-1	Total Metals	NA	nothing noted	NA
EN511	460-90555-2	TCLP Metals	NA	nothing noted	NA
EN512	460-90660-1	Total Metals	282527	MS %R low for As	none required (non-project MS)

Data Validation Checklist: Metals (Update IV)/Wet Chem

Client Name: Entact		Project Number/ Manager: E7976H/ Jenny Self			
Site Name: Revere Smelting & Refining (Phase 2B BF/ECS Dec14-Feb15)		QC Level: IV			
Laboratory: TestAmerica (Edison)		Laboratory Job No: see DURC			
Reviewer: Taryn Scholz		Date Checked: 3/20/15			
Parameters: TCLP Pb, Metals, CrIII/VI, CN		Methods: 1311/3010A/6010C, 3050B/6010C, 7471B, 3060A/7196A, 9012B			
%PERFORMED/	**ITEM**	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?	x*			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x*			
	All project COCs or TAs included?	x*			
100	%R criteria met?		x		method (lab** but within 50-200%) see QC Def
	Matrix spike data included in lab package?	x*			
100	%R criteria met?		x		method (75-125%) see QC Deficiencies
	Sample duplicate data included in lab package?	x*			as LR
100	RPD criteria met?	x			method (20% if >10xMDL)
100	Field dup RPD criteria met? (individual, mean, and overall)	x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	correl coeff criteria met? (r > 0.998 ICP, r > 0.995 AA/Hg)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL, ≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	*Intensities within limits (within ≥ 70% of calib std)?*			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

* No QC reported for Chromium III, which is calculated from the Total Chromium and Chromium VI result.

**For SRMs (solid LCS), the manufacturer's established limits as reported by the lab are used. For aqueous LCS, method limit is 80-120%.

TOTAL METALS VS LEACHED - all leach results < max possible

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting & Refining (Phase 2B BF/ECS Dec14-Feb15)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 3/20/15
Parameters: TCLP Pb	Methods: 1311/3010A/6010C

%PERFORMED/	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			(reported as initial pH of LB)
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

Batch 282406 (EN507,509,511,512) and Batch 282408 (EN512)

Data Validation Checklist: GC (Update IV)

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting & Refining (Phase 2B BF/ECS Dec14-Feb15)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 3/20/15
Parameters: Pesticide, PCB, Herbicide	Methods: 3546/8081B, 3546/8082A, 8151A

%PERFORMED/ ITEM			YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)		x			
100	Criteria met for field blanks? (<MDL)				x	
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			With the exception of multi-component pesticides Chlordane (technical) and Toxaphene; only two multi-component Aroclors (1016 and 1260) spiked per method recommendations
	%R criteria met?		x			method (lab but within 50-200%)
100	RPD criteria met?				x	
	Matrix spike data included in lab package?		x			non-project only
	%R criteria met?				x	method (lab but within 50-200%)
100	RPD criteria met?				x	method (lab but within 40%)
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?			x		method (lab but within 10-200%) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)				x	ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Initial calibration documentation included in lab package?		x			5 peaks used for all multi-comp Pest/PCB
	All target analytes included?		x			
100	%RSD criteria met? (≤20%RSD or r ≥ 0.995 **or COD ≥ 0.990**)		x			
100	DDT/Endrin %breakdown max 15%?		x			
	Calibration verification data included in lab package?		x			
100	**%D criteria met? (<20%)**		x			see Comment no. 1
100	Dual column/detector confirmation data incl in lab package?		x			
100	%Difference criteria met? (<40%)		x			
10	Analyte qualitative ID criteria met?				x	
10	Analyte quantitation/RLs correct?				x	
10	QC parameters calculated correctly?				x	
	Surrogate	**Control Limits**				
PEST/ PCB	Decachlorobiphenyl	**76-149/53-150**				bold updated from P2B 2013
PEST/ PCB	Tetrachloro-m-xylene	**72-136**				bold updated from P2B 2013
HERB	2,4-DCPA	**69**-150				

COMMENTS

1. The validator did not delineate cases where the surrogate has a %D outside the criteria since surrogate recoveries for each analysis are evaluated separately. (none for this data set)

Data Validation Checklist: GC/MS (Update IV)

Client Name: Entact				Project Number/ Manager: E7976H/ Jenny Self		
Site Name: Revere Smelting & Refining (Phase 2B BF/ECS Dec14-Feb15)				QC Level: IV		
Laboratory: TestAmerica (Edison)				Laboratory Job No: see DURC		
Reviewer: Taryn Scholz				Date Checked: 3/20/15		
Parameters: VOC, SVOC				Methods: 5035/8260C, 3546*/8270D		
%PERFORMED/ ITEM				**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?			x			
100	Criteria met? (<MDL)				x		see QC Deficiencies
100	Criteria met for field blanks? (<MDL)			x			
	QC check samples/LCS data included in lab package?			x			
	All project COIs or TAs included?			x			
100	%R criteria met?				x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?			x			method (lab but within 40%)
	Matrix spike data included in lab package?			x			non-project only
100	%R criteria met?					x	method (lab but within 50-200%)
100	RPD criteria met?					x	method (lab but within 40%)
	Surrogate data included in lab package?			x			
	Required surrogates included?			x			
100	%R criteria met?				x		method (lab but within 10-200% extr, 20-200% purg)
100	Field dup RPD criteria met? (individual, mean, and overall)					x	20% aq, 35% solid (+/-2RL aq, +/-3RL sol if either ≤5RL)
	Instrument Tune (12-hr) for GC/MS included in lab package?			x			
100	Instrument Tune method criteria met?			x			
	Initial calibration documentation included in lab package?			x			
	All target analytes included at min 5 levels w low ≤ RL?			x			
	RRF met (Table 4)? Reject for RRF<0.05 or Table 4, whichever lower			x			
100	**%RSD criteria met? (≤20%RSD or r ≥ 0.995 or COD ≥ 0.990)**			x			
	Calibration verification data included in lab package?			x			
	RRF met (Table 4)? Reject for RRF<0.05 or Table 4, whichever lower			x			
100	%D criteria met for CCC/TAs? (20% max)				x		see QC Deficiencies
100	Internal standard data included in lab package?			x			
100	Areas within limits (within -50/+100% of last calib check)?				x		for samples; see QC deficiencies
100	**RTs within limits (<10/30(8270) s diff from ICAL midlevel)?**			x			
10	Analyte qualitative ID criteria met?			x			
10	Analyte quantitation/RLs correct?			x			
10	IS Areas within limits (within -50/+100% of ICAL midlevel)?			x			for CCVs
10	QC parameters calculated correctly?			x			
	Surrogate	**Control Limits**					
VOC	1,2-Dichloroethane-d4	70-130					
	Toluene-d8	70-130					
	Bromofluorobenzene	70-130					
	Dibromofluoromethane	70-130					
SVOC	2,4,6-Tribromophenol	**19-114 (Oct 2014 10-120)**					Bold updated from P2B 2013
	Terphenyl-d14	**41-145 (Oct 2014 16-151)**					Bold updated from P2B 2013
	2-Fluorobiphenyl	**49-112 (Oct 2014 40-109)**					Bold updated from P2B 2013
	Nitrobenzene-d5	**40-106 (Oct 2014 38-105)**					Bold updated from P2B 2013
	2-Fluorophenol	**39-103 (Oct 2014 37-125)**					Bold updated from P2B 2013
	Phenol-d5	**44-104 (Oct 2014 41-118)**					Bold updated from P2B 2013
COMMENTS							
*TALED used 3546 beginning in October 2014.							

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Post-Stabilization Verification Samples and
Stockpile Characterization Samples

February 2015 to July 2015

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

September 14, 2015

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 3

3.0 DATA VALIDATION RESULTS 4

3.1 PRECISION 4
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 4
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 4
3.1.3 Field Duplicate (FD) Precision 4
3.2 ACCURACY 4
3.2.1 Laboratory Control Spike (LCS) Accuracy 4
3.2.2 Matrix Spike (MS) Accuracy 5
3.2.3 Serial Dilution (SD) %Difference 5
3.3 REPRESENTATIVENESS 5
3.3.1 Chain-of-Custody and Analysis Requests 5
3.3.2 Sample Preservation and Holding Time 5
3.3.3 Laboratory and Method Selection 5
3.3.4 Blanks (Laboratory and Field) 6
3.3.5 Analytical Procedures 6
3.4 COMPLETENESS 6
3.4.1 Laboratory Deliverables Completeness 6
3.4.2 EDD Correctness 6
3.4.3 Analytical Completeness 6
3.5 COMPARABILITY 6

LIST OF TABLES

Table 1 – Samples Selected for Validation
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – Qualified Results for Validated Samples
Table 4 – Field Duplicate Results for Validated Samples

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The data include eight investigative soil samples plus one field duplicate sample as shown in Table 1. The samples comprise approximately 10% of the Phase II-B post-stabilization verification (PSV) samples and 10% of the stockpile characterization samples collected during February 2015 to July 2015. (A total of 29 PSV samples and 11 stockpile characterization samples were collected during this period.) The PSV samples were collected by ENTACT from the stabilized material stockpiles and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals to ensure that the stabilized material meets the appropriate criteria for disposal in the on-site containment cell. The stockpile characterization samples were collected by ENTACT from the excavated soil stockpiles and analyzed for TCLP lead to determine if the excavated soil would require treatment to render the material non-hazardous prior to disposal in the containment cell. These soils were excavated from the ecological areas of the site where source material, which requires treatment, is not necessarily present based on the results from the remedial investigation.

Per the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, these data are considered Level 2 and require minimal data review. Per ENTACT's request, QAA performed a full validation of the selected samples and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010). QAA completed the validation using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (August 2014), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The validator assessed precision using the field duplicate results. (No laboratory duplicates were prepared using one of the site samples selected for validation.) For the samples selected for validation, the sampler collected one field duplicate with the PSV investigative samples, and the RPDs are within the limits for all metals, which indicates good precision for the sampling and analytical technique on the given matrices.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The validator assessed accuracy using the laboratory spikes. (No matrix spikes were prepared using one of the site samples selected for validation.) For the samples selected for validation, the laboratory prepared a laboratory control spike (LCS) using reagent water with each analytical batch and reported the recovery for every analyte. The LCS recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the

representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, PSV and stockpile characterization samples were collected as required in the approved sampling and analysis plan. Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory blanks, and analytical instrument setup (i.e., calibration, interference correction, etc.) For the samples selected for validation, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank and leachate blank with each analytical batch and the blanks show no contamination, which indicates the samples were not affected by laboratory procedures. Additionally, proper analytical techniques were used and calibration results met the method requirements.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. For the samples selected for validation, all analyses produced valid analytical measurements, which gives a completeness of 100%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The PSV and stockpile characterization analytical results are classified as Level 2 data with a full review and validation of at least 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated. Note that results are reported in µg/L for all field samples.

DATA USABILITY

All sample results are acceptable for use. As shown in Table 3, ten results are qualified solely because the concentration is between the MDL and RL. The actual value is not expected to exceed the sample RL. No data quality issues were noted.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). For the samples selected for validation, the laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD), and
- Field Duplicates (FD).

Additionally, the validator examined the raw data for one of the two sample batches (randomly selected by the validator) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are 80-120% for laboratory accuracy and 75-125% for matrix accuracy for metals analyses.
- Laboratory Precision – the control limit (20 RPD) as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. A data rejection limit of 30% was used for these inorganic analyses. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

No LCSD were analyzed (or required) with the samples selected for validation.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every analytical batch (maximum 20 samples) and reported RPDs for all analytes. All MD RPDs are at or below the control limit. For the samples selected for validation, none of the MD were prepared using a sample from the site. Note that non-project MD results are included in the data packages but not in the EDD.

3.1.3 FIELD DUPLICATE (FD) PRECISION

For the samples selected for validation, the samplers collected one FD with the eight PSV and stockpile characterization investigative samples, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. Results for the field duplicate are summarized in Table 4 and are within the criteria.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD) and matrix spikes (MS/MSD) plus serial dilutions (SD). LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

For the samples selected for validation, the laboratory analyzed a LCS for every analytical batch (maximum 20 samples) as required and reported recoveries for all analytes. All LCS recoveries are within the control limits.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS for every analytical batch (maximum 20 samples) and reported recoveries for all analytes. All MS recoveries are within the control limits. For the samples selected for validation, none of the MS were prepared using a sample from the site. Note that non-project MS results are included in the data packages but not in the EDD.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all metals detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples selected for validation were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records and custody seals, which confirms that sample integrity was maintained. No issues were noted during sample log-in at the laboratory, and all field samples were analyzed for the tests requested on the chain-of-custody. Additionally, the information on the custody record is correct and agrees with that reported in the analytical results.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

The samples selected for validation were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. The analyte list includes TCLP Antimony, TCLP Arsenic, TCLP Cadmium, and/or TCLP Lead as requested and the nominal reporting limits are below the levels of concern (i.e., the treatment goals) for each analyte.

(Note: The laboratory dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank and leachate blank for every analytical batch (maximum 20 samples) plus a calibration blank for every 10 metals analyses as required per the analytical methodology. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used. No analytes were detected in the laboratory blanks.

3.3.5 ANALYTICAL PROCEDURES

For the samples selected for validation, the analytical procedures (initial calibration, continuing calibration verification, and interference correction), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method.

Additionally, no issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes two analytical batches and the validator re-calculated sample results and QC check parameters for one batch (batch 460-302255 in work order 460-95665-1).

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

For the samples selected for validation, the NYSDEC Category B data packages and EDD contain all necessary information.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	**Sample(s)**	**EDD Field(s)**	**Action**
All	all QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.

3.4.3 ANALYTICAL COMPLETENESS

For the samples selected for validation, the validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. (Note that in some cases the laboratory used a more recent version of the method

specified in the Workplan, e.g. SW846 6010C was used instead of SW846 6010B.) The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which an analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which an analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J-flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results are reported in µg/L and are classified as Level 2 data for TCLP metals with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples and
Stockpile Characterization Samples
February 2015 to July 2015

SAMPLES SELECTED FOR VALIDATION

Lab ID	Field ID	Sample Date	Type	Media	Matrix	TCLP Sb, As, Cd, Pb	TCLP Pb
460-95665-1	C-Area19/TP-Stockpile1	5/29/2015	INV	SC	Soil		x
460-95665-2	C-Area19/TP-Stockpile2	5/29/2015	INV	SC	Soil		x
460-96495-1	PSV-392	6/15/2015	INV	PSV	Soil	x	
460-96495-2	PSV-393	6/15/2015	INV	PSV	Soil	x	
460-96495-3	PSV-393-X	6/15/2015	FD	PSV	Soil	x	
460-96495-4	PSV-394	6/15/2015	INV	PSV	Soil	x	
460-96495-5	PSV-395	6/15/2015	INV	PSV	Soil	x	
460-96495-6	PSV-396	6/15/2015	INV	PSV	Soil	x	
460-96495-7	PSV-397	6/15/2015	INV	PSV	Soil	x	

FD - Field Duplicate Sample
INV - Investigative Sample
PSV – Post-Stabilization Verification Sample
SC – Stockpile Characterization Sample

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Metals: 1311/ 3010A/ 6010C for Antimony, Arsenic, Cadmium, and/or Lead in leachates of soil samples

TABLE 2

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples and
Stockpile Characterization Samples
February 2015 to July 2015

QUALIFIED RESULTS FOR VALIDATED SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-96495-1	PSV-392-20150615	1311 ANTIMONY	72.2 J ug/l	J	Result between MDL and RL
460-96495-1	PSV-392-20150615	1311 ARSENIC	22.9 J ug/l	J	Result between MDL and RL
460-96495-2	PSV-393-20150615	1311 ANTIMONY	82.8 J ug/l	J	Result between MDL and RL
460-96495-3	PSV-393-X-20150615	1311 ANTIMONY	88.7 J ug/l	J	Result between MDL and RL
460-96495-4	PSV-394-20150615	1311 ANTIMONY	56.9 J ug/l	J	Result between MDL and RL
460-96495-4	PSV-394-20150615	1311 ARSENIC	23.1 J ug/l	J	Result between MDL and RL
460-96495-5	PSV-395-20150615	1311 ARSENIC	39.5 J ug/l	J	Result between MDL and RL
460-96495-6	PSV-396-20150615	1311 ANTIMONY	80.1 J ug/l	J	Result between MDL and RL
460-96495-7	PSV-397-20150615	1311 ANTIMONY	65.4 J ug/l	J	Result between MDL and RL
460-96495-7	PSV-397-20150615	1311 ARSENIC	22.4 J ug/l	J	Result between MDL and RL

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples and
Stockpile Characterization Samples
February 2015 to July 2015

FIELD DUPLICATE RESULTS FOR VALIDATED SAMPLES

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-96495-2	460-96495-3	PSV-393-20150615	ANTIMONY	82.8	J	ug/l	88.7	J	ug/l	5.9	200	NA	y
460-96495-2	460-96495-3	PSV-393-20150615	ARSENIC	22.1	U	ug/l	22.1	U	ug/l	0	150	NA	y
460-96495-2	460-96495-3	PSV-393-20150615	CADMIUM	11.6	U	ug/l	11.6	U	ug/l	0	40	NA	y
460-96495-2	460-96495-3	PSV-393-20150615	LEAD	20.8	U	ug/l	20.8	U	ug/l	0	100	NA	y

Note: The RPD test (≤35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test (≤ 2x RL) applies.

ATTACHMENT A

VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact			Project Number/ Manager: E7976H/ Jenny Self	
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC Feb15-Jul15)			QC Level: II	
Laboratory: TestAmerica (Edison, NJ)			Laboratory Job No: 460-95665-1, 460-96495-1	
Reviewer: Taryn Scholz			Date Checked: 9/9/15	
Parameters: TCLP Metals			Methods: 1311/3010A/6010C	
ITEM	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
Laboratory NELAP/ELAP accredited?	x			NYDOH (NELAP) #11452, NYDOH (ELAP) #11452
Signed Narrative included?	x			
No narrative issues noted by lab?	x			
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required)
COCs properly executed and seals used?	x			
Samples received within 2 days?	x			
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL)
RLs acceptable?	x			(ASP Exh C Part III and/or DER-10 App 5)
No elevated RLs for NDs?	x			Note: 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D)
If analytical cleanup used, method ref included and approved?			x	(ASP Exh D)
Sample matrix included?	x			
Soils on dry weight basis?			x	
Correct and consistent units?	x			in ug/L
Holding time to analysis not expired?	x			(Workplan Table 2)
Holding time to preparation not expired?	x			(Workplan Table 2)
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory			NA	
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)	x			Total samples = 6 PSV, 2 SC; Total FD = 1 PSV
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible		x		**none for PSV or SC, all non-project and in HC only not EDD**
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Data Validation Checklist: Metals/Wet Chem

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC Feb15-Jul15)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 460-95665-1, 460-96495-1
Reviewer: Taryn Scholz	Date Checked: 9/9/15
Parameters: TCLP As,Cd,Pb,Sb and TCLP Pb	Methods: 1311/3010A/6010B

%PERFORMED/	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			
100	%R criteria met?	x			method (lab but within 50-200%)
	Matrix spike data included in lab package?	x			all non-project, only in HC not EDD
100	%R criteria met?			x	method (75-125%)
	Sample duplicate data included in lab package?	x			as LR; all non-project, only in HC not EDD
100	RPD criteria met?			x	method (20% if >10xMDL)
100	Field dup RPD criteria met? (individual, mean, and overall)	x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	Intensities within limits? (min 30-120% of calib std)			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV/SC Feb15-Jul15)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 460-95665-1, 460-96495-1
Reviewer: Taryn Scholz	Date Checked: 9/9/15
Parameters: TCLP As,Cd,Pb,Sb and TCLP Pb	Methods: 1311/3010A/6010C

%PERFORMED/ ITEM		YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

TCLP Batches: 5/31 14:30, 6/17 17:30

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action

Front Lawn Area Delineation Samples and Railroad Pond Dewatering Samples

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

October 13, 2015

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 3

3.0 DATA VALIDATION RESULTS 4

3.1 PRECISION 4
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 4
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 4
3.1.3 Field Duplicate (FD) Precision 4
3.2 ACCURACY 4
3.2.1 Laboratory Control Spike (LCS) Accuracy 5
3.2.2 Matrix Spike (MS) Accuracy 5
3.2.3 Serial Dilution (SD) %Difference 5
3.3 REPRESENTATIVENESS 5
3.3.1 Chain-of-Custody and Analysis Requests 5
3.3.2 Sample Preservation and Holding Time 5
3.3.3 Laboratory and Method Selection 5
3.3.4 Blanks (Laboratory and Field) 6
3.3.5 Analytical Procedures 6
3.4 COMPLETENESS 6
3.4.1 Laboratory Deliverables Completeness 6
3.4.2 EDD Correctness 7
3.4.3 Analytical Completeness 7
3.5 COMPARABILITY 7

LIST OF TABLES

Table 1 – Sample Summary
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – Qualified Sample Results

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York (i.e., the Site). The independent data review was completed in accord with the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 21 investigative soil samples and nine investigative water samples. The soil samples were collected by ENTACT during October 2013 to November 2013 to define the horizontal and vertical extent of excavation required in the Front Lawn Area (FLA) along the Ballard Road right of way and the facility entrance road by comparison to the source material and commercial use soil cleanup objectives (SCO) for the Site. The water samples are pond water collected in response to NYSDEC's request in order to allow the dewatering water from the Railroad Pond to be discharged downstream after comparison to the water quality standards applicable to the Site (i.e., 6 NYCRR Part 703(a) Class C(T)). A complete listing of the samples and the tests performed on each is shown in Table 1. Per ENTACT's request, QAA performed a full validation of the samples and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010). The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (August 2014), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846, 40CFR Part 136, and Standard Methods) and the sampling objectives.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The validator assessed precision using the laboratory duplicate results. (No field duplicates were collected with the samples.) The laboratory prepared a laboratory control spike duplicate (LCSD) using reagent water with every TDS and TSS batch plus two of the 200.8 metals in water batches. All LCSD RPDs are at or below the limit, which indicates good precision for the analytical technique on a sample free of matrix effects. Additionally, the laboratory prepared an unspiked matrix duplicate (MD) or spiked matrix duplicate (MSD) with every analytical batch and reported the relative percent difference (RPD) for all analytes. As shown in Table 1, one MD for TDS, two MD for TCLP lead, one MD for 6010C metals in soil, and four spiked matrix duplicates (MSD) for 200.8 metals in water were prepared using a sample from the site. All site MD and MSD RPDs are at or below the limit, which indicates good precision for the analytical technique on the given sample matrix, except for lead in the MD for 6010C metals in soil. As a result, 13 detects for lead in the FLA samples were qualified as estimated (J).

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The validator assessed accuracy using the laboratory spikes and matrix spikes. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with every analytical batch plus a LCSD with the batches noted above and reported the recoveries for all analytes. The LCS/LCSD recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. Additionally, the laboratory prepared a matrix spike (MS) with every metals batch plus a MSD with the batches noted above and reported the recoveries for each analyte. As shown in Table 1, one MS for 6010C metals in soil, two MS for TCLP metals, and four MS/MSD for 200.8 metals in water were prepared

using a sample from the site. All site MS/MSD recoveries are within the limits, which indicates good accuracy for the analytical technique on the given sample matrix.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, FLA and pond water samples were collected as required per the project plan. Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratories are properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory blanks, and analytical instrument setup (i.e., calibration, interference correction, etc.) The preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank with every analytical batch plus a leachate blank with each TCLP Metals batch. The blanks show no contamination, which indicates the samples were not affected by laboratory procedures, except for one TDS batch. The TDS level in this blank is well below (<10x) that in the associated sample, and thus there is no effect on data quality. Additionally, proper analytical techniques were used and calibration results met the method requirements, except for one TDS sample (WSTREAM-N OF 16A). For this sample, a constant weight was not achieved during the drying cycles before calculation of the result. The laboratory reanalyzed the sample with confirming results after the holding time had expired. The validator qualified the result as estimated (J).

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. All analyses produced valid analytical measurements, which gives a completeness of 100%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the submissions. Some minor revisions were required to produce the final data packages as documented in the laboratory narratives.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846, 40CFR Part 136, or Standard Methods. The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results for all field samples are reported in mg/kg with dry-weight correction for metals in soils, in µg/L for TCLP metals and metals in water, and in mg/L for TDS, TSS and BOD.

DATA USABILITY

No major QC deficiencies were noted and all sample results are acceptable for use with the qualifications shown in Table 3.

Thirteen (13) detects for total Lead have a J flag due to poor laboratory duplicate precision (22 RPD). The RPD is just slightly above the limit of 20 RPD. Data quality is not considered to be significantly affected, and the results may be used as reported. One TDS result has a J flag due to a problem with the analytical procedure. This result may be either low or high. The remaining ten results with J flags are qualified solely because the concentration is between the MDL and RL. The actual value is not expected to exceed the sample RL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD), and
- Field Duplicates (FD).

Additionally, the validator examined the raw data for two of the 22 sample batches (randomly selected by the validator) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are between 70-130% for laboratory and matrix accuracy for metals analyses and 85-115% for TDS/TSS/BOD analyses.
- Laboratory Precision – the control limit (20 RPD) as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. A data rejection limit of 30% was used for these inorganic analyses. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

The laboratory analyzed a LCSD for every TDS and TSS analytical batch (maximum 20 samples) plus two of the 200.8 metals in water batches, and reported RPDs for all analytes. All LCSD RPDs are at or below the limit.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD or MSD for every analytical batch (maximum 20 samples) and reported RPDs for all analytes. The validator only evaluated the MD and MSD prepared with a sample from the site (which includes one MD for TDS, two MD for TCLP lead, one MD for 6010C metals in soil, and four MSD for 200.8 metals in water), since those prepared with samples from another site do not reflect data quality for the Revere site. All site MD and MSD RPDs are at or below the control limit, except as follows:

- For QC batch 460-190023, the RPD for lead in the MD prepared with FLATP-1-2' is slightly above the 20% control limit at 22%.

This indicates a potential bias in results for the associated samples. Thus, the reviewer qualified the results for lead (which are all detects) for the FLA samples in the same QC batch as estimated with an unknown bias (J).

Note that non-project MD/MSD results are included in the data packages but not in the EDD.

3.1.3 FIELD DUPLICATE (FD) PRECISION

No FD were collected with the samples.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD) and matrix spikes (MS/MSD) plus serial dilutions (SD). LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS and/or LCSD for every analytical batch (maximum 20 samples) as required and reported recoveries for all analytes. All LCS recoveries are within the control limits.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS and/or MSD for every metals batch (maximum 20 samples) and reported recoveries for each analyte. The validator only evaluated the MS/MSD prepared with a sample from the site (which includes one MS for 6010C metals in soil, two MS for TCLP metals, and four MS/MSD for 200.8 metals in water), since those prepared with samples from another site do not reflect data quality for the Revere site. All site MS/MSD recoveries are within the control limits. Note that non-project MS results are included in the data packages but not in the EDD.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all metals detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records and custody seals, which confirms that sample integrity was maintained. No issues were noted during sample log-in at the laboratory, and all field samples were analyzed for the tests requested on the chain-of-custody. Additionally, the information on the custody record is correct and agrees with that reported in the analytical results, except as follows:

- For laboratory ID 490-78497-2, the custody record shows a sample ID of Pond Water-2. Upon the client's request, the laboratory revised the sample ID to Pond Water-5 per the sample container labels.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

The samples were properly preserved and analyzed within the holding times listed in the analytical methods, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratories are accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452 and TestAmerica-Nashville NYSDOH (NELAP) #11342, NYSDOH (ELAP) #11342). Note that TestAmerica-Nashville performed the 200.8 metals in water, TDS, and TSS analyses for laboratory job numbers 490-78497-1, 490-82374-1, 490-83125-1, and 490-83269-1 under subcontract to TestAmerica-Edison.

Analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) were used for the metals analyses, and the nominal reporting limits are below the levels of concern (i.e., the remedial or treatment goals) for each analyte.

(Note: The laboratory dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank and leachate blank for every analytical batch (maximum 20 samples) plus a calibration blank for every 10 metals analyses as required per the analytical methodology. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used. No analytes were detected in the laboratory blanks, except as follows:

- For QC batch 490-264656, TDS is reported at 8.00 J mg/L in the preparation blank.

This indicates a potential high bias for detects in the associated samples. The only sample prepared in this batch contains TDS at a level well above that in the blank (>10x), and thus the validator did not qualify the data.

3.3.5 ANALYTICAL PROCEDURES

The analytical procedures (ICP-MS tuning, initial calibration, continuing calibration verification, internal standards, and interference correction), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method, except as follows:

- For TDS sample WSTREAM-N of 16A, a constant weight was not achieved after two drying cycles and the analyst inadvertently did not determine a third weight. The laboratory reanalyzed the sample with confirming results after the holding time had expired.

The validator qualified the result as estimated (J).

Note that Form 14 ICP-MS Tune in laboratory job number 490-78497-1 shows results from 5/9/15 12:32, which are above the %RSD criteria for several masses. The validator determined that another tune was subsequently performed at 5/9/15 12:38, which was prior to the sample analyses and that passes the criteria, and thus there is no effect on data quality.

Additionally, no issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes 22 analytical batches and the validator re-calculated sample results and QC check parameters for two batches (batch 460-190023 for 6010C metals in soils in work order 460-65950-1 and batch 490-249162 for 200.8 metals in water for work order 490-78497-1).

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The NYSDEC Category B data packages and EDD contain all necessary information.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	Sample(s)	EDD Field(s)	Action
All	All QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.
460-65950-1 460-66002-1	All FLA samples	start_depth	Part of the sample identification (e.g., the 6 for sample ID FLATP-6-3') was entered as the starting depth. The validator corrected the entry from this sample identification number to 0.
460-65950-1 460-66002-1	FLATP-2-3" FLATP-3-3" FLATP-4-3" FLATP-5-2" FLATP-8-2" FLATP-9-8" FLATP-14-2" FLATP-12-2" FLATP-15-3" FLATP-16-2" FLATP-17-7" FLATP-18-10" FLATP-20-2" FLATP-21-4"	depth_unit	The validator corrected the entry from ft to in based on the sample IDs.
460-95506-1 490-78497-1 490-82374-1 490-83125-1 490-83269-1	Pond Water – 1 Pond Water - 5 Pond Water - 10 POND WATER-1-2 POND WATER-5-2 WSTREAM-N OF 16A Test-Pond Water-7/9/15 TEST - POND WATER - 7/17/15 TEST-POND WATER-7/18/15	sample_matrix_code lab_matrix_code	The validator corrected the entry from WG (to be used for groundwater) to WS (to be used for surface water).
		start_depth end_depth depth_unit	The validator removed the entries (0-0 ft) since these fields are to be used for groundwater or soil only.

3.4.3 ANALYTICAL COMPLETENESS

The validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard method protocols as shown in Table 1. The metals methodologies employed by the laboratory are specified for use in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which an analyte can be positively identified but not necessarily

accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which an analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J-flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results are reported in mg/kg with dry-weight correction for metals in soils, in µg/L for TCLP metals and metals in water, and in mg/L for TDS, TSS and BOD and are classified as Level 4 data for with a full review and validation of 100% of the samples. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Front Lawn Area Delineation Samples and Railroad Pond Dewatering Samples

SAMPLE SUMMARY

Lab ID	Field ID	Sample Date	Type	Media	Matrix	Total Recoverable Metals in Water (Sb , As, Cd, Cr, Pb)	Dissolved Metals in Water (Sb, As, Cd, Cr, Pb)	TDS	TSS	BOD	Metals in Soil (As, Pb)	TCLP Metals (Pb)
460-65950-1	FLATP-1-2'	10/30/13	INV	FLA	Soil						x	x
460-65950-1LR	FLATP-1-2'	10/30/13	MD	FLA	Soil						x	x
460-65950-1MS	FLATP-1-2'	10/30/13	MS	FLA	Soil						x	x
460-65950-2	FLATP-2-3"	10/30/13	INV	FLA	Soil						x	x
460-65950-3	FLATP-3-3"	10/30/13	INV	FLA	Soil						x	x
460-65950-4	FLATP-4-3"	10/30/13	INV	FLA	Soil						x	x
460-65950-5	FLATP-5-2"	10/30/13	INV	FLA	Soil						x	x
460-65950-6	FLATP-6-3'	10/30/13	INV	FLA	Soil						x	x
460-65950-7	FLATP-7-1'	10/31/13	INV	FLA	Soil						x	x
460-65950-8	FLATP-8-2"	10/31/13	INV	FLA	Soil						x	x
460-65950-9	FLATP-9-8"	10/31/13	INV	FLA	Soil						x	x
460-65950-10	FLATP-10-1'	10/31/13	INV	FLA	Soil						x	x
460-65950-11	FLATP-11-1'	10/31/13	INV	FLA	Soil						x	x
460-65950-12	FLATP-13-1'	10/31/13	INV	FLA	Soil						x	x
460-65950-13	FLATP-14-2"	10/31/13	INV	FLA	Soil						x	x
460-66002-1	FLATP-12-2"	11/2/13	INV	FLA	Soil						x	x
460-66002-2	FLATP-15-3"	11/2/13	INV	FLA	Soil						x	x
460-66002-3	FLATP-16-2"	11/2/13	INV	FLA	Soil						x	x
460-66002-3LR	FLATP-16-2"	11/2/13	MD	FLA	Soil							x
460-66002-3MS	FLATP-16-2"	11/2/13	MS	FLA	Soil							x
460-66002-4	FLATP-17-7"	11/2/13	INV	FLA	Soil						x	x
460-66002-5	FLATP-18-10"	11/2/13	INV	FLA	Soil						x	x
460-66002-6	FLATP-19-1'	11/2/13	INV	FLA	Soil						x	x
460-66002-7	FLATP-20-2"	11/2/13	INV	FLA	Soil						x	x
460-66002-8	FLATP-21-4"	11/2/13	INV	FLA	Soil						x	x
460-95506-1	POND WATER-1-2	5/27/15	INV	PW	Water					x		

Lab ID	Field ID	Sample Date	Type	Media	Matrix	Total Recoverable Metals in Water (Sb , As, Cd, Cr, Pb)	Dissolved Metals in Water (Sb, As, Cd, Cr, Pb)	TDS	TSS	BOD	Metals in Soil (As, Pb)	TCLP Metals (Pb)
460-95506-2	POND WATER-5-2	5/27/15	INV	PW	Water					x		
460-95506-3	WSTREAM-N OF 16A	5/27/15	INV	PW	Water			x		x		
490-78497-1	Pond Water - 1	5/14/15	INV	PW	Water	x	x	x	x			
490-78497-1LR	Pond Water - 1	5/14/15	MD	PW	Water			x				
490-78497-1MS	Pond Water - 1	5/14/15	MS	PW	Water		x					
490-78497-1SD	Pond Water - 1	5/14/15	MSD	PW	Water		x					
490-78497-2	Pond Water - 5	5/14/15	INV	PW	Water	x	x	x	x			
490-78497-3	Pond Water - 10	5/14/15	INV	PW	Water	x	x	x	x			
490-82374-1	Test-Pond Water-7/9/15	7/9/15	INV	PW	Water	x*	x*	x	x			
490-82374-1MS	Test-Pond Water-7/9/15	7/9/15	MS	PW	Water		x*					
490-82374-1SD	Test-Pond Water-7/9/15	7/9/15	MSD	PW	Water		x*					
490-83125-1	TEST - POND WATER - 7/17/15	7/17/15	INV	PW	Water	x*	x*	x	x			
490-83125-1MS	TEST - POND WATER - 7/17/15	7/17/15	MS	PW	Water		x*					
490-83125-1SD	TEST - POND WATER - 7/17/15	7/17/15	MSD	PW	Water		x*					
490-83269-1	TEST-POND WATER-7/18/15	7/18/15	INV	PW	Water	x*	x*	x	x			
490-83269-1MS	TEST-POND WATER-7/18/15	7/18/15	MS	PW	Water		x*					
490-83269-1SD	TEST-POND WATER-7/18/15	7/18/15	MSD	PW	Water		x*					

* Sample analyzed for lead only

BOD - Biochemical Oxygen Demand
INV – Investigative Sample
FLA – Front Lawn Area Delineation Sample
MD – Matrix Duplicate
MS – Matrix Spike
MSD – Matrix Spike Duplicate
PW – Railroad Pond Dewatering Sample
TDS – Total Dissolved Solids
TSS – Total Suspended Solids

The following analytical methods from EPA's SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW846), EPA's Clean Water Act methods (40CFR Part 136), or *Standard Methods for the Examination of Water and Wastewater* (Standard Methods) were used:

- Total Recoverable Metals in Water: 40CFR Part 136 Method 200.8 for Antimony, Arsenic, Cadmium, Chromium and/or Lead in aqueous samples
- Dissolved Metals in Water: 40CFR Part 136 Method 200.8 for Antimony, Arsenic, Cadmium, Chromium and/or Lead in aqueous samples following filtration of an unpreserved sample aliquot by the laboratory after sample receipt
- TDS: Standard Method 2540C in aqueous samples
- TSS: Standard Method 2540D in aqueous samples
- BOD: Standard Method 5210B in aqueous samples
- Metals in Soil: SW846 3050B/ 6010C for Arsenic and Lead in soil samples
- TCLP Metals: SW846 1311/ 3010A/ 6010C for Lead in leachates of soil sample

TABLE 2

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Front Lawn Area Delineation Samples and Railroad Pond Dewatering Samples

QUALIFIED SAMPLE RESULTS

Lab ID	Field ID-Date	Analyte	Lab Result			DVQ	QC Issue
460-65950-1	FLATP-1-2'-20131030	Lead	73.0		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-2	FLATP-2-3"-20131030	Lead	482		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-3	FLATP-3-3"-20131030	Lead	683		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-4	FLATP-4-3"-20131030	Lead	657		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-5	FLATP-5-2"-20131030	Lead	541		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-6	FLATP-6-3'-20131030	Lead	1870		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-7	FLATP-7-1'-20131031	Lead	22400		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-8	FLATP-8-2"-20131031	Lead	3350		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-9	FLATP-9-8"-20131031	Lead	308		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-10	FLATP-10-1'-20131031	Lead	10300		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-11	FLATP-11-1'-20131031	Lead	2840		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-12	FLATP-13-1'-20131031	Lead	26500		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-65950-13	FLATP-14-2"-20131031	Lead	1940		mg/kg	J	Poor lab duplicate precision (22 RPD)
460-95506-3	WSTREAM-N OF 16A-20150527	Total Dissolved Solids	560		mg/l	J	Constant weight not achieved before calculation
490-78497-3	Pond Water - 10-20150514 (Dissolved Metals Aliquot)	Cadmium	0.58	J	ug/l	J	Result is between MDL and RL
490-78497-3	Pond Water - 10-20150514 (Total Metals Aliquot)	Cadmium	0.75	J	ug/l	J	Result is between MDL and RL
490-78497-3	Pond Water - 10-20150514 (Total Metals Aliquot)	Chromium, Total	1.6	J	ug/l	J	Result is between MDL and RL
490-78497-1	Pond Water - 1-20150514 (Dissolved Metals Aliquot)	Cadmium	0.44	J	ug/l	J	Result is between MDL and RL
490-78497-1	Pond Water - 1-20150514 (Total Metals Aliquot)	Cadmium	0.48	J	ug/l	J	Result is between MDL and RL
490-78497-1	Pond Water - 1-20150514 (Total Metals Aliquot)	Chromium, Total	0.92	J	ug/l	J	Result is between MDL and RL
490-78497-2	Pond Water - 5-20150514 (Dissolved Metals Aliquot)	Cadmium	0.47	J	ug/l	J	Result is between MDL and RL
490-78497-2	Pond Water - 5-20150514 (Total Metals Aliquot)	Cadmium	0.66	J	ug/l	J	Result is between MDL and RL
490-78497-2	Pond Water - 5-20150514 (Total Metals Aliquot)	Chromium, Total	1.1	J	ug/l	J	Result is between MDL and RL
490-82374-1	Test-Pond Water-7/9/15-20150709 (Dissolved Metals Aliquot)	Lead	0.99	J	ug/l	J	Result is between MDL and RL

ATTACHMENT A

VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact			Project Number/ Manager: E7976H/ Jenny Self	
Site Name: Revere Smelting and Refining (Phase 2B FLA/PW Feb15-Jul15)			QC Level: NA	
Laboratory: TestAmerica (Edison, NJ) and TestAmerica (Nashville, TN)			Laboratory Job No: see below	
Reviewer: Taryn Scholz			Date Checked: 9/9/15	
Parameters: Total/Dissolved Metals, TCLP Metals, TDS, TSS, BOD			Methods: 3050C/6010C & 1311/3010A/6010C; 200.8, LF 200.8, 2540C, 2540D, 5210B	
ITEM	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
Laboratory NELAP/ELAP accredited?	x			NJ - NYDOH (NELAP) #11452, NYDOH (ELAP) #11452; Nash - NYDOH (NELAP) #11342, NYDOH (ELAP) #11342
Signed Narrative included?	x			
No narrative issues noted by lab?		x		see Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(Methods soils - none; water - HNO3 (total metals), none (unfiltered diss metals, TDS/TSS, BOD)
COCs properly executed and seals used?	x			
Samples received within 2 days?		x		some rec'd day 3, all in good condition and within hold time
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			Pond Water - 2 changed to Pond Water - 5 per the sample container labels and Entact's request (490-78497-2).
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?			x	
RLs acceptable?		x		(ASP Exh C Part III and/or DER-10 App 5); see comment no. 1
No elevated RLs for NDs?	x			Note: 5x std dilution for TCLP
Prep/Analysis method references included and approved?		x		(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D); see no. 2
If analytical cleanup used, method ref included and approved?			x	(ASP Exh D)
Sample matrix included?	x			
Soils on dry weight basis?			x	
Correct and consistent units?	x			soils in mg/Kg, water in ug/L for metals, mg/L for TDS/TSS/BOD
Holding time to analysis not expired?	x			(Methods metals (soil/water) - 180 d, TDS/TSS - 7 d, BOD - 48 h
Holding time to preparation not expired?			x	
QC Samples (not listed in Workplan)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory			NA	
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)			NA	none collected
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible			NA	none collected
Completeness criteria met?			NA	
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job Nos: 460-65950-1, 460-66002-1, 490-78497-1 (Nash), 460-95506-1, 490-82374-1 (Nash), 490-83125-1 (Nash), 490-83269-1 (Nash)

1. Some RLs > ASP Exh C but all below decision criteria

2. TDS/TSS/BOD by Std Methods (listed in ASP under 40CFR 136)

QAA No	Lab Job No.	Test	Batch/Sample	Issue	Resolution
EN517	460-65950-1	TCLP Metals	7,10,12	samples req'd 20-50x dilution due to nature of sample matrix (high lead); RLs adjusted (5x std)	NA - result is not non-detect
		Total Metals	7,8,10,11,12	samples req'd 10-100x dilution prior to analysis; RLs adjusted (rest at 4x)	NA - result is not non-detect
		Total Metals	190023	65950-1MD RPD out for Lead due to sample non-homogeneity	see QC Deficiencies
EN518	460-66002-1	Total Metals	2,6	samples req'd 20-30x dilution prior to analysis; RLs adjusted (rest at 4x)	NA - result is not non-detect
		Total Metals	190487	MD RPD out for Lead due to sample non-homogeneity	None (non-project QC)
EN519	490-78497-1	Diss Metals	NA	As std practice, all non-potable samples and QC diluted 5x prior to analysis	None (all Revere samples at 1x)
		Total Metals	NA	As std practice, all non-potable samples and QC diluted 5x prior to analysis	None (all Revere samples at 1x)
		TSS	248934	78320-1MD RPD out	None (non-project QC)
EN520	460-95506-1	TDS	301699	Constant weight not achieved after 2 drying cycles for 95406-2 DUP	None (non-project QC)
		TDS	301699	Constant weight not achieved after 2 drying cycles for 95506-3, reanalyzed in 303836 w confirming results	Result qualified as estimated (J)
EN521	490-82374-1	TDS	262498	Min volume (1-ml) produced base result >200-mg for 82384-1 and its DUP, qualified per method	None (non-project DUP, no effect on sample, 50-mls used for sample with <200-mg base result)
EN522	490-83125-1	Diss Metals	NA	As std practice, all non-potable samples and QC diluted 5x prior to analysis	None (all Revere samples at 1x)
		Total Metals	NA	As std practice, all non-potable samples and QC diluted 5x prior to analysis	None (all Revere samples at 1x)
		TSS	266086	83133-1MD RPD out	None (non-project QC)
EN523	490-83269-1	Diss Metals	NA	As std practice, all non-potable samples and QC diluted 5x prior to analysis	None (all Revere samples at 1x)
		Total Metals	NA	As std practice, all non-potable samples and QC diluted 5x prior to analysis	None (all Revere samples at 1x)
		TDS	264656	TDS in MB <RL, samples with detects flagged	see QC Deficiencies

Data Validation Checklist: Metals

Client Name: Entact		Project Number/ Manager: E7976H/ Jenny Self			
Site Name: Revere Smelting and Refining (Phase 2B FLA/PW Feb15-Jul15)		QC Level: NA			
Laboratory: TestAmerica (Edison, NJ) and TestAmerica (Nashville, TN)		Laboratory Job No: see Validation - General			
Reviewer: Taryn Scholz		Date Checked: 9/9/15			
Parameters: Total/TCLP Metals (soils); Total/Dissolved Metals (water)		Methods: 3050C/6010C & 1311/3010A/6010C; 200.8 & LF 200.8			
%PERFORMED/	**ITEM**	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			
100	%R criteria met?	x			method (lab but within 50-200% or 85-115% EPA)
	Matrix spike data included in lab package?	x			
100	%R criteria met?	x			method (75-125% SW846 or 70-130% EPA)
	Sample duplicate data included in lab package?	x			as LR
100	RPD criteria met?		x		method (20% if >10xMDL); see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)			x	ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Instrument Tune for ICP-MS included in lab package?	x			applies for 200.8
100	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)	x			
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL, ≥2-RL)	x			2RL per ASP Exh E
	Internal standard data included in lab package?	x			applies for 200.8
100	Intensities within limits? (min 60-125% of calib std)	x			
	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			
COMMENTS					

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B FLA/PW Feb15-Jul15)	QC Level: NA
Laboratory: TestAmerica (Edison, NJ) and TestAmerica (Nashville, TN)	Laboratory Job No: see Validation - General
Reviewer: Taryn Scholz	Date Checked: 9/9/15
Parameters: TCLP Pb	Methods: 1311/3010A/6010C

	%PERFORMED/ ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

TCLP Batches: 190004, 190405

Data Validation Checklist: Misc Parameters

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B FLA/PW Feb15-Jul15)	QC Level: NA
Laboratory: TestAmerica (Edison, NJ) and TestAmerica (Nashville, TN)	Laboratory Job No: see Validation - General
Reviewer: Taryn Scholz	Date Checked: 9/9/15
Parameters: TDS, TSS, BOD	Methods: 2540C, 2540D, 5210B

%PERFORMED/ ITEM		YES	NO	N/A	CRITERIA
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL)		x		see QC Deficiencies
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			
100	%R criteria met? (individual and overall)	x			
	Matrix spike data included in lab package?			x	
100	%R criteria met? (individual and overall)			x	
	Sample duplicate data included in lab package?	x			
100	RPD criteria met?	x			
100	Field dup RPD criteria met? (individual, mean, and overall)			x	
	Calibration verification data included in lab package?			x	
	ICV %R criteria met? (90-110% IC, 85-115% CN)			x	
NA	CCV %R criteria met? (90-110% IC, 85-115% CN)			x	
	Analyte quantitation/RLs correct?				
10	QC parameters calculated correctly?				

COMMENTS

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples

February 2015 to July 2015

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

November 11, 2015

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 5

3.0 DATA VALIDATION RESULTS 7

3.1 PRECISION 7
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 7
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 7
3.1.3 Field Duplicate (FD) Precision 7
3.2 ACCURACY 8
3.2.1 Laboratory Control Spike (LCS) Accuracy 8
3.2.2 Matrix Spike (MS) Accuracy 8
3.2.3 Serial Dilution (SD) %Difference 9
3.2.4 Surrogate (SU) Recovery 9
3.3 REPRESENTATIVENESS 9
3.3.1 Chain-of-Custody and Analysis Requests 9
3.3.2 Sample Preservation and Holding Time 10
3.3.3 Laboratory and Method Selection 10
3.3.4 Blanks (Laboratory and Field) 11
3.3.5 Analytical Procedures 11
3.4 COMPLETENESS 12
3.4.1 Laboratory Deliverables Completeness 12
3.4.2 EDD Correctness 12
3.4.3 Analytical Completeness 13
3.5 COMPARABILITY 13

LIST OF TABLES

Table 1 – Sample Summary
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – QC Deficiencies and Data Qualification Actions
Table 4 – Qualified Results for Field Samples
Table 5 – Field Duplicate Results

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The independent data review was completed in accord with the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 200 investigative soil samples plus the associated field QC samples, which were collected by ENTACT in February 2015 through July 2015 with the intended use of confirming that backfill materials are suitable for use on-site and verifying that remediation goals have been achieved in excavated grids. A complete listing of the samples collected and tests performed is shown in Table 1. QAA performed a full validation of the data and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) as specified in Section 5.9 of the Workplan. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (August 2014) and *National Functional Guidelines for Superfund Organic Methods Data Review* (August 2014), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The Workplan stipulates that the precision control limits will be dictated by the analytical method. The validator assessed precision using the laboratory and field duplicates, and the limits are 20-32 RPD depending upon the test. The laboratory prepared a laboratory control spike duplicate (LCSD) using reagent water or sand for each VOC analytical batch plus at least one unspiked matrix duplicate (MD) or matrix spike duplicate (MSD) using a sample from the site for each test except Metals, Pest, PCB, Herb, and VOC for the backfill samples. All LCS/LCSD RPDs are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. The RPDs for the matrix duplicates are within the limits, which indicates good precision for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the duplicate. Of the 1,666 total results for field samples (investigative samples and field duplicates), only fifteen (15) results (for total Lead) are qualified as estimated (J) based on matrix duplicate precision. Additionally, the sampler collected three field duplicates for TCLP Lead and eight field duplicates for total Arsenic/Lead with the 200 investigative samples and the RPDs are within the limits, which indicates good precision for the sampling and analytical technique, or the validator qualified the results for the original and duplicate sample. One (for total Lead) of the 19 pairs of results is qualified as estimated (J) based on field duplicate precision.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The Workplan stipulates that the accuracy control limits will be dictated by the analytical method. The validator assessed accuracy using the laboratory spikes and matrix spikes, and the limits are either 75-125%, 80-120%, or the laboratory/manufacturer's established control limit for soils/solid reference materials (which range from 0.1%-209.5% for this data set). In order to better assess data usability, limits of 50-200% were employed where the method limits for a spiked analyte falls outside these values. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with each analytical

batch and reported the recovery for all spiked compounds, which included every target compound except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result). The laboratory also prepared a laboratory control spike duplicate (LCSD) with each VOC analytical batch. The LCS/LCSD recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects, with some exceptions for Antimony, a few VOC and SVOC analytes, and Cyanide. (Note that in each case the recoveries are within the laboratory limits or are outside the limits for only a small percentage of the total number of target analytes for the test, and thus corrective action was not required.) Most of the exceedances did not result in data qualification (e.g., the recovery was above the limit indicating a potential bias for detected results and the analyte was not detected in any of the associated samples) with just eight results (one for Antimony and seven for Cyanide) being qualified as not detected at an estimated reporting limit (UJ) due to laboratory spike recovery. Additionally, the laboratory prepared four matrix spike samples (MS) along with four post digestion spikes (PDS) and serial dilutions (SD) for TCLP Lead, eight MS/PDS/SD for total Arsenic/Lead, two MS/SD for Mercury, one MS for Chromium VI, two MS along with two matrix spike duplicate samples (MSD) for SVOC, and two MS/MSD for Cyanide using a sample from the site. All SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy of metals results that are substantially above the reporting limit. The MS/MSD/PDS recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the spike samples. One result (the non-detect for Pentachlorophenol in BF-5L-GF-4c-01) is qualified as rejected (R) due to extremely low matrix spike recovery (<20%). Of the remaining 1,665 total results for field samples, only sixteen (16) results (one for 2-Methylphenol and 15 for total Lead) are qualified as estimated based on matrix spike recovery. Additionally, the laboratory utilized one or more surrogate spikes for each organic analysis. The surrogate recoveries are within the laboratory limits for all field samples except three VOC samples. Each of these exceedances is above the limit indicating a potential bias for detected results. The samples are non-detect for all VOC analytes, and thus laboratory corrective action was not required and the validator did not qualify the data.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, investigative samples were collected as required in the approved sampling and analysis plans. (Note that sampling is an on-going process at the site and all samples may not be reflected in this validation batch.) Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory and field QC blanks, and analytical instrument setup (i.e., tuning, calibration, interference correction, etc.) For all samples, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation with one exception. The detect for Mercury in sample ECS-WSTREAM-13+00-F is qualified as estimated (J) because the sample was received outside the temperature criteria at 6.6 C. The laboratory prepared and analyzed a method blank with each analytical batch and the sampler collected a trip blank with the VOC samples. The laboratory and field QC blanks show no contamination, which indicates the samples were not affected by laboratory or field procedures, or the validator qualified the samples associated with the blank that have a concentration similar to the blank. Six detects for Methylene Chloride (which is all the Methylene Chloride detects for this event) are qualified as potentially contaminated (U) due to laboratory blank contamination below the reporting limit but above the detection limit. Additionally, the validator qualified three detects for Cyanide due to low-level laboratory blank contamination using the UJ flag since the results are also associated with low laboratory

spike recovery. Proper analytical procedures were used and calibration results met the method requirements or the validator qualified the affected samples. Seventeen (17) non-detect results for Acetone, Methyl Ethyl Ketone (2-Butanone), or Tetrachloroethylene (PCE) are qualified as estimated (UJ) due to calibration drift. Note that in each case only a small percentage of the total number of target analytes for the test is affected, and thus corrective action was not required.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. The validator rejected just one of the 1,666 total results for field samples, which gives a completeness of 99.9%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results for all field samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics.

DATA USABILITY

The following non-detect result is qualified as rejected (R):

Lab ID	Field ID	Test	Analyte(s)	Result	DVQ	QC Issue
460-97323-3	BF-5L-GF-4c-01	SVOC	Pentachlorophenol	280 U µg/kg	R	Low matrix spike recovery (22%); Extremely low matrix spike duplicate recovery (17%)

For this result, the absence or presence of the analyte cannot be confirmed in the sample due to serious QC issues, and thus it is not suitable for use.

All other results for the samples are acceptable for use with the qualifications shown in Table 4, as follows:

- Six (6) detects for Methylene Chloride in the backfill samples are qualified with a U (potentially contaminated) and the analyte should be considered not detected at the associated value, which is the higher of the measured concentration or the sample reporting limit (RL). In each case, the associated value (0.76-0.95 µg/kg) is well below the Allowable Constituent Level (ACL) for imported fill or soil from Appendix 5 of the DER-10 (50 µg/kg), and thus there is negligible effect on data quality.
- Three (3) detects for Cyanide in the backfill samples are qualified with a UJ (potentially contaminated at an estimated reporting limit) and the analyte should be considered not detected at the associated value, which is an estimated value. In each case, the associated value (0.10-0.12 mg/kg) is well below the ACL (27 mg/kg), and thus there is negligible effect on data quality.
- Twenty-two (22) non-detects for Cyanide, Acetone, Methyl Ethyl Ketone (2-Butanone), Tetrachloroethylene (PCE), or 2-Methylphenol (o-Cresol) in the backfill samples are qualified with a UJ (estimated) and the analyte should be considered not present above the reporting limit; however the reporting limit is an estimated value. In each case, the sample reporting limit (RL) is well below (more than ten times) the ACL, and thus there is negligible effect on data quality, with one exception:

Lab ID	Field ID	Test	Analyte(s)	Result	ACL	DVQ	QC Issue
460-97323-3	BF-5L-GF-4c-01	SVOC	2-Methylphenol (o-Cresol)	350 U µg/kg	330 µg/kg	UJ	Low matrix spike recovery (52%)

Though non-detects are reported at the sample reporting limit (RL) as requested, the samples were evaluated to the method detection limit (MDL). The MDL for this sample is 15 µg/kg, which is well below (more than ten times) the ACL and thus there is negligible effect on data quality.

- One non-detect for Antimony in an excavation confirmation sample (ECS-WSTREAM-25+00-F) is qualified with a UJ (estimated) and the analyte should be considered not present above the reporting limit; however the reporting limit is an estimated value. There is no established level of concern for this analyte.
- One detect for Mercury in an excavation sample (ECS-WSTREAM-13+00-F) is qualified with a J (estimated). This result can be used for determining the presence of the analyte; however, the concentration reported may be either high or low. There is no established level of concern for this analyte.
- Fifteen (15) detects for Lead in the excavation confirmation samples are qualified with a J (estimated). These results can be used for determining the presence of the analyte; however, the concentration reported may be either high or low. The results are flagged due to high matrix spike recovery (207%) and poor lab duplicate precision (66 RPD), which indicates a maximum potential +/-2x bias. In each case, the result is below (more than two times) the 400 mg/kg remedial goal, and thus there is minimal effect on data quality.
- Two (2) detects for Lead in excavation confirmation samples ECS-WSTREAM-25+00-SE and its field duplicate are qualified with a J (estimated) due to poor field duplicate precision. For a conservative approach relative to protection of the environment, the higher result for this pair (which is reported in the original sample ECS-WSTREAM-25+00-SE for Lead) should be used for project decisions.
- The remaining 76 results with J flags are qualified solely because the concentration is between the MDL and RL. In each case, the actual value is not expected to exceed the sample RL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include pdf data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Instrument Tuning and Initial Calibration,
- Calibration Verification,
- Interference Check Standards (ICS),
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD),
- Field Duplicates (FD),
- Dual Column Confirmation,
- Surrogates (SU), and
- Internal Standards (IS).

Additionally, the validator examined the raw data for 10% of the sample batches (randomly selected by the validator across the various analysis dates and tests) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not less than 50% lower limit or greater than 200% upper limit)
- Laboratory Precision – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not greater than 40%)
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator

considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 40% and 30% for inorganics laboratory and matrix spikes, and 30%, 20% and 10% for organics laboratory, matrix and surrogate spikes were used. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

The laboratory analyzed an LCSD and reported RPDs for all target compounds for each VOC batch (maximum 20 samples). All LCSD RPDs are at or below the criteria.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every inorganics analytical batch (maximum 20 samples) and an MSD for every organics analytical batch (maximum 20 samples) and reported RPDs for MD and MSD prepared using a sample from the site or another site. MD/MSD prepared with a sample from another site were not evaluated, since they do not reflect data quality for the site. No soil samples were designated by the sampler for MD/MSD for the backfill samples; however, the laboratory selected one or more backfill samples for batch QC for Mercury, Chromium VI, SVOC, and Cyanide. Eight excavation confirmation soil samples (seven of which were designated by the sampler on the custody record) were used to prepare an MD for total Arsenic/Lead and four of these were also used for TCLP Lead. With a total of 173 investigative confirmation samples, this is slightly below the Workplan requirement of one per 20 or fewer samples per sample matrix.

Two of the RPDs for MD prepared using a sample from the site are above the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that, for cases where either result for the duplicate pair is non-detect, the check does not apply and the laboratory reported the RPD as NC (not calculable) in the pdf report and as 0 in the EDD. Additionally, the validator considered samples of the same media (i.e., backfill or excavation confirmation) and source to be of similar matrix (e.g., if deficiencies were noted for a MD or MSD prepared using a backfill sample from a particular source, all backfill samples from that source in the same analytical batch were qualified).

3.1.3 FIELD DUPLICATE (FD) PRECISION

The samplers collected eight FD with the 173 investigative confirmation samples, which is slightly below the Workplan requirement of one per 20 or fewer samples per sample matrix. No FD were collected with the backfill samples. Results for the field duplicates are summarized in Table 5.

One pair of results is outside the field precision criteria and the validator qualified the data as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4

lists all qualified results for the field samples. Note that the remaining 18 pairs of FD results meet the criteria, which indicates good overall precision, and thus the validator only qualified the original and duplicate sample for the FD deficiency.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD), matrix spikes including post digestion spikes (MS/MSD/PDS), serial dilutions (SD), and surrogate (SU) spikes. LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD/PDS are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit. Surrogates are added to each sample before preparation and analysis and provide an indication of accuracy for each individual sample analysis.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS and/or LCSD for every analytical batch (maximum 20 samples) as required and reported recoveries for all target compounds except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result).

Some LCS/LCSD recoveries are outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator did not qualify the data for cases where the LCS or LCSD recovery for an organic analyte is outside the criteria (i.e., the laboratory-derived recovery control limits based on historical performance or 50-200%, whichever is more stringent) but within 70-130% since this is considered within the inherent method error and suitable for the intended use. Additionally, the validator did not qualify the data for cases where the LCS or LCSD recovery is outside the criteria (but greater than the data rejection limit) but the average LCS/LCSD recovery is within control.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS/PDS for every inorganics analytical batch (maximum 20 samples) and an MS/MSD for every organics analytical batch (maximum 20 samples) and reported recoveries for MS/PDS/MSD prepared using a sample from the site or another site. MS/PDS/MSD prepared with a sample from another site were not evaluated, since they do not reflect data quality for the site. No soil samples were designated by the sampler for MS/PDS/MSD for the backfill samples; however, the laboratory selected one or more backfill samples for batch QC for Mercury, Chromium VI, SVOC, and Cyanide. Eight excavation confirmation soil samples (seven of which were designated by the sampler on the custody record) were used to prepare an MD for total Arsenic/Lead and four of these were also used for TCLP Lead. With a total of 173 investigative confirmation samples, this is slightly below the Workplan requirement of one per 20 or fewer samples per sample matrix.

Some of the recoveries for MS prepared using a sample from the site are outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. The validator considered samples of the same media (i.e., backfill or excavation confirmation) and source to be of similar matrix (e.g., if

deficiencies were noted for a MS/MSD prepared using a backfill sample from a particular source, all backfill samples from that source in the same analytical batch were qualified).

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all target compounds detected above 50x the method detection limit (MDL). All %differences for SD prepared using a sample from the site are at or below the control limit (10%).

3.2.4 SURROGATE (SU) RECOVERY

The laboratory spiked each organic sample with one or more surrogates before preparation and analysis.

Some surrogate recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records, which confirms that sample integrity was maintained. The validator noted the following regarding the custody records and sample log-in at the laboratory:

- All samples were received within two days of collection as recommended in DER-10, except as follows:
    - For work order 460-96096-1, the samples were received on 6/9/15, which was five days after collection due to shipment issues. All of the samples are backfill soil samples with two samples (BF-ETETZ-GF-1c-01 and BF-ETETZ-GF-1c-02) requiring analysis for DER-10 total metals including Mercury, Chromium III/VI, PEST, PCB, HERB, SVOC, and Cyanide and the rest requiring analysis for DER-10 VOC. The samples were received at proper temperature (5.7 C) on ice under custody seal; however, the VOC samples were received beyond the laboratory standard two-day holding time from collection to freezing, and thus these analyses were cancelled and the samples were re-collected on 6/10/15. The second set of VOC samples was logged in using laboratory IDs of 460-96245-1 to 460-96245-8 but are reported under the original work order (460-96096-1).
    - For work order 460-96099-1, the samples were received on 6/9/15, which was five days after collection due to shipment issues. All of the samples are soil samples requiring analysis for total Arsenic/Lead and TCLP lead. The samples were received at proper temperature (5.7 C) on ice under custody seal and well before holding time expiration. Thus, the laboratory proceeded with analyses as requested.
- For work order 460-96096-1, the documentation indicates that no custody seals were used for the transfer of the VOC grab samples (BF-ETETZ-GF-1g-01 through BF-ETETZ-GF-1g-07) from the field to the laboratory. The samples were transferred by commercial, overnight courier and were received in good condition, and thus no further action was taken.

- For work order 460-95664-1, the container was received broken but intact for ECS-Area19-D18-F. The sample was transferred to new containers upon receipt. Analyses were performed for metals only, and thus this is not considered to significantly affect data quality and no further action was taken.
- For work order 460-96096-1, one of the two 8-ounce jars collected on 6/4/15 for BF-ETETZ-GF-1c-01 was received broken. A second aliquot was collected on 6/10/15 and sent to the laboratory to be used as needed. All analyses were performed using the remaining container from 6/4/15.

All samples were analyzed for the tests requested on the chain-of-custody, and the information on the custody record is correct and agrees with that reported in the analytical results except as follows:

- For work orders 460-96336-1, 460-98313-1, and 460-98409-1, the sample IDs for one or more samples were revised from those on the custody record per ENTACT'S request.
- For work order 460-97009-1, the sampler did not indicate any requested tests on the custody record for sample ECS-WSTREAM-25+00-SE-X. The laboratory logged in the sample for total Arsenic/Lead per ENTACT's request and the project plan.
- For work order 460-97107-1, the custody record incorrectly indicates that the trip blank was of solid matrix. The laboratory received an aqueous trip blank and proceeded with DER-10 VOC analysis as planned.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

All samples were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan, and/or SW-846, which confirms that sample results are not affected by sample degradation, except as follows:

- For work order 460-94569-1, the samples were received at 6.6 C on ice. This is above the laboratory's standard receipt requirement of $\leq$6 C. All of the samples in this work order are soil samples with one sample (ECS-WSTREAM-13+00-F) analyzed for TAL Metals (including Mercury) and the rest analyzed for total Arsenic/Lead only. Per the Workplan and SW846, soil samples to be analyzed for metals with the exception of Mercury and Chromium VI do not require thermal preservation; while soil samples to be analyzed for Mercury require cooling to $\leq$6 C.

As a result, the validator qualified the Mercury detect in ECS-WSTREAM-13+00-F as estimated (J). The remaining metals results were not qualified.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (no. 11452).

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. (In some cases, the method update number used by the laboratory may differ from that in the Workplan. For example, method 8260C was used rather than 8260B for the VOCs for the backfill samples.)

For the backfill samples, the target analyte list includes all DER-10 analytes and the nominal reporting limits (i.e., without dry-weight correction or sample dilution and based on the standard sample weight and final volume) are at or below the levels of concern (i.e., the Allowable Constituent Levels (ACLs) for imported fill or soil from Appendix 5 of the DER-10), except as follows:

- DER-10 Appendix 5 lists m-Cresol(s), o-Cresol(s), and p-Cresol(s). The laboratory reported m & p-Cresols and o-Cresol as it is not possible to separate m-Cresol and p-Cresol using method 8270D.
- DER-10 Appendix 5 lists Chlordane (alpha). The laboratory reported technical Chlordane, which is a commercial mixture that contains alpha-Chlordane and gamma-Chlordane along with other related compounds.
- The laboratory reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) for the backfill samples instead of the DER-10 analytes as requested on the custody record.

None of the backfill samples required dilution, and thus none have elevated reporting limits.

For the excavation confirmation samples, the target analyte list includes total Arsenic, total Lead, and/or TCLP Lead as requested and all Contract Laboratory Program (CLP) metals for the TAL metals. The nominal reporting limits are below the levels of concern (i.e., the remedial goals) for total Arsenic, total Lead, and TCLP Lead. There are no established levels of concern for the TAL metals. The nominal reporting limits comply with the requirements in the ASP for TAL metals with the exception of Iron, which has a nominal reporting limit of 30 mg/kg that is above the ASP reporting limit of 20 mg/kg.

Some of the excavation confirmation samples required dilution, but none has elevated reporting limits for a non-detect result with one exception:

- The non-detect for Selenium in ECS-AREA22-N21SE-F is reported at a 10x dilution, which was required for analysis of the sample.

(Note: The laboratory dilutes all total metals samples 2-4x before analysis as standard practice. All Revere samples were diluted 4x and thus nominal reporting limits were determined at this dilution rate. The laboratory also dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank (and leachate blank for TCLP) for every analytical batch (maximum 20 samples) and a calibration blank for every 10 metals analyses as required per the analytical methodology. Additionally, a trip blank was included with the single shipment of VOC samples, which meets the Workplan requirement of one for every cooler of VOC samples. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used.

Some detects are reported in the laboratory blanks and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator calculated a blank equivalent concentration taking into account the sample weight, moisture content, and dilution factor for each sample when determining if the contamination in the blank is near that in the sample, and thus if data quality is affected for that sample.

3.3.5 ANALYTICAL PROCEDURES

The analytical procedures (instrument tuning and initial calibration, calibration verification, interference check standards, dual column confirmation, and internal standards), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method with a few exceptions. The validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

No issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes 93 analytical batches. The validator re-calculated sample results and QC check parameters for nine batches and made the following observations from the review of the raw data:

- The laboratory used dual column confirmation for all GC analyses (including Pesticides, PCBs, and Herbicides). For surrogates and spiked analytes, the laboratory reports the results from both columns in the pdf report. For target analytes in blanks and field samples (and as the reportable result in the EDD for surrogates and spiked analytes), the laboratory reports the result from the column with the higher concentration (unless chromatographic performance is better on one column and it is therefore used for all analyses), provided that the RPD between the two columns is less than 40%. If the RPD is greater than 40%, the column with the lower concentration is reported with a note in the narrative and the result is reported with a P flag. The RPD did not exceed 40% for any field or QC samples in this data set. (All field samples are non-detect.)
- For batch 305340 in work order 460-96483-1, the validator noted that the Q value is low (30-32) and the printed spectra do not show the characteristic ions for the Methylene Chloride detects in the laboratory blank and samples 1 through 6, and thus requested that the laboratory confirm the presence of this analyte. Per the laboratory, the Methylene Chloride target concentration is small and present but is co-eluting with the larger concentration of the internal standard TBA-d9, and thus the smaller target spectrum of the Methylene Chloride was obscured by the larger internal standard. No further action is required.
- For batch 305298 in work order 460-96483-1, the retention time for the 8082A Decachlorobiphenyl surrogate in samples 8 and 9 on the secondary column (CLP-2) is outside the established window (11.25-11.39) at 11.23 minutes. The retention time on the primary column is within the window and the samples are all non-detect, and thus there is no effect on data quality.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The Level 4 data packages and EDD contain all necessary information or the laboratory submitted a revision upon request as detailed in the case narratives.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
All	All laboratory QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.
460-96096-1 460-96483-1 460-97107-1 460-97323-1	All backfill composite samples (*c-001 and *c-002)	composite_yn	The validator changed the entry from N to Y based on the custody record.

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
All	All 6010C total metals samples	prep_method	The validator changed the method reference from SW3020B to SW3050B based on the pdf analytical results and as confirmed by the laboratory.

3.4.3 ANALYTICAL COMPLETENESS

The validator rejected one non-detect result for Pentachlorophenol due to extremely low matrix spike duplicate recovery. With 1,666 total results for field samples (investigative samples and field duplicates), this gives a completeness of 99.9%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which a target analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which a target analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size and include dry-weight correction for all soil samples as required per Section 5.7.1 of the Workplan. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results for the investigative samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics. (For the 7196A analyses, Chromium III is shown as not dry-weight corrected. Chromium III is calculated from the results for Chromium VI and total Chromium, which are dry-weight corrected, and thus the Chromium III is not directly dry-weight corrected but is on a dry-weight basis.)

The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
February 2015 to July 2015

SAMPLE SUMMARY

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-94449-1	ECS-WStream-11+00F	5/6/15	INV	ECS	Soil		x										
460-94449-2	ECS-WStream-11+00WB	5/6/15	INV	ECS	Soil		x										
460-94449-3	ECS-WStream-11+00EB	5/6/15	INV	ECS	Soil		x										
460-94449-4	ECS-WStream-11+50F	5/6/15	INV	ECS	Soil		x										
460-94449-5	ECS-WStream-11+50WB	5/6/15	INV	ECS	Soil		x										
460-94449-6	ECS-WStream-11+50EB	5/6/15	INV	ECS	Soil		x										
460-94449-7	ECS-WStream-12+00F	5/6/15	INV	ECS	Soil		x										
460-94449-8	ECS-WStream-12+00WB	5/6/15	INV	ECS	Soil		x										
460-94449-9	ECS-WStream-12+00EB	5/6/15	INV	ECS	Soil		x										
460-94569-1	ECS-WSTREAM-12+50-F	5/7/15	INV	ECS	Soil		x										
460-94569-2	ECS-WSTREAM-12+50-EB	5/7/15	INV	ECS	Soil		x										
460-94569-3	ECS-WSTREAM-12+50-WB	5/7/15	INV	ECS	Soil		x										
460-94569-3LR	ECS-WSTREAM-12+50-WB	5/7/15	MD	ECS	Soil		x										
460-94569-3MS	ECS-WSTREAM-12+50-WB	5/7/15	MS	ECS	Soil		x										
460-94569-4	ECS-WSTREAM-13+00-F	5/7/15	INV	ECS	Soil			x	x								
460-94569-5	ECS-WSTREAM-13+00-EB	5/7/15	INV	ECS	Soil		x										
460-94569-6	ECS-WSTREAM-13+00-WB	5/7/15	INV	ECS	Soil		x										
460-94569-7	ECS-WSTREAM-13+50-F	5/7/15	INV	ECS	Soil		x										
460-94569-8	ECS-WSTREAM-13+50-EB	5/7/15	INV	ECS	Soil		x										
460-94569-9	ECS-WSTREAM-13+50-EB-X	5/7/15	FD	ECS	Soil		x										
460-94569-10	ECS-WSTREAM-13+50-WB	5/7/15	INV	ECS	Soil		x										
460-94569-11	ECS-WSTREAM-14+00-F	5/7/15	INV	ECS	Soil		x										
460-94569-12	ECS-WSTREAM-14+00-EB	5/7/15	INV	ECS	Soil		x										
460-94569-13	ECS-WSTREAM-14+00-WB	5/7/15	INV	ECS	Soil		x										
460-94614-1	ECS-WSTREAM-14+50-F	5/8/15	INV	ECS	Soil		x										
460-94614-2	ECS-WSTREAM-14+50-WB	5/8/15	INV	ECS	Soil		x										
460-94614-2LR	ECS-WSTREAM-14+50-WB	5/8/15	MD	ECS	Soil		x										
460-94614-2MS	ECS-WSTREAM-14+50-WB	5/8/15	MS	ECS	Soil		x										
460-94614-3	ECS-WSTREAM-15+00-F	5/8/15	INV	ECS	Soil		x										
460-94614-4	ECS-WSTREAM-15+00-WB	5/8/15	INV	ECS	Soil		x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-94614-5	ECS-WSTREAM-15+50-F	5/8/15	INV	ECS	Soil		x										
460-94614-6	ECS-WSTREAM-15+50-EB	5/8/15	INV	ECS	Soil		x										
460-94614-7	ECS-WSTREAM-15+50-WB	5/8/15	INV	ECS	Soil		x										
460-94648-1	ECS-WSTREAM-16+00-F	5/11/15	INV	ECS	Soil		x										
460-94648-2	ECS-WSTREAM-16+00-F-X	5/11/15	FD	ECS	Soil		x										
460-94648-3	ECS-WSTREAM-16+00-EB	5/11/15	INV	ECS	Soil		x										
460-94648-4	ECS-WSTREAM-16+00-WB	5/11/15	INV	ECS	Soil		x										
460-94648-5	ECS-WSTREAM-16+50-F	5/11/15	INV	ECS	Soil		x										
460-94648-6	ECS-WSTREAM-16+50-EB	5/11/15	INV	ECS	Soil		x										
460-94648-7	ECS-WSTREAM-16+50-WB	5/11/15	INV	ECS	Soil		x										
460-94648-7LR	ECS-WSTREAM-16+50-WB	5/11/15	MD	ECS	Soil		x										
460-94648-7MS	ECS-WSTREAM-16+50-WB	5/11/15	MS	ECS	Soil		x										
460-94648-8	ECS-WSTREAM-17+00-F	5/11/15	INV	ECS	Soil	x	x										
460-94648-9	ECS-WSTREAM-17+00-EB	5/11/15	INV	ECS	Soil	x		x	x								
460-94648-10	ECS-WSTREAM-17+00-WB	5/11/15	INV	ECS	Soil	x	x										
460-94905-1	ECS-WSTREAM-13+50-EB-R	5/14/15	INV	ECS	Soil		x										
460-94905-2	ECS-WSTREAM-13+50-WB-R	5/14/15	INV	ECS	Soil		x										
460-94905-3	ECS-WSTREAM-16+00-WB-R	5/14/15	INV	ECS	Soil		x										
460-94905-4	ECS-WSTREAM-16+50-WB-R	5/14/15	INV	ECS	Soil		x										
460-94905-5	ECS-WSTREAM-16+50-F-R	5/14/15	INV	ECS	Soil		x										
460-95432-1	ECS-Area 18-D16-SS	5/26/15	INV	ECS	Soil		x										
460-95503-1	ECS-AREA TP-B20S-SS	5/27/15	INV	ECS	Soil	x	x										
460-95503-2	ECS-AREA TP-B20S-SE	5/27/15	INV	ECS	Soil	x	x										
460-95503-3	ECS-AREA TP-B20S-F	5/27/15	INV	ECS	Soil	x	x										
460-95503-4	DS-AREA TP-B20S-SW	5/27/15	INV	ECS	Soil	x	x										
460-95503-5	ECS-AREA TP-B20N-F	5/27/15	INV	ECS	Soil	x	x										
460-95503-6	ECS-AREA TP-B20N-SE	5/27/15	INV	ECS	Soil	x	x										
460-95503-7	DS-AREA TP-B20N-SW	5/27/15	INV	ECS	Soil	x	x										
460-95503-8	ECS-AREA TP-B19S-SN	5/27/15	INV	ECS	Soil	x	x										
460-95503-9	ECS-AREA TP-B19S-SE	5/27/15	INV	ECS	Soil	x	x										
460-95503-10	ECS-AREA TP-B19S-F	5/27/15	INV	ECS	Soil	x	x										
460-95503-11	DS-AREA TP-B19S-SW	5/27/15	INV	ECS	Soil	x	x										
460-95599-1	DS-Area TP-B17W-SN	5/28/15	INV	ECS	Soil	x	x										
460-95599-2	DS-Area TP-B17W-SW	5/28/15	INV	ECS	Soil	x	x										
460-95599-3	ECS-Area TP-B17W-SS	5/28/15	INV	ECS	Soil	x	x										
460-95599-4	ECS-Area TP-B17W-F	5/28/15	INV	ECS	Soil	x	x										
460-95599-5	ECS-Area TP-B17E-SS	5/28/15	INV	ECS	Soil	x	x										
460-95599-6	ECS-Area TP-B17E-F	5/28/15	INV	ECS	Soil	x	x										
460-95599-7	DS-Area TP-B17E-SN	5/28/15	INV	ECS	Soil	x	x										
460-95599-8	ECS-Area TP-C17W-SS	5/28/15	INV	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-95599-9	ECS-Area TP-C17W-F	5/28/15	INV	ECS	Soil	x	x										
460-95599-10	DS-Area TP-C17W-SN	5/28/15	INV	ECS	Soil	x	x										
460-95664-1	DS-Area19-D17-SN	5/29/15	INV	ECS	Soil	x	x										
460-95664-2	ECS-Area19-D17-F	5/29/15	INV	ECS	Soil	x	x										
460-95664-3	ECS-Area19-D18-F	5/29/15	INV	ECS	Soil	x	x										
460-95664-4	ECS-Area19-D18-SW	5/29/15	INV	ECS	Soil	x	x										
460-95672-1	DS-AreaTP-C17E-SN	5/30/15	INV	ECS	Soil	x	x										
460-95672-2	ECS-AreaTP-C17E-F	5/30/15	INV	ECS	Soil	x	x										
460-95672-3	ECS-AreaTP-C17E-SS	5/30/15	INV	ECS	Soil	x	x										
460-95672-4	ECS-Area19-D19-F	5/30/15	INV	ECS	Soil	x	x										
460-95672-5	ECS-Area19-D19-SW	5/30/15	INV	ECS	Soil	x	x										
460-95891-1	ECS-AREA19-D20-SW	6/3/15	INV	ECS	Soil	x	x										
460-95891-2	ECS-AREA19-D20-SW-X	6/3/15	FD	ECS	Soil	x	x										
460-95891-3	ECS-AREA19-D20-F	6/3/15	INV	ECS	Soil	x		x	x								
460-95891-4	ECS-AREA19-D21-SW	6/3/15	INV	ECS	Soil	x	x										
460-95891-5	ECS-AREA19-D21-F	6/3/15	INV	ECS	Soil	x	x										
460-95891-5LR	ECS-AREA19-D21-F	6/3/15	MD	ECS	Soil	x	x		x								
460-95891-5MS	ECS-AREA19-D21-F	6/3/15	MS	ECS	Soil	x	x		x								
460-96031-1	ECS-AREA19-D-23-F	6/5/15	INV	ECS	Soil	x	x										
460-96031-1LR	ECS-AREA19-D-23-F	6/5/15	MD	ECS	Soil	x	x										
460-96031-1MS	ECS-AREA19-D-23-F	6/5/15	MS	ECS	Soil	x	x										
460-96031-2	ECS-AREA19-D23-SW	6/5/15	INV	ECS	Soil	x	x										
460-96096-8	BF-ETETZ-GF-1c-01	6/4/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-96096-8MS	BF-ETETZ-GF-1c-01-2	6/4/15	MS	BF	Soil											x	x
460-96096-8SD	BF-ETETZ-GF-1c-01-2	6/4/15	MSD	BF	Soil											x	x
460-96096-9	BF-ETETZ-GF-1c-02	6/4/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-96245-1	BF-ETETZ-GF-1g-01	6/10/15	INV	BF	Soil										x		
460-96245-2	BF-ETETZ-GF-1g-02	6/10/15	INV	BF	Soil										x		
460-96245-3	BF-ETETZ-GF-1g-03	6/10/15	INV	BF	Soil										x		
460-96245-4	BF-ETETZ-GF-1g-04	6/10/15	INV	BF	Soil										x		
460-96245-5	BF-ETETZ-GF-1g-05	6/10/15	INV	BF	Soil										x		
460-96245-6	BF-ETETZ-GF-1g-06	6/10/15	INV	BF	Soil										x		
460-96245-7	BF-ETETZ-GF-1g-07	6/10/15	INV	BF	Soil										x		
460-96245-8	TB - 6/10/15	6/10/15	TB	TB	Water										x		
460-96099-1	ECS-AREA 19-D22-F	6/4/15	INV	ECS	Soil	x	x										
460-96099-2	ECS-AREA 19-D22-F-X	6/4/15	FD	ECS	Soil	x	x										
460-96099-3	ECS-AREA 19-D22-SW	6/4/15	INV	ECS	Soil	x		x	x								
460-96336-1	ECS-WSTREAM-20+00-F	6/11/15	INV	ECS	Soil	x	x										
460-96336-2	ECS-WSTREAM-20+00-SE	6/11/15	INV	ECS	Soil	x	x										
460-96336-3	ECS-WSTREAM-20+00-SW	6/11/15	INV	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-96336-4	ECS-WSTREAM-20+50-F	6/11/15	INV	ECS	Soil		x										
460-96336-5	ECS-WSTREAM-20+50-SE	6/11/15	INV	ECS	Soil		x										
460-96336-6	ECS-WSTREAM-20+50-SW	6/11/15	INV	ECS	Soil		x										
460-96336-7	ECS-WSTREAM-21+00-F	6/11/15	INV	ECS	Soil		x										
460-96336-8	ECS-WSTREAM-21+00-SE	6/11/15	INV	ECS	Soil		x										
460-96336-9	ECS-WSTREAM-21+00-SW	6/11/15	INV	ECS	Soil		x										
460-96413-1	ECS-WSTREAM-21+50-F	6/12/15	INV	ECS	Soil		x										
460-96413-2	ECS-WSTREAM-21+50-F-X	6/12/15	FD	ECS	Soil		x										
460-96413-3	ECS-WSTREAM-21+50-SE	6/12/15	INV	ECS	Soil			x	x								
460-96413-4	ECS-WSTREAM-21+50-SW	6/12/15	INV	ECS	Soil		x										
460-96413-5	ECS-WSTREAM-22+00-F	6/12/15	INV	ECS	Soil		x										
460-96413-6	ECS-WSTREAM-22+00-SE	6/12/15	INV	ECS	Soil		x										
460-96413-7	ECS-WSTREAM-22+00-SW	6/12/15	INV	ECS	Soil		x										
460-96413-7LR	ECS-WSTREAM-22+00-SW	6/12/15	MD	ECS	Soil		x										
460-96413-7MS	ECS-WSTREAM-22+00-SW	6/12/15	MS	ECS	Soil		x										
460-96483-1	BF-5L-GF-1g-01	6/15/15	INV	BF	Soil										x		
460-96483-2	BF-5L-GF-1g-02	6/15/15	INV	BF	Soil										x		
460-96483-3	BF-5L-GF-1g-03	6/15/15	INV	BF	Soil										x		
460-96483-4	BF-5L-GF-1g-04	6/15/15	INV	BF	Soil										x		
460-96483-5	BF-5L-GF-1g-05	6/15/15	INV	BF	Soil										x		
460-96483-6	BF-5L-GF-1g-06	6/15/15	INV	BF	Soil										x		
460-96483-7	BF-5L-GF-1g-07	6/15/15	INV	BF	Soil										x		
460-96483-8	BF-5L-GF-1c-01	6/15/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-96483-8MS	BF-5L-GF-1c-01-2	6/15/15	MS	BF	Soil												x
460-96483-8SD	BF-5L-GF-1c-01-2	6/15/15	MSD	BF	Soil												x
460-96483-9	BF-5L-GF-1c-02	6/15/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-96483-10	TB-6/15/15	6/15/15	TB	TB	Water										x		
460-96489-1	ECS-WSTREAM-22+50-F	6/14/15	INV	ECS	Soil		x										
460-96489-2	ECS-WSTREAM-22+50-SE	6/14/15	INV	ECS	Soil		x										
460-96489-3	ECS-WSTREAM-22+50-SW	6/14/15	INV	ECS	Soil		x										
460-96489-4	ECS-WSTREAM-23+00-F	6/14/15	INV	ECS	Soil		x										
460-96489-5	ECS-WSTREAM-23+00-SE	6/14/15	INV	ECS	Soil		x										
460-96489-6	ECS-WSTREAM-23+00-SW	6/14/15	INV	ECS	Soil		x										
460-96489-7	ECS-WSTREAM-23+50-F	6/14/15	INV	ECS	Soil		x										
460-96489-8	ECS-WSTREAM-23+50-SE	6/14/15	INV	ECS	Soil		x										
460-96489-9	ECS-WSTREAM-23+50-SW	6/14/15	INV	ECS	Soil		x										
460-96494-1	DS-AREA 16B-D18-SE	6/14/15	INV	ECS	Soil	x	x										
460-96494-2	DS-AREA 16B-E19-SW	6/14/15	INV	ECS	Soil	x	x										
460-96494-3	DS-AREA 16B-E20-SW	6/15/15	INV	ECS	Soil	x	x										
460-96549-1	ECS-AREA 2-N19-F	6/16/15	INV	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-96549-2	ECS-WSTREAM-24+00-F	6/16/15	INV	ECS	Soil		x										
460-96549-3	ECS-WSTREAM-24+00-SE	6/16/15	INV	ECS	Soil		x										
460-96549-4	ECS-WSTREAM-24+00-SW	6/16/15	INV	ECS	Soil		x										
460-96873-1	DS-AREA16B-E21-SE	6/23/15	INV	ECS	Soil	x	x										
460-96873-2	DS-AREA16B-E22-SE	6/23/15	INV	ECS	Soil	x	x										
460-96873-3	DS-AREA16B-E23-SE	6/23/15	INV	ECS	Soil	x	x										
460-97009-1	ECS-WSTREAM-24+50-F	6/25/15	INV	ECS	Soil		x										
460-97009-2	ECS-WSTREAM-24+50-SE	6/25/15	INV	ECS	Soil		x										
460-97009-3	ECS-WSTREAM-24+50-SW	6/25/15	INV	ECS	Soil		x										
460-97009-4	ECS-WSTREAM-25+00-F	6/25/15	INV	ECS	Soil			x	x								
460-97009-5	ECS-WSTREAM-25+00-SE	6/25/15	INV	ECS	Soil		x										
460-97009-6	ECS-WSTREAM-25+00-SE-X	6/25/15	FD	ECS	Soil		x										
460-97009-7	ECS-WSTREAM-25+00-SW	6/25/15	INV	ECS	Soil		x										
460-97009-8	ECS-WSTREAM-25+50-F	6/25/15	INV	ECS	Soil		x										
460-97009-9	ECS-WSTREAM-25+50-SE	6/25/15	INV	ECS	Soil		x										
460-97009-10	ECS-WSTREAM-25+50-SW	6/25/15	INV	ECS	Soil		x										
460-97106-1	ECS-WSTREAM-26+00-F	6/26/15	INV	ECS	Soil		x										
460-97106-2	ECS-WSTREAM-26+00-SE	6/26/15	INV	ECS	Soil		x										
460-97106-3	ECS-WSTREAM-26+00-SW	6/26/15	INV	ECS	Soil		x										
460-97106-4	ECS-WSTREAM-26+50-F	6/26/15	INV	ECS	Soil		x										
460-97106-5	ECS-WSTREAM-26+50-SN	6/26/15	INV	ECS	Soil		x										
460-97106-6	ECS-WSTREAM-26+50-SS	6/26/15	INV	ECS	Soil		x										
460-97106-6LR	ECS-WSTREAM-26+50-SS	6/26/15	MD	ECS	Soil		x										
460-97106-6MS	ECS-WSTREAM-26+50-SS	6/26/15	MS	ECS	Soil		x										
460-97106-7	ECS-WSTREAM-27+00-F	6/26/15	INV	ECS	Soil		x										
460-97106-8	ECS-WSTREAM-27+00-SE	6/26/15	INV	ECS	Soil		x										
460-97106-9	ECS-WSTREAM-27+00-SW	6/26/15	INV	ECS	Soil		x										
460-97106-10	ECS-WSTREAM-27+50-F	6/26/15	INV	ECS	Soil		x										
460-97106-11	ECS-WSTREAM-27+50-SE	6/26/15	INV	ECS	Soil			x	x								
460-97106-12	ECS-WSTREAM-27+50-SW	6/26/15	INV	ECS	Soil		x										
460-97106-13	ECS-WSTREAM-28+00-F	6/26/15	INV	ECS	Soil		x										
460-97106-14	ECS-WSTREAM-28+00-SE	6/26/15	INV	ECS	Soil		x										
460-97106-15	ECS-WSTREAM-28+00-SW	6/26/15	INV	ECS	Soil		x										
460-97106-16	ECS-WSTREAM-28+50-F	6/26/15	INV	ECS	Soil		x										
460-97106-17	ECS-WSTREAM-28+50-SE	6/26/15	INV	ECS	Soil		x										
460-97106-18	ECS-WSTREAM-28+50-SW	6/26/15	INV	ECS	Soil		x										
460-97106-19	ECS-WSTREAM-29+00-F	6/26/15	INV	ECS	Soil		x										
460-97106-20	ECS-WSTREAM-29+00-SE	6/26/15	INV	ECS	Soil		x										
460-97106-21	ECS-WSTREAM-29+00-SW	6/26/15	INV	ECS	Soil		x										
460-97106-22	ECS-WSTREAM-29+00-SW-X	6/26/15	FD	ECS	Soil		x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-97107-1	BF-5L-GF-2g-01	6/26/15	INV	BF	Soil										x		
460-97107-2	BF-5L-GF-2g-02	6/26/15	INV	BF	Soil										x		
460-97107-3	BF-5L-GF-2c-01	6/26/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-97107-3LR	BF-5L-GF-2c-01-2	6/26/15	MD	BF	Soil				x								
460-97107-3MS	BF-5L-GF-2c-01-2	6/26/15	MS	BF	Soil				x								
460-97107-4	BF-5L-GF-3g-01	6/26/15	INV	BF	Soil										x		
460-97107-5	BF-5L-GF-3g-02	6/26/15	INV	BF	Soil										x		
460-97107-6	BF-5L-GF-3c-01	6/26/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-97107-6LR	BF-5L-GF-3c-01	6/26/15	MD	BF	Soil						x						
460-97107-6MS	BF-5L-GF-3c-01	6/26/15	MS	BF	Soil						x						
460-97107-7	TB-6/26/15	6/26/15	TB	TB	Water										x		
460-97162-1	ECS-AREA20-E24/25-F	6/29/15	INV	ECS	Soil	x	x										
460-97162-1LR	ECS-AREA20-E24/25-F	6/29/15	MD	ECS	Soil	x											
460-97162-1MS	ECS-AREA20-E24/25-F	6/29/15	MS	ECS	Soil	x											
460-97162-2	DS-AREA20-E25-SS	6/29/15	INV	ECS	Soil	x	x										
460-97313-1	ECS-WSTREAM-27+50-F-R	7/1/15	INV	ECS	Soil		x										
460-97313-2	ECS-WSTREAM-28+50-F-R	7/1/15	INV	ECS	Soil		x										
460-97313-3	ECS-WSTREAM-29+00-SE-R	7/1/15	INV	ECS	Soil		x										
460-97323-1	BF-5L-GF-4g-01	7/1/15	INV	BF	Soil										x		
460-97323-2	BF-5L-GF-4g-02	7/1/15	INV	BF	Soil										x		
460-97323-3	BF-5L-GF-4c-01	7/1/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-97323-3MS	BF-5L-GF-4c-01-2	7/1/15	MS	BF	Soil											x	
460-97323-3SD	BF-5L-GF-4c-01-2	7/1/15	MSD	BF	Soil											x	
460-97323-4	TB-7/1/15	7/1/15	TB	TB	Water										x		
460-98192-1	ECS-AREA-12/13-G10-F	7/16/15	INV	ECS	Soil		x										
460-98192-2	ECS-AREA-12/13-G10-SS	7/16/15	INV	ECS	Soil		x										
460-98192-3	ECS-AREA-12/13-H10-SS	7/16/15	INV	ECS	Soil		x										
460-98192-4	ECS-AREA-12-H9-SN-R	7/16/15	INV	ECS	Soil		x										
460-98192-5	ECS-AREA-12/13-G9-SN	7/16/15	INV	ECS	Soil		x										
460-98313-1	ECS-AREA22-O20-F	7/21/15	INV	ECS	Soil	x	x										
460-98313-2	ECS-AREA22-O21NW-F	7/21/15	INV	ECS	Soil	x	x										
460-98409-1	ECS-AREA22-N19SE-F	7/22/15	INV	ECS	Soil	x	x										
460-98409-2	ECS-AREA22-N20NE-F	7/22/15	INV	ECS	Soil	x	x										
460-98409-3	ECS-AREA22-N20SE-F	7/22/15	INV	ECS	Soil	x	x										
460-98409-4	ECS-AREA22-N21NE-F	7/22/15	INV	ECS	Soil	x	x										
460-98409-5	ECS-AREA22-N21SE-F	7/22/15	INV	ECS	Soil	x		x	x								
460-98409-6	DS-AREA22-N21SE-SS	7/22/15	INV	ECS	Soil	x	x										
460-98409-7	ECS-AREA22-N21NW-F	7/22/15	INV	ECS	Soil	x	x										
460-98409-8	ECS-AREA22-N21NW-F-X	7/22/15	FD	ECS	Soil	x	x										
460-98409-9	ECS-AREA22-O21NE-F	7/22/15	INV	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-98409-9LR	ECS-AREA22-O21NE-F	7/22/15	MD	ECS	Soil	x	x										
460-98409-9MS	ECS-AREA22-O21NE-F	7/22/15	MS	ECS	Soil	x	x										
460-98409-10	DS-AREA22-O21NE-SS	7/22/15	INV	ECS	Soil	x	x										
460-98409-11	DS-AREA22-O21SW-SS	7/22/15	INV	ECS	Soil	x	x										
460-98481-1	ECS-AREA22-N19SW-F	7/23/15	INV	ECS	Soil	x	x										
460-98481-2	ECS-AREA22-N20NW-F	7/23/15	INV	ECS	Soil	x	x										
460-98481-3	ECS-AREA22-N21SW-F	7/23/15	INV	ECS	Soil	x	x										
460-98481-4	DS-AREA22-N22NW-SS	7/23/15	INV	ECS	Soil	x	x										
460-98481-5	ECS-AREA22-N20SW-F	7/23/15	INV	ECS	Soil	x	x										
460-98481-6	ECS-AREA2-M19-F	7/23/15	INV	ECS	Soil	x	x										

BF - Backfill Sample
ECS - Excavation Confirmation Sample
FD - Field Duplicate Sample
INV - Investigative Sample
MD – Matrix Duplicate Sample (unspiked)
MS - Matrix Spike Sample
MSD - Matrix Spike Duplicate Sample
TB - Trip Blank

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Pb: 1311/ 3010A/ 6010C for Lead in leachates of soil samples
- Total As and Pb: 3050B/ 6010C for Arsenic and Lead in soil samples
- Total TAL Metals: 3050B/ 6010C for 22 ICP-AES Target Analyte List (TAL) Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc) in soil samples
- Hg: 7471B for total Mercury in soil samples
- Total DER10 Metals: 3050B/ 6010C for 12 ICP-AES NYSDEC DER-10 Appendix 5 Metals (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, Selenium, Silver, and Zinc) in soil samples
- Cr III/VI: 3060A/7196A for Trivalent Chromium and Hexavalent Chromium in soil samples
- PEST: 3546/ 3620C/ 8081B for 15 NYSDEC DER-10 Appendix 5 pesticides plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene in soil samples
- PCB: 3546/ 3665A/ 8082A for 7 Aroclors in soil samples
- HERB: 8151A for Silvex (2,4,5-TP) in soil samples
- VOC: 5035/8260C for 30 NYSDEC DER-10 Appendix 5 volatile organic compounds (VOCs) in soil samples and 5030B/ 8260C for 30 VOCs in aqueous trip blanks
- SVOC: 3546/ 8270D for 20 NYSDEC DER-10 Appendix 5 semivolatile organic compounds (SVOCs) plus Dibenzofuran and Hexachlorobenzene in soil samples
- CN: 9012B for Cyanide in soil samples

TABLE 2
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
February 2015 to July 2015

QC DEFICIENCIES AND DATA QUALIFICATION ACTIONS

Lab ID	Sample Code	Type	Method			Date and Time			GC	DF	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col			Qual	LCL	UCL	CL		
MATRIX DUPLICATE (MD) PRECISION																	
460-97106-6LR	ECS-WSTREAM-26+50-SS-20150626LR-20150626	LR		3050B	6010C		6/27/15 16:47	7/1/15 11:28	NA	4	ARSENIC				20	Poor lab duplicate precision (59 RPD)	None (results <5xRL and absolute difference <2xRL)
460-97106-6LR	ECS-WSTREAM-26+50-SS-20150626LR-20150626	LR		3050B	6010C		6/27/15 16:47	7/1/15 11:28	NA	4	LEAD	T			20	Poor lab duplicate precision (66 RPD)	J/UJ to detects/NDs for ECS samples digested in the same batch (all detects)
FIELD DUPLICATE (FD) PRECISION																	
460-97009-6	ECS-WSTREAM-25+00-SE-X-20150625	N		3050B	6010C		6/26/15 17:17	6/27/15 14:59	NA	4	LEAD				35	Poor field precision (63 RPD)	J/UJ to detects/NDs for original and duplicate sample
LABORATORY CONTROL SPIKE (LCS) ACCURACY																	
4603072582A4	4603072582A4	BS		3050B	6010C		6/26/15 17:17	6/27/15 13:20	NA	4	ANTIMONY		0.1	201		Low laboratory control spike recovery (48.4%) - within lab limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (ND)
4603046633	4603046633	BS			8260C			6/13/15 5:03	NA	1	ACETONE	T	58	139		High laboratory control spike recovery (157%)	J+ to detects for samples digested in the same batch (none)
4603046634	4603046634	BD			8260C			6/13/15 5:28	NA	1	ACETONE	T	58	139	30	High laboratory control spike duplicate recovery (155%)	J+ to detects for samples digested in the same batch (none)
4603074873	4603074873	BS			8260C			6/29/15 7:19	NA	1	ACETONE	T	58	139		High laboratory control spike recovery (152%)	J+ to detects for samples digested in the same batch (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4603074874	4603074874	BD			8260C			6/29/15 7:54	NA	1	ACETONE	T	58	139	30	High laboratory control spike duplicate recovery (147%)	J+ to detects for samples digested in the same batch (none)
4603074873	4603074873	BS			8260C			6/29/15 7:19	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	T	58	140		High laboratory control spike recovery (144%)	J+ to detects for samples digested in the same batch (none)
4603074874	4603074874	BD			8260C			6/29/15 7:54	NA	1	METHYL ETHYL KETONE (2-BUTANONE)		58	140	30	Passing laboratory control spike duplicate recovery (140%)	NA
4603085453	4603085453	BS			8260C			7/6/15 3:55	NA	1	TETRACHLORO-ETHYLENE(PCE)	T	80	127		Low laboratory control spike recovery (70%)	None (recovery within 70-130% data qualification limits)
4603085454	4603085454	BD			8260C			7/6/15 4:20	NA	1	TETRACHLORO-ETHYLENE(PCE)	T	80	127	30	Low laboratory control spike duplicate recovery (72%)	None (recovery within 70-130% data qualification limits)
46030548224	46030548224	BS			8260C			6/18/15 6:40	NA	1	1,2-DICHLOROETHANE	T	79	120		Low laboratory control spike recovery (125%)	None (recovery within 70-130% data qualification limits)
4603054826	4603054826	BD			8260C			6/17/15 22:53	NA	1	1,1-DICHLOROETHANE		78	125	30	Passing laboratory control spike duplicate recovery (107%)	NA
46030548224	46030548224	BS			8260C			6/18/15 6:40	NA	1	CARBON TETRACHLORIDE	T	77	137		High laboratory control spike recovery (141%)	None (average LCS/LCSD recovery (134.5%) within control)
4603054826	4603054826	BD			8260C			6/17/15 22:53	NA	1	CARBON TETRACHLORIDE		77	137	30	Passing laboratory control spike duplicate recovery (128%)	NA
4603089384	4603089384	BS			8260C			7/7/15 20:11	NA	1	ACETONE	T	26	150		High laboratory control spike recovery (205%) - QC for TB only	None (analytes ND in this TB, samples results not affected)
4603089384	4603089384	BS			8260C			7/7/15 20:11	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	T	52	140		High laboratory control spike recovery (144%) - QC for TB only	None (analytes ND in this TB, samples results not affected)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4603044032A	4603044032A	BS		3546	8270D		6/11/15 19:09	6/12/15 6:58	NA	1	INDENO(1,2,3-C,D)PYRENE	T	43	109		High laboratory control spike recovery (120%)	J+ to detects for samples digested in the same batch (none)
4603077673A	4603077673A	BS		3546	8270D		6/30/15 8:19	7/1/15 3:29	NA	1	BENZO(A)PYRENE	T	36	89		High laboratory control spike recovery (105%)	J+ to detects for samples digested in the same batch (none)
4603077673A	4603077673A	BS		3546	8270D		6/30/15 8:19	7/1/15 3:29	NA	1	BENZO(B) FLUORANTHENE	T	33	96		High laboratory control spike recovery (107%)	J+ to detects for samples digested in the same batch (none)
4603041144A20	4603041144A20	BS		method	9012		6/10/15 13:30	6/10/15 16:07	NA	20	CYANIDE		3.5	121.4		Extremely low soil LCS-SRM recovery (21.4%) - within vendor limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 92% and 90%, and two MS/MSD from other batches that were prepared using a sample from the site are within control.)
4603057314A	4603057314A	BS		method	9012		6/18/15 21:30	6/19/15 1:01	NA	10	CYANIDE		3.5	121.4		Extremely low soil LCS-SRM recovery (18.5%) - within vendor limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 106% and 109%, and two MS/MSD from other batches that were prepared using a sample from the site are within control.)
4603075984A20	4603075984A20	BS		method	9012		6/29/15 12:00	6/29/15 17:10	NA	20	CYANIDE		3.5	121.4		Extremely low soil LCS-SRM recovery (19.6%) - within vendor limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 99% and 98%, and two MS/MSD from other batches that were prepared using a sample from the site are within control.)
4603091004A20	4603091004A20	BS		method	9012		7/8/15 8:00	7/8/15 11:29	NA	20	CYANIDE		3.5	121.4		Extremely low soil LCS-SRM recovery (21.4%) - within vendor limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 102% and 99%, and two MS/MSD from other batches that were prepared using a sample from the site are within control.)
MATRIX SPIKE (MS) ACCURACY																	

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-97106-6MS	ECS-WSTREAM-26+50-SS-20150626MS-20150626	MS (no SD)		3050B	6010C		6/27/15 16:47	7/1/15 11:39	NA	4	LEAD	N	75	125		High matrix spike recovery (207%)	J+ to detects for ECS samples digested in the same batch (J flagged due to poor precision too)
460-97323-3MS	BF-5L-GF-4c-01-20150701MS	MS		3546	8270D		7/6/15 11:09	7/7/15 21:56	NA	1	2-METHYLPHENOL (O-CRESOL)	T	54	117		Low matrix spike recovery (52%)	J-/UJ to detects/NDs for BF samples digested in the same batch (ND)
460-97323-3SD	BF-5L-GF-4c-01-20150701SD	SD		3546	8270D		7/6/15 11:09	7/7/15 22:19	NA	1	2-METHYLPHENOL (O-CRESOL)		54	117	30	Passing matrix spike duplicate recovery (55%)	NA
460-97323-3MS	BF-5L-GF-4c-01-20150701MS	MS		3546	8270D		7/6/15 11:09	7/7/15 21:56	NA	1	PENTACHLORO-PHENOL		19	113		Low matrix spike recovery (22%)	J-/R to detects/NDs for BF samples digested in the same batch (ND)
460-97323-3SD	BF-5L-GF-4c-01-20150701SD	SD		3546	8270D		7/6/15 11:09	7/7/15 22:19	NA	1	PENTACHLORO-PHENOL	T	19	113	30	Extremely low matrix spike duplicate recovery (17%)	J-/R to detects/NDs for BF samples digested in the same batch (ND)
SURROGATE (SU) RECOVERY																	
460-96245-1	BF-ETETZ-GF-1g-01-20150610	N		5035	8260C		6/11/15 14:55	6/13/15 12:50	NA	1	DIBROMOFLUORO-METHANE	T	70	130		High surrogate recovery (134%)	J+ to detects for all analytes in this sample (none)
460-96245-4	BF-ETETZ-GF-1g-04-20150610	N		5035	8260C		6/11/15 14:56	6/13/15 14:06	NA	1	DIBROMOFLUORO-METHANE	T	70	130		High surrogate recovery (140%)	J+ to detects for all analytes in this sample (none)
460-96245-6	BF-ETETZ-GF-1g-06-20150610	N		5035	8260C		6/11/15 14:57	6/13/15 14:56	NA	1	DIBROMOFLUORO-METHANE	T	70	130		High surrogate recovery (133%)	J+ to detects for all analytes in this sample (none)
LABORATORY BLANKS																	
4603053406	4603053406	LB			8260C			6/17/15 11:06	NA	1	ACETONE	J				Method blank contamination (2.87 J ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch (none)
4603053406	4603053406	LB			8260C			6/17/15 11:06	NA	1	METHYLENE CHLORIDE	J				Method blank contamination (0.653 J ug/kg)	U at RL to Js, U to detects < 2x blank equivalent concentration for samples prepared in the same batch
4603057311A	4603057311A	LB		method	9012		6/18/15 21:30	6/19/15 0:59	NA	1	CYANIDE	J				Preparation blank contamination (0.0454 J mg/kg)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples prepared in the same batch
4603091001A	4603091001A	LB		method	9012		7/8/15 8:00	7/8/15 11:27	NA	1	CYANIDE	J				Preparation blank contamination (0.0188 J mg/kg)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples prepared in the same batch

Lab ID	Sample Code	Type	Method			Date and Time			GC	DF	Analyte	Lab	Spk	Spk	RPD	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy	Col			Qual	LCL	UCL	CL		
CALIBRATION VERIFICATION																	
CCVL 460-308059/22	CCVL 460-308059/22	LLCCV			6010C			7/1/15 11:57	NA	1	SELENIUM		70	130		Low calibration verification recovery (66%)	None (CCV only applies for batch QC (MB, LCS, PDS, SD), samples flagged based on QC outcomes)
CCVIS 460-304663/2	CCVIS 460-304663/2	CCV			8260C			6/13/15 4:38	NA	1	ACETONE	*	-20	+20		Calibration drift (%D= +58.2%)	J+ to detects, UJ to NDs for samples analyzed this shift (all ND)
CCVIS 460-305482/4	CCVIS 460-305482/4	CCV			8260C			6/17/15 22:05	NA	1	CARBON TETRACHLORIDE	*	-20	+20		Calibration drift (%D= +29.1%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-307487/2	CCVIS 460-307487/2	CCV			8260C			6/29/15 6:55	NA	1	ACETONE		-20	+20		Calibration drift (%D= +50.0%)	J+ to detects, UJ to NDs for samples analyzed this shift (all ND)
CCVIS 460-307487/2	CCVIS 460-307487/2	CCV			8260C			6/29/15 6:55	NA	1	CARBON TETRACHLORIDE	*	-20	+20		Calibration drift (%D= +20.9%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-307487/2	CCVIS 460-307487/2	CCV			8260C			6/29/15 6:55	NA	1	METHYL ETHYL KETONE (2-BUTANONE)		-20	+20		Calibration drift (%D= +40.2%)	J+ to detects, UJ to NDs for samples analyzed this shift
CCVIS 460-308545/2	CCVIS 460-308545/2	CCV			8260C			7/6/15 3:31	NA	1	N-BUTYLBENZENE	*	-20	+20		Calibration drift (%D= +21.9%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-308545/2	CCVIS 460-308545/2	CCV			8260C			7/6/15 3:31	NA	1	TETRACHLORO-ETHYLENE(PCE)	*	-20	+20		Calibration drift (%D= -28.1%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-304453/2	CCVIS 460-304453/2	CCV			8270D			6/12/15 3:55	NA	1	DIBENZ(A,H) ANTHRACENE	*	-20	+20		Calibration drift (%D= +22.1%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-305539/2	CCVIS 460-305539/2	CCV			8270D			6/18/15 6:53	NA	1	DIBENZ(A,H) ANTHRACENE	*	-20	+20		Calibration drift (%D= +21.1%)	J+ to detects only since < +40% for samples analyzed this shift (none)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-307940/2	CCVIS 460-307940/2	CCV			8270D			7/1/15 2:05	NA	1	DIBENZ(A,H) ANTHRACENE	*	-20	+20		Calibration drift (%D= +21.1%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-307940/2	CCVIS 460-307940/2	CCV			8270D			7/1/15 2:05	NA	1	INDENO(1,2,3-C,D)PYRENE	*	-20	+20		Calibration drift (%D= +21.6%)	J+ to detects only since < +40% for samples analyzed this shift (none)

CL – Control Limit
DF – Dilution Factor
LCL – Lower Control Limit
UCL – Upper Control Limit

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
February 2015 to July 2015

QUALIFIED RESULTS FOR FIELD SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
TCLP METALS					
460-94648-9	ECS-WSTREAM-17+00-EB-20150511	TCLP LEAD	21.7 J ug/l	J	Result between MDL and RL
460-94648-10	ECS-WSTREAM-17+00-WB-20150511	TCLP LEAD	26.5 J ug/l	J	Result between MDL and RL
460-95503-5	ECS-AREA TP-B20N-F-20150527	TCLP LEAD	29.5 J ug/l	J	Result between MDL and RL
460-95503-6	ECS-AREA TP-B20N-SE-20150527	TCLP LEAD	45.2 J ug/l	J	Result between MDL and RL
460-95503-10	ECS-AREA TP-B19S-F-20150527	TCLP LEAD	25.9 J ug/l	J	Result between MDL and RL
460-95599-3	ECS-Area TP-B17W-SS-20150528	TCLP LEAD	29.0 J ug/l	J	Result between MDL and RL
460-95891-3	ECS-AREA19-D20-F-20150603	TCLP LEAD	23.8 J ug/l	J	Result between MDL and RL
460-95891-5	ECS-AREA19-D21-F-20150603	TCLP LEAD	33.2 J ug/l	J	Result between MDL and RL
460-96031-2	ECS-AREA19-D23-SW-20150605	TCLP LEAD	21.6 J ug/l	J	Result between MDL and RL
460-96099-1	ECS-AREA 19-D22-F-20150604	TCLP LEAD	23.4 J ug/l	J	Result between MDL and RL
460-96549-1	ECS-AREA 2-N19-F-20150616	TCLP LEAD	44.4 J ug/l	J	Result between MDL and RL
460-96873-1	DS-AREA16B-E21-SE-20150623	TCLP LEAD	48.7 J ug/l	J	Result between MDL and RL
460-98313-1	ECS-AREA22-O20-F-20150721	TCLP LEAD	33.2 J ug/l	J	Result between MDL and RL
460-98313-2	ECS-AREA22-O21NW-F-20150721	TCLP LEAD	41.3 J ug/l	J	Result between MDL and RL
460-98409-2	ECS-AREA22-N20NE-F-20150722	TCLP LEAD	33.5 J ug/l	J	Result between MDL and RL
460-98409-4	ECS-AREA22-N21NE-F-20150722	TCLP LEAD	39.1 J ug/l	J	Result between MDL and RL
460-98409-5	ECS-AREA22-N21SE-F-20150722	TCLP LEAD	32.1 J ug/l	J	Result between MDL and RL
TOTAL METALS					
460-94449-2	ECS-WStream-11+00WB-20150506	ARSENIC	2.7 J mg/kg	J	Result between MDL and RL
460-94449-3	ECS-WStream-11+00EB-20150506	ARSENIC	2.0 J mg/kg	J	Result between MDL and RL
460-94449-7	ECS-WStream-12+00F-20150506	ARSENIC	1.4 J mg/kg	J	Result between MDL and RL
460-94449-9	ECS-WStream-12+00EB-20150506	ARSENIC	2.5 J mg/kg	J	Result between MDL and RL
460-94569-3	ECS-WSTREAM-12+50-WB-20150507	ARSENIC	3.0 J mg/kg	J	Result between MDL and RL
460-94569-4	ECS-WSTREAM-13+00-F-20150507	BARIUM	27.8 J mg/kg	J	Result between MDL and RL
460-94569-4	ECS-WSTREAM-13+00-F-20150507	MERCURY	0.013 J mg/kg	J	Sample received on ice but above temperature at 6.6 C; Result between MDL and RL
460-94569-4	ECS-WSTREAM-13+00-F-20150507	POTASSIUM	789 J mg/kg	J	Result between MDL and RL
460-94614-3	ECS-WSTREAM-15+00-F-20150508	ARSENIC	2.7 J mg/kg	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-94614-4	ECS-WSTREAM-15+00-WB-20150508	ARSENIC	2.0 J mg/kg	J	Result between MDL and RL
460-94648-9	ECS-WSTREAM-17+00-EB-20150511	CADMIUM	0.62 J mg/kg	J	Result between MDL and RL
460-94648-9	ECS-WSTREAM-17+00-EB-20150511	POTASSIUM	741 J mg/kg	J	Result between MDL and RL
460-94648-9	ECS-WSTREAM-17+00-EB-20150511	SODIUM	104 J mg/kg	J	Result between MDL and RL
460-95432-1	ECS-Area 18-D16-SS-20150526	ARSENIC	4.4 J mg/kg	J	Result between MDL and RL
460-95891-3	ECS-AREA19-D20-F-20150603	CALCIUM	705 J mg/kg	J	Result between MDL and RL
460-95891-3	ECS-AREA19-D20-F-20150603	POTASSIUM	677 J mg/kg	J	Result between MDL and RL
460-95891-3	ECS-AREA19-D20-F-20150603	SILVER	1.4 J mg/kg	J	Result between MDL and RL
460-95891-4	ECS-AREA19-D21-SW-20150603	ARSENIC	2.5 J mg/kg	J	Result between MDL and RL
460-95891-5	ECS-AREA19-D21-F-20150603	ARSENIC	1.4 J mg/kg	J	Result between MDL and RL
460-96096-8	BF-ETETZ-GF-1c-01-20150604	BARIUM	38.4 J mg/kg	J	Result between MDL and RL
460-96096-8	BF-ETETZ-GF-1c-01-20150604	MERCURY	0.015 J mg/kg	J	Result between MDL and RL
460-96096-9	BF-ETETZ-GF-1c-02-20150604	BARIUM	33.7 J mg/kg	J	Result between MDL and RL
460-96096-9	BF-ETETZ-GF-1c-02-20150604	MERCURY	0.013 J mg/kg	J	Result between MDL and RL
460-96099-2	ECS-AREA 19-D22-F-X-20150604	ARSENIC	2.5 J mg/kg	J	Result between MDL and RL
460-96099-3	ECS-AREA 19-D22-SW-20150604	BARIUM	40.1 J mg/kg	J	Result between MDL and RL
460-96099-3	ECS-AREA 19-D22-SW-20150604	CALCIUM	770 J mg/kg	J	Result between MDL and RL
460-96099-3	ECS-AREA 19-D22-SW-20150604	COBALT	7.7 J mg/kg	J	Result between MDL and RL
460-96099-3	ECS-AREA 19-D22-SW-20150604	POTASSIUM	842 J mg/kg	J	Result between MDL and RL
460-96413-3	ECS-WSTREAM-21+50-SE-20150612	BARIUM	28.1 J mg/kg	J	Result between MDL and RL
460-96413-3	ECS-WSTREAM-21+50-SE-20150612	POTASSIUM	897 J mg/kg	J	Result between MDL and RL
460-96483-8	BF-5L-GF-1c-01-20150615	BARIUM	34.4 J mg/kg	J	Result between MDL and RL
460-96483-9	BF-5L-GF-1c-02-20150615	BARIUM	37.1 J mg/kg	J	Result between MDL and RL
460-96489-1	ECS-WSTREAM-22+50-F-20150614	ARSENIC	1.7 J mg/kg	J	Result between MDL and RL
460-96489-2	ECS-WSTREAM-22+50-SE-20150614	ARSENIC	1.4 J mg/kg	J	Result between MDL and RL
460-96489-3	ECS-WSTREAM-22+50-SW-20150614	ARSENIC	2.5 J mg/kg	J	Result between MDL and RL
460-96489-6	ECS-WSTREAM-23+00-SW-20150614	ARSENIC	1.2 J mg/kg	J	Result between MDL and RL
460-96489-9	ECS-WSTREAM-23+50-SW-20150614	ARSENIC	1.8 J mg/kg	J	Result between MDL and RL
460-96549-3	ECS-WSTREAM-24+00-SE-20150616	ARSENIC	2.7 J mg/kg	J	Result between MDL and RL
460-97009-1	ECS-WSTREAM-24+50-F-20150625	ARSENIC	2.6 J mg/kg	J	Result between MDL and RL
460-97009-2	ECS-WSTREAM-24+50-SE-20150625	ARSENIC	2.0 J mg/kg	J	Result between MDL and RL
460-97009-4	ECS-WSTREAM-25+00-F-20150625	ANTIMONY	4.0 U mg/kg	UJ	Low laboratory control spike recovery (48.4%) - within lab limits but <50%
460-97009-4	ECS-WSTREAM-25+00-F-20150625	ARSENIC	2.1 J mg/kg	J	Result between MDL and RL
460-97009-4	ECS-WSTREAM-25+00-F-20150625	COBALT	8.3 J mg/kg	J	Result between MDL and RL
460-97009-4	ECS-WSTREAM-25+00-F-20150625	POTASSIUM	995 J mg/kg	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-97009-4	ECS-WSTREAM-25+00-F-20150625	SODIUM	103 J mg/kg	J	Result between MDL and RL
460-97009-5	ECS-WSTREAM-25+00-SE-20150625	ARSENIC	2.6 J mg/kg	J	Result between MDL and RL
460-97009-5	ECS-WSTREAM-25+00-SE-20150625	LEAD	28.1 mg/kg	J	Poor field precision (63 RPD)
460-97009-6	ECS-WSTREAM-25+00-SE-X-20150625	ARSENIC	2.2 J mg/kg	J	Result between MDL and RL
460-97009-6	ECS-WSTREAM-25+00-SE-X-20150625	LEAD	14.7 mg/kg	J	Poor field precision (63 RPD)
460-97009-8	ECS-WSTREAM-25+50-F-20150625	ARSENIC	1.9 J mg/kg	J	Result between MDL and RL
460-97106-1	ECS-WSTREAM-26+00-F-20150626	LEAD	13.9 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-2	ECS-WSTREAM-26+00-SE-20150626	LEAD	13.8 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-3	ECS-WSTREAM-26+00-SW-20150626	LEAD	17.2 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-4	ECS-WSTREAM-26+50-F-20150626	LEAD	13.7 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-5	ECS-WSTREAM-26+50-SN-20150626	LEAD	117 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-6	ECS-WSTREAM-26+50-SS-20150626	LEAD	166 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-7	ECS-WSTREAM-27+00-F-20150626	LEAD	16.8 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-8	ECS-WSTREAM-27+00-SE-20150626	LEAD	13.9 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-9	ECS-WSTREAM-27+00-SW-20150626	LEAD	18.5 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-10	ECS-WSTREAM-27+50-F-20150626	LEAD	17.9 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-11	ECS-WSTREAM-27+50-SE-20150626	LEAD	94.4 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-11	ECS-WSTREAM-27+50-SE-20150626	MERCURY	0.017 J mg/kg	J	Result between MDL and RL
460-97106-11	ECS-WSTREAM-27+50-SE-20150626	SODIUM	76.3 J mg/kg	J	Result between MDL and RL
460-97106-12	ECS-WSTREAM-27+50-SW-20150626	LEAD	43.0 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-13	ECS-WSTREAM-28+00-F-20150626	LEAD	40.2 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-14	ECS-WSTREAM-28+00-SE-20150626	LEAD	15.2 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)
460-97106-15	ECS-WSTREAM-28+00-SW-20150626	LEAD	17.2 mg/kg	J	High matrix spike recovery (207%); Poor lab duplicate precision (66 RPD)

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-97106-17	ECS-WSTREAM-28+50-SE-20150626	ARSENIC	1.8 J mg/kg	J	Result between MDL and RL
460-97106-18	ECS-WSTREAM-28+50-SW-20150626	ARSENIC	1.5 J mg/kg	J	Result between MDL and RL
460-97106-21	ECS-WSTREAM-29+00-SW-20150626	ARSENIC	2.5 J mg/kg	J	Result between MDL and RL
460-97106-22	ECS-WSTREAM-29+00-SW-X-20150626	ARSENIC	2.1 J mg/kg	J	Result between MDL and RL
460-97107-6	BF-5L-GF-3c-01-20150626	BARIUM	39.6 J mg/kg	J	Result between MDL and RL
460-97162-1	ECS-AREA20-E24/25-F-20150629	ARSENIC	3.1 J mg/kg	J	Result between MDL and RL
460-97323-3	BF-5L-GF-4c-01-20150701	SELENIUM	1.3 J mg/kg	J	Result between MDL and RL
460-98409-1	ECS-AREA22-N19SE-F-20150722	ARSENIC	1.8 J mg/kg	J	Result between MDL and RL
460-98409-5	ECS-AREA22-N21SE-F-20150722	SODIUM	217 J mg/kg	J	Result between MDL and RL
460-98409-7	ECS-AREA22-N21NW-F-20150722	ARSENIC	2.2 J mg/kg	J	Result between MDL and RL
460-98409-8	ECS-AREA22-N21NW-F-X-20150722	ARSENIC	2.4 J mg/kg	J	Result between MDL and RL
VOLATILE ORGANIC COMPOUNDS (VOC)					
460-96245-1	BF-ETETZ-GF-1g-01-20150610	ACETONE	4.1 UT ug/kg	UJ	Calibration drift (%D= +58.2%)
460-96245-2	BF-ETETZ-GF-1g-02-20150610	ACETONE	4.0 UT ug/kg	UJ	Calibration drift (%D= +58.2%)
460-96245-3	BF-ETETZ-GF-1g-03-20150610	ACETONE	4.1 UT ug/kg	UJ	Calibration drift (%D= +58.2%)
460-96245-4	BF-ETETZ-GF-1g-04-20150610	ACETONE	4.0 UT ug/kg	UJ	Calibration drift (%D= +58.2%)
460-96245-5	BF-ETETZ-GF-1g-05-20150610	ACETONE	4.3 UT ug/kg	UJ	Calibration drift (%D= +58.2%)
460-96245-6	BF-ETETZ-GF-1g-06-20150610	ACETONE	4.0 UT ug/kg	UJ	Calibration drift (%D= +58.2%)
460-96245-7	BF-ETETZ-GF-1g-07-20150610	ACETONE	4.2 UT ug/kg	UJ	Calibration drift (%D= +58.2%)
460-96483-1	BF-5L-GF-1g-01-20150615	METHYLENE CHLORIDE	0.76 BJ ug/kg	U	Method blank contamination (0.653 J ug/kg)
460-96483-2	BF-5L-GF-1g-02-20150615	METHYLENE CHLORIDE	0.84 BJ ug/kg	U	Method blank contamination (0.653 J ug/kg)
460-96483-3	BF-5L-GF-1g-03-20150615	METHYLENE CHLORIDE	0.81 BJ ug/kg	U	Method blank contamination (0.653 J ug/kg)
460-96483-4	BF-5L-GF-1g-04-20150615	METHYLENE CHLORIDE	0.95 B ug/kg	U	Method blank contamination (0.653 J ug/kg)
460-96483-5	BF-5L-GF-1g-05-20150615	METHYLENE CHLORIDE	0.83 BJ ug/kg	U	Method blank contamination (0.653 J ug/kg)
460-96483-6	BF-5L-GF-1g-06-20150615	METHYLENE CHLORIDE	0.80 BJ ug/kg	U	Method blank contamination (0.653 J ug/kg)
460-97107-1	BF-5L-GF-2g-01-20150626	ACETONE	4.1 UT ug/kg	UJ	Calibration drift (%D= +50.0%)
460-97107-1	BF-5L-GF-2g-01-20150626	METHYL ETHYL KETONE (2-BUTANONE)	4.1 UT ug/kg	UJ	Calibration drift (%D= +40.2%)
460-97107-2	BF-5L-GF-2g-02-20150626	ACETONE	4.4 UT ug/kg	UJ	Calibration drift (%D= +50.0%)
460-97107-2	BF-5L-GF-2g-02-20150626	METHYL ETHYL KETONE (2-BUTANONE)	4.4 UT ug/kg	UJ	Calibration drift (%D= +40.2%)
460-97107-4	BF-5L-GF-3g-01-20150626	ACETONE	4.2 UT ug/kg	UJ	Calibration drift (%D= +50.0%)
460-97107-4	BF-5L-GF-3g-01-20150626	METHYL ETHYL KETONE (2-BUTANONE)	4.2 UT ug/kg	UJ	Calibration drift (%D= +40.2%)
460-97107-5	BF-5L-GF-3g-02-20150626	ACETONE	4.5 UT ug/kg	UJ	Calibration drift (%D= +50.0%)
460-97107-5	BF-5L-GF-3g-02-20150626	METHYL ETHYL KETONE (2-BUTANONE)	4.5 UT ug/kg	UJ	Calibration drift (%D= +40.2%)
460-97323-1	BF-5L-GF-4g-01-20150701	TETRACHLORO-ETHYLENE(PCE)	0.80 UT ug/kg	UJ	Calibration drift (%D= -28.1%)
460-97323-2	BF-5L-GF-4g-02-20150701	TETRACHLORO-ETHYLENE(PCE)	0.79 UT ug/kg	UJ	Calibration drift (%D= -28.1%)
SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)					

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-97323-3	BF-5L-GF-4c-01-20150701	2-METHYLPHENOL (O-CRESOL)	350 U ug/kg	UJ	Low matrix spike recovery (52%)
460-97323-3	BF-5L-GF-4c-01-20150701	PENTACHLORO-PHENOL	280 U ug/kg	R	Low matrix spike recovery (22%); Extremely low matrix spike duplicate recovery (17%)
CYANIDE					
460-96096-8	BF-ETETZ-GF-1c-01-20150604	CYANIDE	0.12 U mg/kg	UJ	Extremely low soil LCS-SRM recovery (21.4%) - within vendor limits but <50%
460-96096-9	BF-ETETZ-GF-1c-02-20150604	CYANIDE	0.11 U mg/kg	UJ	Extremely low soil LCS-SRM recovery (21.4%) - within vendor limits but <50%
460-96483-8	BF-5L-GF-1c-01-20150615	CYANIDE	0.11 BJ mg/kg	UJ	Preparation blank contamination (0.0454 J mg/kg); Extremely low soil LCS-SRM recovery (18.5%) - within vendor limits but <50%
460-96483-9	BF-5L-GF-1c-02-20150615	CYANIDE	0.12 BJ mg/kg	UJ	Preparation blank contamination (0.0454 J mg/kg); Extremely low soil LCS-SRM recovery (18.5%) - within vendor limits but <50%
460-97107-3	BF-5L-GF-2c-01-20150626	CYANIDE	0.11 U mg/kg	UJ	Extremely low soil LCS-SRM recovery (19.6%) - within vendor limits but <50%
460-97107-6	BF-5L-GF-3c-01-20150626	CYANIDE	0.12 U mg/kg	UJ	Extremely low soil LCS-SRM recovery (19.6%) - within vendor limits but <50%
460-97323-3	BF-5L-GF-4c-01-20150701	CYANIDE	0.10 BJ mg/kg	UJ	Preparation blank contamination (0.0188 J mg/kg); Extremely low soil LCS-SRM recovery (21.4%) - within vendor limits but <50%

1) Results in red have been elevated to the reporting limit per the NFG. The laboratory reported a detect between the MDL and RL for this analyte, but the result has been qualified (U flag) and raised to the reporting limit due to laboratory or field contamination.

TABLE 5
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
February 2015 to July 2015

FIELD DUPLICATE RESULTS

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-94569-8	460-94569-9	ECS-WSTREAM-13+50-EB-20150507	ARSENIC	9.9		mg/kg	9.1		mg/kg	0.8	6.4	NA	y
460-94569-8	460-94569-9	ECS-WSTREAM-13+50-EB-20150507	LEAD	20.2		mg/kg	19.3		mg/kg	NA	4.4	4.6	y
460-94648-1	460-94648-2	ECS-WSTREAM-16+00-F-20150511	ARSENIC	4.8		mg/kg	4.4		mg/kg	0.4	5.6	NA	y
460-94648-1	460-94648-2	ECS-WSTREAM-16+00-F-20150511	LEAD	18.9		mg/kg	16.2		mg/kg	NA	3.8	15	y
460-95891-1	460-95891-2	ECS-AREA19-D20-SW-20150603	ARSENIC	6.8		mg/kg	6.7		mg/kg	0.1	5.4	NA	y
460-95891-1	460-95891-2	ECS-AREA19-D20-SW-20150603	LEAD	14.2		mg/kg	15.3		mg/kg	NA	3.6	7.5	y
460-95891-1	460-95891-2	ECS-AREA19-D20-SW-20150603	TCLP LEAD	50	U	ug/l	50	U	ug/l	0	100	NA	y
460-96099-1	460-96099-2	ECS-AREA 19-D22-F-20150604	ARSENIC	3.6	U	mg/kg	2.5	J	mg/kg	1.1	7.8	NA	y
460-96099-1	460-96099-2	ECS-AREA 19-D22-F-20150604	LEAD	10.6		mg/kg	13		mg/kg	2.4	5.2	NA	y
460-96099-1	460-96099-2	ECS-AREA 19-D22-F-20150604	TCLP LEAD	23.4	J	ug/l	50	U	ug/l	26.6	100	NA	y
460-96413-1	460-96413-2	ECS-WSTREAM-21+50-F-20150612	ARSENIC	6.8		mg/kg	6.3		mg/kg	0.5	6	NA	y
460-96413-1	460-96413-2	ECS-WSTREAM-21+50-F-20150612	LEAD	12.6		mg/kg	15.5		mg/kg	NA	4	21	y
460-97009-5	460-97009-6	ECS-WSTREAM-25+00-SE-20150625	ARSENIC	2.6	J	mg/kg	2.2	J	mg/kg	0.4	5.6	NA	y
460-97009-5	460-97009-6	ECS-WSTREAM-25+00-SE-20150625	LEAD	28.1		mg/kg	14.7		mg/kg	NA	3.6	63	NO
460-97106-21	460-97106-22	ECS-WSTREAM-29+00-SW-20150626	ARSENIC	2.5	J	mg/kg	2.1	J	mg/kg	0.4	7.4	NA	y
460-97106-21	460-97106-22	ECS-WSTREAM-29+00-SW-20150626	LEAD	11.1		mg/kg	10.7		mg/kg	0.4	4.8	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-98409-7	460-98409-8	ECS-AREA22-N21NW-F-20150722	ARSENIC	2.2 J mg/kg	2.4 J mg/kg	0.2	5.4	NA	y
460-98409-7	460-98409-8	ECS-AREA22-N21NW-F-20150722	LEAD	12.2 mg/kg	11.6 mg/kg	NA	3.6	5.0	y
460-98409-7	460-98409-8	ECS-AREA22-N21NW-F-20150722	TCLP LEAD	50 U ug/l	50 U ug/l	0	100	NA	y

Note: The RPD test (≤35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test (≤ 2x RL) applies.

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact		Project Number/ Manager: E7976H/ Jenny Self		
Site Name: Revere Smelting and Refining (Phase 2B ECS/BF Feb-Jul15)		QC Level: IV		
Laboratory: TestAmerica (Edison)		Laboratory Job No: see below		
Reviewer: Taryn Scholz		Date Checked: 9/18/15		
Parameters: TCLP Pb, Metals, CrIII/VI, Pesticide, PCB, Herbicide, VOC, SVOC, CN		Methods: 1311/6010C, 6010C/7471B, 7196A, 8081B, 8082A, 8151A, 5035/8260C, 8270D, 9012B		
ITEM	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
Laboratory NELAP/ELAP accredited?	x			#11452 for Edison
Signed Narrative included?	x			certification signature on cover page and/or separate cert statement
No narrative issues noted by lab?		x		See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?		x		see Comment no. 1
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required); see Comment no. 1A
COCs properly executed and seals used?		x		see Comment no. 2
Samples received within 2 days?		x		(DER10 - recommended) see Comment no. 3
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL) see Comment no. 4
RLs acceptable?		x		(ASP Exh C Part III and/or DER-10 App 5) see Comment no. 4A
No elevated RLs for NDs?		x		Note: 4x std dilution for total metals in soil, 5x std dilution for TCLP; Se at 10x for ECS-AREA22-N21SE-F
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D); (5035 used for VOC soils this phase) see Comment no. 5
If analytical cleanup used, method ref included and approved?	x			(ASP Exh D) see Comment no. 6
Sample matrix included?	x			
Soils on dry weight basis?	x*			
Correct and consistent units?	x			Organics in ug/L (TBs) and ug/kg for rest; Inorganics in mg/kg or ug/L (TCLP)
Holding time to analysis not expired?	x**			(P1 WP Table 2, P2A/B WP Table 1/2 or SW846 for those not in table per ASP Exh I, which gives only aq HTs) Hg 28-d, Extr 14/40-d, Cr VI 30/7-d, CN 14-d, VOC 14-d (freeze within 2-d)
Holding time to preparation not expired?	x**			same as above
QC Samples (Phase 2B Workplan Section 5.4.7)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory	x			
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)		x		Total samples = 173 confirmation (71/173 TCLP/Total) + 7 BF comp + 20 BF grab = 200; Total FD = 8 (3/8 conf + 0 comp + 0 grab) -> One short for conf, BF comp, and BF grab
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible		x		MS/LR used for metals (ICP, Hg, Cr VI - %R not reported for calc Cr III); 7 field MS/MSD (conf for Total As/Pb w 3 also TCLP) - with lab MS/MSD still one short for conf (plus no TAL) and 1 short for DER Metals, Pest, PCB, HERB, and VOC each with no MS/MSD
Completeness criteria met?	x			(P2B WP Section 5.3.3 - 100%) 1665/1666=99.9%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-94449-1, 460-94569-1, 460-94614-1, 460-94648-1, 460-94905-1, 460-95432-1, 460-95503-1, 460-95599-1, 460-95664-1, 460-95672-1, 460-95891-1, 460-96031-1, 460-96096-1, 460-96099-1, 460-96336-1, 460-96413-1, 460-96483-1, 460-96489-1, 460-96494-1, 460-96549-1, 460-96873-1, 460-97009-1, 460-97106-1, 460-97107-1, 460-97162-1, 460-97313-1, 460-97323-1, 460-98192-1, 460-98313-1, 460-98409-1, 460-98481-1

*For the 7196A analyses, Cr III is shown as not dry-weight corrected. However, Cr III is calculated from the results for Cr VI and Total Cr, which are dry-weight corrected, and thus the Cr III is not directly dry-weight corrected but is on a dry-weight basis.

**** The holding time was calculated using dates only without regard to the time of day since all holding times are greater than 24 hours. Also, note that Cr III is a calculated result and the holding time check does not apply for this analyte.**

1. Receipt Temp:

For work order 460-94569-1, the samples were received at 6.6 C on ice. This is above the laboratory's standard receipt requirement of≤6 C. All of the samples in this work order are soil samples with one sample (ECS-WSTREAM-13+00-F) analyzed for TAL Metals (including mercury) and the rest analyzed for total arsenic and lead only. Per the WP and SW846, soil samples to be analyzed for metals with the exception of mercury and hexavalent chromium do not require thermal preservation; while soil samples to be analyzed for mercury require cooling to≤ 6 C. Thus, the validator qualified the mercury result in ECS-WSTREAM-13+00-F as estimated (J or UJ). The remaining metals results were not qualified.

1A. Containers/Preservative:

For work order 460-95664-1, the container was received broken but intact for ECS-Area19-D18-F. The sample was transferred to new containers upon receipt. Analyses performed for metals only, and thus this is not considered to significantly affect data quality and no further action was taken.

For work order 460-96096-1, one of the two 8-ounce jars collected for 6/4/15 for BF-ETETZ-GF-1c-01 was received broken. A second aliquot was collected on 6/10/15 and sent to the laboratory to be used as needed. All analyses were performed using the remaining container from 6/4/15.

2. Custody Records:

For work order 460-96096-1, the documentation indicates that no custody seals were used for the transfer of the VOC grab samples (BF-ETETZ-GF-1g-01 throught BF-ETETZ-GF-1g-07) from the field to the laboratory. The samples were transferred by commercial, overnight courier and were received in good condition, and thus no further action was taken.

For work orders 460-96336-1, 460-98313-1, and 460-98409-1, the sample IDs for one or more samples were revised from those on the custody record per ENTACT'S request.

For work order 460-97009-1, the sampler did not indicate any requested tests on the custody record for sample ECS-WSTREAM-25+00-SE-X. The laboratory logged in the sample for total arsenic and lead per ENTACT's request and the project plan.

For work order 460-97107-1, the custody record incorrectly indicates that the trip blank was of solid matrix. The laboratory received an aqueous trip blank and proceeded with DER-10 VOC analysis as planned.

3. Receipt Date:

For work order 460-96096-1, the samples were received on 6/9/15, which was five days after collection due to shipment issues. All of the samples are backfill soil samples with two samples (BF-ETETZ-GF-1c-01 and BF-ETETZ-GF-1c-02) requiring analysis for DER-10 SVOC, PEST, PCB, HERB, totat metals, trivalent/hexavalent chromium, and cyanide and the rest requiring analysis for DER-10 VOC. The samples were received at proper temperature (5.7 C) on ice under custody seal; however, the VOC samples were received beyond the laboratory standard two-day holding time from collection to freezing, and thus these analyses were cancelled and the samples were re-collected on 6/10/15

For work order 460-96099-1, the samples were received on 6/9/15, which was five days after collection due to shipment issues. All of the samples are soil samples requiring analysis for total arsenic and lead, and TCLP lead. The samples were received at proper temperature (5.7 C) on ice under custody seal and well before holding time expiration. Thus, the laboratory proceeded with analyses as requested.

4. Analyte List:

P1 WP Table 3, P2A/B WP Table 2/4, and DER10 App5 list m-cresol, o-cresol, and p-cresol separately. The laboratory reported m,p-cresol and o-cresol as it is not possible to separate m-cresol and p-cresol using method 8270D. P1 WP Table 3, which only lists RLs for the DER-10 metals and not the 23 TAL metals, also mistakenly lists Antimony. This metal does not appear in DER10 Appendix 5 and was not reported by the laboratory for the backfill samples.

For all BF samples (and the associated QC), the laboratory reported technical Chlordane rather than Chlordane (alpha) as listed in the workplan and DER10 Appendix 5.

For all BF samples (and the associated QC), the laboratory inadvertently reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of just the DER-10 analytes as requested. Note: These extra analytes are all ND in the samples.

For the LB/BS/BD - the lab reported m,p-Xylene and o-Xylene. For the LB, Xylenes (total) is also reported.

Note: The analyte names in the hardcopy report differ from those in the EDD for some analytes.

4A. The MQL (Unadj) for several DER-10 analytes (metals) is above the CRQL, but in each case, it is below the Allowable Constituent Level in DER10 App 5. Additionally, the MQL (Unadj) for the TAL metal Iron is above the CRQL. There are no action levels for this analyte.

5. Update IV methods (6010C, 7471B, 8260C, 8270D) used instead of Update III as in WP. Prep method for 6010C total metals in soils shown as SW3020B in EDD, validator changed all to SW3050B per the pdf report and as confirmed correct by the laboratory.

6. Per laboratory, Florisil cleanup (SW3620C) used for Pesticide analyses and sulfuric acid cleanup (SW3665A) used for PCB analyses (not indicated in package exc on prep log nor in EDD). No cleanup used for SVOC or Herbicides.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	Total Metals	All samples	Required 4x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
EN524	460-94449-1	Total Metals	NA	nothing noted	NA
EN525	460-94569-1	Total Metals	NA	nothing noted	NA
		Mercury	297747	MS %R hi for Hg	none required (MS is non-project)
EN526	460-94614-1	Total Metals	NA	nothing noted	NA
EN527	460-94648-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
EN528	460-94905-1	Total Metals	NA	nothing noted	NA
EN529	460-95432-1	Total Metals	NA	nothing noted	NA
EN530	460-95503-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN531	460-95599-1	TCLP Metals	1	Required 25x dilution prior to analysis; RLs adjusted accordingly	none required (only detects reported from dilution)
		Total Metals	1,7,10	Required 50x, 20x, 20x dilution prior to analysis; RLs adjusted accordingly	none required (only detects reported from dilution)
		Total Metals	NA	MD RPD hi for As	none required (MD is non-project)
EN532	460-95664-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN533	460-95672-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	1	Required 10x dilution prior to analysis; RLs adjusted accordingly	none required (only detects reported from dilution)
EN534	460-95891-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	303663	MS %R hi for Al,Fe	none required (MS is non-project)
		Mercury	NA	nothing noted	NA
EN535	460-96031-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	303475	MS %R low for Pb	none required (MS is non-project)
EN536	460-96096-1	VOC	304663	LCS/D %R hi for Acetone, samples ND, data reported	see QC Deficiencies
		VOC	1,4,6	DBFM SU %R hi, samples ND so no RE	see QC Deficiencies
		VOC	304663	CCV %R out for Acetone, samples ND, data reported	see QC Deficiencies
		VOC	304812	MSD RPD hi for 1,4-Dioxane	none required (MSD is non-project, applies for TB only)
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	304260	MSD %R hi for Silvex	none required (MSD is non-project)
		SVOC	304403	LCS %R out for Indeno[1,2,3-cd]pyrene, SOP allows 5 out for this full spike list so no RE, data flagged and reported	see QC Deficiencies
		SVOC	304453	CCV %R out for Dibenz[a,h]anthracene, CCVLL in control, samples analyzed per method, detects should be considered estimated	see QC Deficiencies (CCVLL not reported)
		Total Metals	NA	MD RPD hi for Mn	none required (MD is non-project)
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	NA	nothing noted	NA
EN537	460-96099-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	304123	MS %R and MD RPD out for some metals	none required (MS/MD are non-project)
		Mercury	NA	nothing noted	NA
EN538	460-96336-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN539	460-96413-1	Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
EN540	460-96483-1	VOC	305340	Blank contains Acetone, MeCl2 >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
		VOC	305482	LCS %R hi for CCl4, 12DCA; samples ND, data reported	see QC Deficiencies

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
		VOC	305482	CCV %R hi for CCl4, samples ND, data reported	see QC Deficiencies
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	306066	CCV %R hi for 2,4-D on primary column, samples ND, data reported	none required (not a target analyte)
		Herb	306066	CCV %R hi for 2,4,5-T on secondary column, samples ND, data reported	none required (not a target analyte)
		SVOC	305539	MS/D %R low for PCP	none required (MS/D are non-project)
		SVOC	305539	CCV %R out for Dibenz[a,h]anthracene, samples analyzed per method, detects should be considered estimated	see QC Deficiencies
		Total Metals	NA	MD RPD hi for As, Pb	none required (MD is non-project)
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	305731	Blank contains CN >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
EN541	460-96489-1	Total Metals	NA	MD RPD hi for As	none required (MD is non-project)
EN542	460-96494-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	MD RPD hi for Pb	none required (MD is non-project)
EN543	460-96549-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN544	460-96873-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		%Solids	306779	MD RPD hi	none required (MD is non-project)
EN545	460-97009-1	Total Metals	307394	MS %R low for Sb, hi for others	none required (MS is non-project)
		Mercury	NA	nothing noted	NA
EN546	460-97106-1	Total Metals	308059	CCVL %R out for Se; due to lab error, sample not reanalyzed	see QC Deficiencies
		Total Metals	308059/6	MS %R hi for Pb	see QC Deficiencies
		Total Metals	308059/6	MD RPD hi for Pb	see QC Deficiencies
		Total Metals	NA	MD RPD hi for Pb	none required (MD is non-project)
		Mercury	NA	nothing noted	NA
EN547	460-97107-1	VOC	307487	LCS/D %R hi for Acetone, MEK; samples ND, data reported	see QC Deficiencies
		VOC	307487	CCV %R hi for CCl4, samples ND, data reported	see QC Deficiencies
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	307769	CCV %R hi for 2,4,5-T on secondary column, samples ND, data reported	none required (not a target analyte)
		Herb	307833	CCV %R hi for 2,4,5-T on secondary column, samples ND, data reported	none required (not a target analyte)
		SVOC	307767	LCS %R out for Benzo[a]pyrene, Benzo[b]fluoranthene; SOP allows 5 out for this full spike list so no RE, data flagged and reported	see QC Deficiencies
		SVOC	307940	MS/D %R and RPD out for several analytes	none required (MS/D are non-project)
		Total Metals	308323	MS%R out for Cd, Mn	none required (MS is non-project)
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	NA	nothing noted	NA
EN548	460-97162-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		%Solids	307866	MD RPD hi	none required (MD is non-project)
EN549	460-97313-1	Total Metals	NA	MD RPD hi for Pb	none required (MD is non-project)
EN550	460-97323-1	VOC	308545	LCS/D %R out for PCE; samples ND, data reported	see QC Deficiencies
		VOC	308545	CCV %R out for n-Butylbenzene (hi), PCE (low); CCVLL in control, samples analyzed per method, detects should be considered estimated	see QC Deficiencies (CCVLL not reported)
		VOC	308938	LCS %R hi for Acetone, MEK; samples ND, data reported	none required (applies for TB only)
		VOC	308938	CCV %R out for 3 TAs; CCVLL in control, samples analyzed per method, detects should be considered estimated	none required (applies for TB only)
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
		Herb	309232	24DCPAA SU %R hi on secondary column for LCS, primary column passes	none required (sample results not affected)
		SVOC	308762/3	MS %R low for 2-Methylphenol	see QC Deficiencies
		SVOC	308762/3	MSD %R low for PCP	see QC Deficiencies
		Total Metals	308729	MS %R hi for Mn	none required (MS is non-project)
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	309100	Blank contains CN >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
EN551	460-98192-1	Total Metals	NA	nothing noted	NA
EN552	460-98313-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN553	460-98409-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	5	Required 10x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
		Mercury	NA	nothing noted	NA
EN554	460-98481-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA

Data Validation Checklist: Metals (Update IV)/Wet Chem

Client Name: Entact		Project Number/ Manager: E7976H/ Jenny Self			
Site Name: Revere Smelting and Refining (Phase 2B ECS/BF Feb-Jul15)		QC Level: IV			
Laboratory: TestAmerica (Edison)		Laboratory Job No: see DURC			
Reviewer: Taryn Scholz		Date Checked: 9/18/15			
Parameters: TCLP Pb, Metals, CrIII/VI, CN		Methods: 1311/3010A/6010C, 3050B/6010C, 7471B, 3060A/7196A, 9012B			
%PERFORMED/	**ITEM**	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package? *	x			
100	Criteria met? (< MDL, ≥ -RL)		x		see QC Deficiencies
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package? *	x			
	All project COCs or TAs included? *	x			
100	%R criteria met?		x		method (lab** but within 50-200%) see QC Def
	Matrix spike data included in lab package? *	x			
100	%R criteria met?		x		method (75-125%) see QC Deficiencies
	Sample duplicate data included in lab package? *	x			as LR
100	RPD criteria met?		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL) see QC Deficiencies
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	correl coeff criteria met? (r > 0.998 ICP, r > 0.995 AA/Hg)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	*Intensities within limits (within ≥ 70% of calib std)?*			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

* No QC reported for Chromium III, which is calculated from the Total Chromium and Chromium VI result.

**For SRMs (solid LCS), the manufacturer's established limits as reported by the lab are used. For aqueous LCS, method limit is 80-120%.

TOTAL METALS VS LEACHED - all leach results < max possible

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B ECS/BF Feb-Jul15)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 9/18/15
Parameters: TCLP Pb	Methods: 1311/3010A/6010C

	%PERFORMED/ ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			pH of fluid not reported but pH of LB leachate 4.89-4.98
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

Data Validation Checklist: GC (Update IV)

Client Name: Entact			Project Number/ Manager: E7976H/ Jenny Self			
Site Name: Revere Smelting and Refining (Phase 2B ECS/BF Feb-Jul15)			QC Level: IV			
Laboratory: TestAmerica (Edison)			Laboratory Job No: see DURC			
Reviewer: Taryn Scholz			Date Checked: 9/18/15			
Parameters: Pesticide, PCB, Herbicide			Methods: 3546/8081B, 3546/8082A, 8151A			
%PERFORMED/ ITEM			**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)		x			
100	Criteria met for field blanks? (<MDL)				x	
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			With the exception of multi-component pesticides Chlordane (technical) and Toxaphene; only two multi-component Aroclors (1016 and 1260) spiked per method recommendations
	%R criteria met?		x			method (lab but within 50-200%)
100	RPD criteria met?				x	
	Matrix spike data included in lab package?		x			all non-project
	%R criteria met?				x	method (lab but within 50-200%)
100	RPD criteria met?				x	method (lab but within 40%)
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?		x			method (lab but within 10-200%) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)				x	ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Initial calibration documentation included in lab package?		x			5 peaks used for all multi-comp Pest/PCB
	All target analytes included?		x			
100	%RSD criteria met? (≤20%RSD or r ≥ 0.995 or COD ≥ 0.990)		x			
100	DDT/Endrin %breakdown max 15%?		x			
	Calibration verification data included in lab package?		x			only beg CCV (no end) for 8082 since IS used
100	%D criteria met? (<20%)		x			
100	Internal standard data included in lab package?		x			**used for 8082A, Form VIII in error (has DCB instead of BNB), validator used raw data to make check**
100	Areas within limits (within -50/+100% of ICAL)?		x			
100	RTs within limits (<30 s diff from ICAL midlevel)?		x			
100	Dual column/detector confirmation data incl in lab package?		x			
100	%Difference criteria met? (<40%)		x			
10	Analyte qualitative ID criteria met?		x			see Comment no. 1
10	Analyte quantitation/RLs correct?		x			
10	QC parameters calculated correctly?		x			
	Surrogate	**Control Limits**				
PEST/	Decachlorobiphenyl	**76-149/53-150**				bold updated from P2B 2013 (32-136 for TALBUFF)
PCB	Tetrachloro-m-xylene	**72-136**				bold updated from P2B 2013 (30-124 for TALBUFF)
HERB	2,4-DCPA	**69**-150				

COMMENTS

The validator did not delineate cases where the surrogate has a %D outside the criteria since surrogate recoveries for each analysis are evaluated separately - none this set

1. For samples 460-96483-8 and 460-96483-9, the retention time for the 8082A DCB surrogate on the secondary column (CLP-2) is outside the window (11.25-11.39) at 11.23 minutes. The RT on the primary column is in the window and the samples are all ND, and thus no effect on data quality. Similar issue noted for samples 460-97107-3 and 460-97107-6 (not in raw data batches).

Data Validation Checklist: GC/MS (Update IV)

Client Name: Entact			Project Number/ Manager: E7976H/ Jenny Self			
Site Name: Revere Smelting and Refining (Phase 2B ECS/BF Feb-Jul15)			QC Level: IV			
Laboratory: TestAmerica (Edison)			Laboratory Job No: see DURC			
Reviewer: Taryn Scholz			Date Checked: 9/18/15			
Parameters: VOC, SVOC			Methods: 5035/8260C, 3546/8270D			
%PERFORMED/	**ITEM**		**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)			x		see QC Deficiencies
100	Criteria met for field blanks? (<MDL)		x			
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			
100	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?		x			method (lab but within 40%)
	Matrix spike data included in lab package?		x			
100	%R criteria met?			x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?		x			method (lab but within 40%)
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?			x		method (lab but within 10-200% extr, 20-200% purg) see
100	Field dup RPD criteria met? (individual, mean, and overall)				x	20% aq, 35% solid (+/-2RL aq, +/-3RL sol if either≤5RL)
	Instrument Tune (12-hr) for GC/MS included in lab package?		x			
100	Instrument Tune method criteria met?		x			
	Initial calibration documentation included in lab package?		x			
	All target analytes included at min 5 levels w low≤ RL?		x			
	RRF met (Table 4)? Reject for RRF<0.05 or Table 4, whichever lower		x			
100	%RSD criteria met? (≤20%RSD or r ≥ 0.995 or COD ≥ 0.990)		x			
	Calibration verification data included in lab package?		x			
	RRF met (Table 4)? Reject for RRF<0.05 or Table 4, whichever lower		x			
100	%D criteria met for CCC/TAs? (20% max)			x		see QC Deficiencies
100	Internal standard data included in lab package?		x			
100	Areas within limits (within -50/+100% of last calib check)?		x			
100	RTs within limits (<10/30(8270) s diff from ICAL midlevel)?		x			
10	Analyte qualitative ID criteria met?		x			see Comment no. 1
10	Analyte quantitation/RLs correct?		x			
10	IS Areas within limits (within -50/+100% of ICAL midlevel)?		x			for CCVs
10	QC parameters calculated correctly?		x			
	Surrogate	**Control Limits**				
VOC	1,2-Dichloroethane-d4	70-130				
	Toluene-d8	70-130				
	Bromofluorobenzene	70-130				
	Dibromofluoromethane	70-130				
SVOC	2,4,6-Tribromophenol	**19-114 (Oct 2014 10-120**]				Bold updated from P2B 2013 (10-120 TALNASH)
	Terphenyl-d14	**41-145 (Oct 2014 16-151**]				(13-120 TALNASH)
	2-Fluorobiphenyl	**49-112 (Oct 2014 40-109**]				(29-120 TALNASH)
	Nitrobenzene-d5	**40-106 (Oct 2014 38-105**]				(27-120 TALNASH)
	2-Fluorophenol	**39-103 (Oct 2014 37-125**]				(10-120 TALNASH)
	Phenol-d5	**44-104 (Oct 2014 41-118**]				(10-120 TALNASH)

COMMENTS

1. For work order 460-96483-1, the validator noted that the Q value is low (30-32) and the printed spectra do not show the characteristic ions for the methylene chloride detects in the laboratory blank and samples 1-6 in batch 305340. Requested confirmation of presence from laboratory. Per the laboratory, the Methylene Chloride target concentration is small and present but is co-eluting with the larger internal standard concentration of the TBA-d9. The smaller target spectrum of the methylene chloride was obscured by the larger internal standard.

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

July 2015 to September 2015

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

November 20, 2015

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 3

3.0 DATA VALIDATION RESULTS 4

3.1 PRECISION 4
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 4
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 4
3.1.3 Field Duplicate (FD) Precision 4
3.2 ACCURACY 4
3.2.1 Laboratory Control Spike (LCS) Accuracy 5
3.2.2 Matrix Spike (MS) Accuracy 5
3.2.3 Serial Dilution (SD) %Difference 5
3.3 REPRESENTATIVENESS 5
3.3.1 Chain-of-Custody and Analysis Requests 5
3.3.2 Sample Preservation and Holding Time 5
3.3.3 Laboratory and Method Selection 5
3.3.4 Blanks (Laboratory and Field) 6
3.3.5 Analytical Procedures 6
3.4 COMPLETENESS 6
3.4.1 Laboratory Deliverables Completeness 6
3.4.2 EDD Correctness 6
3.4.3 Analytical Completeness 6
3.5 COMPARABILITY 7

LIST OF TABLES

Table 1 – Samples Selected for Validation
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – Qualified Results for Validated Samples

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The data include five investigative soil samples as shown in Table 1. The samples comprise approximately 10% of the Phase II-B post-stabilization verification (PSV) samples collected during July 2015 to September 2015. (A total of 40 PSV samples were collected during this period.) The PSV samples were collected by ENTACT from the stabilized material stockpiles and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals to ensure that the stabilized material meets the appropriate criteria for disposal in the on-site containment cell.

Per the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, these data are considered Level 2 and require minimal data review. Per ENTACT's request, QAA performed a full validation of the selected samples and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010). QAA completed the validation using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (August 2014), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The validator assessed precision using the laboratory duplicate results. The laboratory prepared an unspiked matrix duplicate (MD) with every analytical batch and reported the RPD for each analyte. As shown in Table 1, one MD was prepared using a sample from the site. No data required qualification based on the MD results, which indicates good precision for the analytical technique on the given sample matrix.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The validator assessed accuracy using the laboratory spikes and matrix spikes. The laboratory prepared a laboratory control spike (LCS) using reagent water with every analytical batch and reported the recoveries for all analytes. The LCS recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. Additionally, the laboratory prepared a matrix spike (MS) with every analytical batch and reported the recoveries for each analyte. As shown in Table 1, one MS was prepared using a sample from the site. No data required qualification based on the MS results, which indicates good accuracy for the analytical technique on the given sample matrix.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, PSV samples were collected as required in the approved sampling and analysis plan. Representativeness is also ensured by using the proper analytical

procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory blanks, and analytical instrument setup (i.e., calibration, interference correction, etc.) For the samples selected for validation, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank and leachate blank with each analytical batch and the blanks show no contamination, which indicates the samples were not affected by laboratory procedures. Additionally, proper analytical techniques were used and calibration results met the method requirements.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. For the samples selected for validation, all analyses produced valid analytical measurements, which gives a completeness of 100%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The PSV analytical results are classified as Level 2 data with a full review and validation of at least 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated. Note that results are reported in µg/L for all field samples.

DATA USABILITY

All sample results are acceptable for use. As shown in Table 3, four results are qualified solely because the concentration is between the MDL and RL. The actual value is not expected to exceed the sample RL. No data quality issues were noted.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). For the samples selected for validation, the laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD), and
- Field Duplicates (FD).

Additionally, the validator examined the raw data for one of the two sample batches (randomly selected by the validator) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are 80-120% for laboratory accuracy and 75-125% for matrix accuracy for metals analyses.
- Laboratory Precision – the control limit (20 RPD) as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 40% for laboratory spikes and 30% for matrix spikes was used for these inorganic analyses. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

No LCSD were analyzed (or required) with the samples selected for validation.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every analytical batch (maximum 20 samples) and reported RPDs for all analytes. The validator only evaluated the MD prepared with a sample from the site (of which there is one), since those prepared with a sample from another site do not reflect data quality for the Revere site. All site MD RPDs are at or below the control limit, except as follows:

- For QC batch 460-321093, the RPD for Arsenic in the MD prepared with PSV-439 is slightly above the 20% control limit at 22%.

For this duplicate pair, both results are below the reporting limit (RL) and thus the RPD test is not applicable. The absolute difference between the results is less than 2x RL, which indicates good precision and thus the validator did not qualify the data.

Note that non-project MD results are included in the data packages but not in the EDD.

3.1.3 FIELD DUPLICATE (FD) PRECISION

No field duplicates were collected with the samples selected for validation.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD) and matrix spikes (MS/MSD) plus serial dilutions (SD). LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

For the samples selected for validation, the laboratory analyzed a LCS for every analytical batch (maximum 20 samples) as required and reported recoveries for all analytes. All LCS recoveries are within the control limits.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS for every analytical batch (maximum 20 samples) and reported recoveries for all analytes. The validator only evaluated the MS prepared with a sample from the site (of which there is one), since those prepared with a sample from another site do not reflect data quality for the Revere site. All site MS recoveries are within the control limits. Note that non-project MS results are included in the data packages but not in the EDD.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all metals detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples selected for validation were hand-delivered to the laboratory or delivered by an overnight, commercial carrier with properly executed chain-of-custody records and custody seals, which confirms that sample integrity was maintained. No issues were noted during sample log-in at the laboratory, and all field samples were analyzed for the tests requested on the chain-of-custody. Additionally, the information on the custody record is correct and agrees with that reported in the analytical results.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

The samples selected for validation were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. The analyte list includes TCLP Antimony, TCLP Arsenic, TCLP Cadmium, and TCLP Lead and the nominal reporting limits are below the levels of concern (i.e., the treatment goals) for each analyte.

(Note: The laboratory dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank and leachate blank for every analytical batch (maximum 20 samples) plus a calibration blank for every 10 metals analyses as required per the analytical methodology. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used. No analytes were detected in the laboratory blanks.

3.3.5 ANALYTICAL PROCEDURES

For the samples selected for validation, the analytical procedures (initial calibration, continuing calibration verification, and interference correction), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method.

Additionally, no issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes two analytical batches and the validator re-calculated sample results and QC check parameters for one batch (batch 460-314473 in work order 460-98826-1).

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

For the samples selected for validation, the NYSDEC Category B data packages and EDD contain all necessary information.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	**Sample(s)**	**EDD Field(s)**	**Action**
All	All QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.

3.4.3 ANALYTICAL COMPLETENESS

For the samples selected for validation, the validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. (Note that in some cases the laboratory used a more recent version of the method specified in the Workplan, e.g. SW846 6010C was used instead of SW846 6010B.) The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which an analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which an analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J-flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results are reported in µg/L and are classified as Level 2 data for TCLP metals with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples
July 2015 to September 2015

SAMPLES SELECTED FOR VALIDATION

Lab ID	Field ID	Sample Date	Type	Media	Matrix	TCLP Sb, As, Cd, Pb
460-98826-1	PSV-417	7/30/2015	INV	PSV	Soil	x
460-98826-2	PSV-418	7/30/2015	INV	PSV	Soil	x
460-98826-3	PSV-419	7/30/2015	INV	PSV	Soil	x
460-100647-1	PSV-438	9/2/2015	INV	PSV	Soil	x
460-100647-2	PSV-439	9/2/2015	INV	PSV	Soil	x
460-100647-2LR	PSV-439	9/2/2015	MD	PSV	Soil	x
460-100647-2MS	PSV-439	9/2/2015	MS	PSV	Soil	x

INV - Investigative Sample
MD – Matrix Duplicate Sample
MS – Matrix Spike Sample
PSV – Post-Stabilization Verification Sample

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Metals: 1311/ 3010A/ 6010C for Antimony, Arsenic, Cadmium, and Lead in leachates of soil samples

TABLE 2

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples
July 2015 to September 2015

QUALIFIED RESULTS FOR VALIDATED SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-98826-1	PSV-417-20150730	TCLP ANTIMONY	96.9 J ug/l	J	Result between MDL and RL
460-98826-3	PSV-419-20150730	TCLP ANTIMONY	57.4 J ug/l	J	Result between MDL and RL
460-98826-3	PSV-419-20150730	TCLP ARSENIC	22.3 J ug/l	J	Result between MDL and RL
460-100647-2	PSV-439-20150902	TCLP ARSENIC	53.9 J ug/l	J	Result between MDL and RL

ATTACHMENT A

VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact			Project Number/ Manager: E7976H/ Jenny Self	
Site Name: Revere Smelting and Refining (Phase 2B PSV Jul15-Sept15)			QC Level: II	
Laboratory: TestAmerica (Edison, NJ)			Laboratory Job No: 460-98826-1, 460-100647-1	
Reviewer: Taryn Scholz			Date Checked: 10/13/15	
Parameters: TCLP Metals			Methods: 1311/3010A/6010C	
ITEM	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
Laboratory NELAP/ELAP accredited?	x			NYDOH (NELAP) #11452, NYDOH (ELAP) #11452
Signed Narrative included?	x			
No narrative issues noted by lab?	x			
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required)
COCs properly executed and seals used?	x			
Samples received within 2 days?	x			
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL)
RLs acceptable?	x			(ASP Exh C Part III and/or DER-10 App 5, WP Remedial Goal)
No elevated RLs for NDs?	x			Note: 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D)
If analytical cleanup used, method ref included and approved?			x	(ASP Exh D)
Sample matrix included?	x			
Soils on dry weight basis?			x	
Correct and consistent units?	x			in ug/L
Holding time to analysis not expired?	x			(Workplan Table 2)
Holding time to preparation not expired?	x			(Workplan Table 2)
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory			NA	
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)		x		Total samples = 6 PSV; Total FD = 0
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible	x			Total samples = 6 PSV; Total MS/MD = 1
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
EN555	460-98826-1	NA	NA	no issues notec	NA
EN556	460-100647-1	TCLP Metals	-2	MD RPD exceeded limit for As	see QC deficiencies

Data Validation Checklist: Metals/Wet Chem

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV Jul15-Sept15)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 460-98826-1, 460-100647-1
Reviewer: Taryn Scholz	Date Checked: 10/13/15
Parameters: TCLP As,Cd,Pb,Sb and TCLP Pb	Methods: 1311/3010A/6010B

%PERFORMED/	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			
100	%R criteria met?	x			method (lab but within 50-200%)
	Matrix spike data included in lab package?	x			
100	%R criteria met?	x			method (75-125%)
	Sample duplicate data included in lab package?	x			as LR
100	RPD criteria met?		x		method (20% if >10xMDL)
100	Field dup RPD criteria met? (individual, mean, and overall)			x	ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	Intensities within limits? (min 30-120% of calib std)			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV Jul15-Sept15)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 460-98826-1, 460-100647-1
Reviewer: Taryn Scholz	Date Checked: 10/13/15
Parameters: TCLP As,Cd,Pb,Sb and TCLP Pb	Methods: 1311/3010A/6010C

%PERFORMED/ ITEM		YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

TCLP Batches: 314381, 320965

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples

July 2015 to September 2015

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

December 15, 2015

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 6

3.0 DATA VALIDATION RESULTS 8

3.1 PRECISION 8
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 8
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 8
3.1.3 Field Duplicate (FD) Precision 8
3.2 ACCURACY 9
3.2.1 Laboratory Control Spike (LCS) Accuracy 9
3.2.2 Matrix Spike (MS) Accuracy 9
3.2.3 Serial Dilution (SD) %Difference 10
3.2.4 Surrogate (SU) Recovery 10
3.3 REPRESENTATIVENESS 10
3.3.1 Chain-of-Custody and Analysis Requests 10
3.3.2 Sample Preservation and Holding Time 11
3.3.3 Laboratory and Method Selection 11
3.3.4 Blanks (Laboratory and Field) 12
3.3.5 Theoretical Result Values 12
3.3.6 Analytical Procedures 13
3.4 COMPLETENESS 13
3.4.1 Laboratory Deliverables Completeness 13
3.4.2 EDD Correctness 14
3.4.3 Analytical Completeness 14
3.5 COMPARABILITY 14

LIST OF TABLES

Table 1 – Sample Summary
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – QC Deficiencies and Data Qualification Actions
Table 4 – Qualified Results for Field Samples
Table 5 – Field Duplicate Results

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The independent data review was completed in accord with the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 138 investigative soil samples plus the associated field QC samples, which were collected by ENTACT in July 2015 through September 2015 with the intended use of confirming that backfill materials are suitable for use on-site and verifying that remediation goals have been achieved in excavated grids. A complete listing of the samples collected and tests performed is shown in Table 1. QAA performed a full validation of the data and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) as specified in Section 5.9 of the Workplan. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (August 2014) and *National Functional Guidelines for Superfund Organic Methods Data Review* (August 2014), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The Workplan stipulates that the precision control limits will be dictated by the analytical method. The validator assessed precision using the laboratory and field duplicates, and the limits are 20-35 RPD depending upon the test. The laboratory prepared a laboratory control spike duplicate (LCSD) using reagent water or sand for each VOC analytical batch plus at least one unspiked matrix duplicate (MD) or matrix spike duplicate (MSD) using a sample from the site for each test except Metals, Chromium VI, VOC, SVOC and Cyanide for the backfill samples. All LCS/LCSD RPDs are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. The RPDs for the matrix duplicates are within the limits, which indicates good precision for the analytical technique on the given sample matrix, with one exception. The affected analytical batch only contains the parent sample and the validator qualified the total Lead result for this sample as estimated (J). Thus, of the 1,481 total results for field samples (investigative samples and field duplicates), only one result is qualified based on matrix duplicate precision. Additionally, the sampler collected five field duplicates (FD) for TCLP Lead and total Arsenic/Lead, two FD for VOC, and one FD for Metals, Chromium VI, PEST, PCB, HERB, SVOC and Cyanide with the 138 investigative samples. The RPDs are within the limits, which indicates good precision for the sampling and analytical technique, or the validator qualified the results for the original and duplicate sample. Two (one for TCLP Lead and one for total Lead) of the 141 pairs of results are qualified as estimated (J) based on field duplicate precision.
2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The Workplan stipulates that the accuracy control limits will be dictated by the analytical method. The validator assessed accuracy using the laboratory spikes and matrix spikes, and the limits are either 75-125%, 80-120%, or the laboratory/manufacturer's established control limit for soils/solid reference materials (which range from 0.1%-201% for this data set). In order to better assess

data usability, limits of 50-200% were employed where the method limits for a spiked analyte falls outside these values. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with each analytical batch and reported the recovery for all spiked compounds, which included every target compound except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result). The laboratory also prepared a laboratory control spike duplicate (LCSD) with each VOC analytical batch. The LCS/LCSD recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects, with some exceptions for a few VOC and SVOC analytes and Cyanide. (In each case the recoveries are within the laboratory limits or are outside the limits for only a small percentage of the total number of target analytes for the test, and thus laboratory corrective action was not required.) Most of the exceedances did not result in data qualification (e.g., the recovery was above the limit indicating a potential bias for detected results and the analyte was not detected in any of the associated samples) with fourteen (14) results (six for Methyl Ethyl Ketone (2-Butanone) and eight for Cyanide) of the 1,481 total results for field samples being qualified as not detected at an estimated reporting limit (UJ) due to laboratory spike recovery. Additionally, the laboratory prepared seven matrix spike samples (MS) along with four post digestion spikes (PDS) and serial dilutions (SD) for TCLP Lead, six MS/PDS/SD for total Arsenic/Lead, one MS/SD for Mercury, two MS along with two matrix spike duplicate samples (MSD) for PEST and PCB, and one MS/MSD for HERB using a sample from the site. All SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy of metals results that are substantially above the reporting limit. The MS/MSD/PDS recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, with a few exceptions. Most of the exceedance did not result in data qualification (e.g., the check was waived because the unspiked sample concentration is greater than four times the spike amount and the PDS passes) with one result (for total Lead) being qualified as estimated (J) due to matrix spike recovery. Additionally, the laboratory utilized one or more surrogate spikes for each organic analysis. The surrogate recoveries are within the laboratory limits for all field samples except one SVOC sample. As a result, four results are qualified as not detected at an estimated reporting limit (UJ). (The surrogate recoveries are within the laboratory limits, and thus laboratory corrective action was not required.)

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, investigative samples were collected as required in the approved sampling and analysis plans. (Note that sampling is an on-going process at the site and all samples may not be reflected in this validation batch.) Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory and field QC blanks, theoretical result values, and analytical instrument setup (i.e., tuning, calibration, interference correction, etc.) For all samples, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank with each analytical batch and the sampler collected trip blanks with the VOC samples. The laboratory and field QC blanks show no contamination, which indicates the samples were not affected by laboratory or field procedures, with one exception. Cyanide was detected in one method blank; however, data qualification is not required because the analyte was detected in the associated field sample at a level well above (greater than ten times) that in the blank. Additionally, Methylene Chloride was detected in one trip blank; however, data qualification is not required because the analyte was not detected in the associated field samples. The validator also assessed representativeness by comparing the TCLP Lead results to the total Lead results and determined that the TCLP Lead result is above the

theoretical maximum for three of the 122 pairs. Thus, three TCLP Lead results and three total Lead results are qualified as estimated (J). Proper analytical procedures were used and calibration results met the method requirements or the validator qualified the affected samples. Twenty (20) non-detect results for 1,1,1-Trichloroethane, Acetone, Carbon Tetrachloride, Methyl Ethyl Ketone (2-Butanone), Phenol, or Silvex (2,4,5-TP) are qualified as estimated (UJ) due to calibration drift. (In each case the %differences are within the laboratory limits or are outside the limits for only a small percentage of the total number of target analytes for the test, and thus laboratory corrective action was not required.)

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. All analyses produced valid analytical measurements for this data set, which gives a completeness of 100%. (Completeness to-date for all Phase II-B backfill and post-excavation confirmation samples is 99.7%.) Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request, with the exception of the instrument raw data for the TCLP Lead testing of the three samples in work order 460-101506-1. The laboratory was unable to retrieve this data. All other QC data including sample leaching and digestion information, blank and spike results, and the sample final results are available. Two of the samples are confirmation samples (ECS-AREA25-H28-F and ECS-AREA28-J28-F), and complete data including the instrument raw data is available for the total metals testing of these samples, which confirms the samples meet the decision criteria. The third sample is a documentation sample (DS-AREA28-J28-SS) taken from a sidewall that has been lined, in order to document the concentration remaining in place.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results for all field samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics.

DATA USABILITY

No major QC deficiencies were noted and all sample results are acceptable for use with the qualifications shown in Table 4, as follows:

- Twenty-six (26) non-detects for 1,1,1-Trichloroethane, 2-Methylphenol (o-Cresol), Acetone, Carbon Tetrachloride, m & p-Cresols, Cyanide, Methyl Ethyl Ketone (2-Butanone), Pentachlorophenol, Phenol, or Silvex (2,4,5-TP) in the backfill samples are qualified with a UJ (estimated) and the analyte should be considered not present above the reporting limit; however the reporting limit is an estimated value. In each case, the sample reporting limit (RL) is well below (more than ten times) the DER-10 Appendix 5 Allowable Constituent Level for Imported Fill or Soil (ACL), and thus there is negligible effect on data quality, except as follows:

Lab ID	Field ID	Test	Analyte(s)	Result (µg/kg)	MDL (µg/kg)	ACL (µg/kg)	DVQ	QC Issue
460-98659-1	BF-ORI-HS-7g-01	VOC	Acetone	5.8 U	1.2	50	UJ	Calibration drift (%D= -29.5%)
460-98659-2	BF-ORI-HS-7g-02	VOC	Acetone	6.2 U	1.3	50	UJ	Calibration drift (%D= -29.5%)
460-98659-3	BF-ORI-HS-7c-01	SVOC	Phenol	520 U	17	330	UJ	Calibration drift (%D= -28.1%)

Lab ID	Field ID	Test	Analyte(s)	Result (µg/kg)	MDL (µg/kg)	ACL (µg/kg)	DVQ	QC Issue
460-98662-3	BF-5L-GF-5c-01	SVOC	Phenol	370 U	12	330	UJ	Calibration drift (%D= -28.1%)
460-98662-6	BF-5L-GF-6c-01	SVOC	Phenol	380 U	12	330	UJ	Calibration drift (%D= -28.1%)
460-99248-3	BF-ETETZ-GF-2c-01	SVOC	2-Methylphenol (o-Cresol)	340 U	15	330	UJ	Low acid surrogate recovery (38%)
460-99248-3	BF-ETETZ-GF-2c-01	SVOC	Cresols, m & p	340 U	9.0	330	UJ	Low acid surrogate recovery (38%)
460-99248-3	BF-ETETZ-GF-2c-01	SVOC	Pentachlorophenol	270 U	41	800	UJ	Low acid surrogate recovery (38%)
460-99248-3	BF-ETETZ-GF-2c-01	SVOC	Phenol	340 U	11	330	UJ	Low acid surrogate recovery (38%)

Though non-detects are reported at the sample reporting limit (RL) as requested, the samples were evaluated to the method detection limit (MDL). In each case, the MDL is well below (more than ten times) the ACL and thus the potential bias has negligible effect on data quality.

- Six (6) detects for Cyanide in the backfill samples are qualified with a J (estimated, for detects between the MDL and RL) or J- (biased low, for detects above the RL) due to extremely low (less than 40%) laboratory control spike recovery. These results can be used for determining the presence of the analyte; however, the concentration reported is likely biased low. In each case, the laboratory control spike recovery is greater than 15% and the result is well below (more than ten times) the ACL (27 mg/kg) and thus the potential low bias has negligible effect on data quality.

- Four (4) detects for TCLP Lead in the confirmation samples are qualified with a J (estimated). These results can be used for determining the presence of the analyte; however, the concentration reported may be either high or low. The results are flagged due to poor field duplicate precision (150 RPD) and/or the result being outside the theoretical balance (i.e., above the maximum leachate concentration possible based on the total Lead concentration, and the relative amounts of soil used and leachate prepared per the analytical method, assuming 100% leachability). In one case (DS-PSTREAM-51+00-SS), the sample is a documentation sample (DS) intended to document the concentrations remaining in place (i.e., in areas where remediation was terminated (e.g., a sample from the excavation sidewall of the railroad right-of-way)) as compared to the source material soil cleanup objective (SCO) of 5,000 µg/L. The sample concentration (318,000 µg/L) is greater than the maximum theoretical concentration (173,500 µg/L) calculated from the total Lead concentration at this location (3,470 mg/kg) and should be considered estimated. No other QC issues were noted for the TCLP Lead or total Lead measurements for this sample. The results for the remaining three cases, which are for excavation confirmation samples (ECS), are as follows:

Lab ID	Field ID	Test	Analyte(s)	Result (µg/L)	MDL (µg/L)	Remedial Goal (µg/L)	DVQ	QC Issue
460-99013-9	ECS-PSTREAM-50+50-F	TCLP Metals	TCLP Lead	2660	20.8	5000	J	Metals leach-to-total balance greater than theoretical
460-101342-5	ECS-PSTREAM-62+00-SE	TCLP Metals	TCLP Lead	2560	20.8	5000	J	Poor field duplicate precision (150 RPD), use higher result from original sample; Metals leach-to-total balance greater than theoretical
460-101342-13	ECS-PSTREAM-62+00-SE-X	TCLP Metals	TCLP Lead	347	20.8	5000	J	Poor field duplicate precision (150 RPD), use higher result from original sample

For results qualified due to field duplicate precision, the higher result (i.e., from either the original or duplicate sample) should be used for project decisions. This gives a conservative approach relative to protection of the environment. (For field duplicate pairs that pass the precision criteria, the value should be selected based on accepted convention for the site and/or agency requirements, e.g., select the value reported for the original sample, the average of the two values, etc.) Thus, estimated results with an unknown bias (i.e., high or low) that are below but within one half of the remedial goal have been determined for ECS-PSTREAM-50+50-F and ECS-PSTREAM-62+00-SE. Given the potential for a high or low bias and the proximity to the remedial goal, these results may be inconclusive; however, the theoretical balance and/or field duplicate comparison indicate the results are likely high. Other considerations such as sample location and evaluation of results for other samples may produce a conclusive result.

- Five (5) detects for total Lead in the confirmation samples are qualified with a J (estimated). These results can be used for determining the presence of the analyte; however, the concentration reported may be either high or low. The results are flagged due to low matrix spike recovery (45%), poor laboratory duplicate precision (27 RPD), poor field duplicate precision (71 RPD) and/or the result being outside the theoretical balance. In one case, the sample is a documentation sample (DS-PSTREAM-51+00-SS) and the total Lead concentration at this location (3,470 mg/kg) should be considered estimated based on the theoretical balance as discussed above. In the remaining four cases, which are for excavation confirmation samples (ECS), the concentration is either well above (almost ten times) or well below (more the ten times) the remedial goal (400 mg/kg) and thus the potential bias is considered to have negligible effect on data quality, with one exception:

Lab ID	Field ID	Test	Analyte(s)	Result (mg/kg)	MDL (mg/kg)	Remedial Goal (mg/kg)	DVQ	QC Issue
460-100387-6	ECS-AREA29-F28-SS-20150827	Total Metals	LEAD	118	0.77	400	J	Low matrix spike recovery (45%); Poor lab duplicate precision (27 RPD)

For this result, the QC outcomes indicate a potential bias of +/- two times the reported result. The result is more than three times below the remedial goal, thus this is considered to have minimal effect on data quality.

- The remaining 65 results with J flags are qualified solely because the concentration is between the MDL and RL. In each case, the actual value is not expected to exceed the sample RL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include pdf data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Instrument Tuning and Initial Calibration,
- Calibration Verification,
- Interference Check Standards (ICS),
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD),
- Field Duplicates (FD),
- Dual Column Confirmation,
- Surrogates (SU), and
- Internal Standards (IS).

Additionally, the validator examined the raw data for 10% of the sample batches (randomly selected by the validator across the various analysis dates and tests) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not less than 50% lower limit or greater than 200% upper limit)
- Laboratory Precision – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not greater than 40%)
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator

considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 40% and 30% for inorganics laboratory and matrix spikes, and 30%, 20% and 10% for organics laboratory, matrix and surrogate spikes were used. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

The laboratory analyzed an LCSD and reported RPDs for all target compounds for each VOC batch (maximum 20 samples). All LCSD RPDs are at or below the criteria.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every inorganics analytical batch (maximum 20 samples) and an MSD for every organics analytical batch (maximum 20 samples) and reported RPDs for MD and MSD prepared using a sample from the site or another site. MD/MSD prepared with a sample from another site were not evaluated, since they do not reflect data quality for the site. No soil samples were designated by the sampler for MD/MSD for the backfill samples; however, the laboratory selected one or more backfill samples for batch QC for PEST, PCB, and HERB. Seven confirmation soil samples (four of which were designated by the sampler on the custody record) were used to prepare an MD for TCLP Lead and six of these were also used for total Arsenic/Lead. With a total of 117 investigative confirmation samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix.

One of the RPDs for MD prepared using a sample from the site is above the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that, for cases where either result for the duplicate pair is non-detect, the check does not apply and the laboratory reported the RPD as NC (not calculable) in the pdf report and as 0 in the EDD. Additionally, the validator considered samples of the same media (i.e., backfill or excavation confirmation) and source to be of similar matrix (e.g., if deficiencies were noted for a MD or MSD prepared using a backfill sample from a particular source, all backfill samples from that source in the same analytical batch were qualified).

3.1.3 FIELD DUPLICATE (FD) PRECISION

The samplers collected five FD with the 117 investigative confirmation samples, which is slightly below the Workplan requirement of one per 20 or fewer samples per sample matrix for this event. Additionally, the samplers collected three FD (two grab samples for VOC only and one composite sample for the remaining DER-10 tests) with the 21 investigative backfill samples. Results for the field duplicates are summarized in Table 5.

Two pairs of results are outside the field precision criteria and the validator qualified the data as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4

lists all qualified results for the field samples. Note that the remaining 139 pairs of FD results meet the criteria, which indicates good overall precision, and thus the validator only qualified the original and duplicate sample for the FD deficiency.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD), matrix spikes including post digestion spikes (MS/MSD/PDS), serial dilutions (SD), and surrogate (SU) spikes. LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD/PDS are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit. Surrogates are added to each sample before preparation and analysis and provide an indication of accuracy for each individual sample analysis.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS and/or LCSD for every analytical batch (maximum 20 samples) as required and reported recoveries for all target compounds except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result).

Some LCS/LCSD recoveries are outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator did not qualify the data for cases where the LCS or LCSD recovery for an organic analyte is outside the criteria (i.e., the laboratory-derived recovery control limits based on historical performance or 50-200%, whichever is more stringent) but within 70-130% since this is considered within the inherent method error and suitable for the intended use. Additionally, the validator did not qualify the data for cases where the LCS or LCSD recovery is outside the criteria (but greater than the data rejection limit) but the average LCS/LCSD recovery is within control (of which there are none for this data set).

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS/PDS for every inorganics analytical batch (maximum 20 samples) and an MS/MSD for every organics analytical batch (maximum 20 samples) and reported recoveries for MS/PDS/MSD prepared using a sample from the site or another site. MS/PDS/MSD prepared with a sample from another site were not evaluated, since they do not reflect data quality for the site. No soil samples were designated by the sampler for MS/PDS/MSD for the backfill samples; however, the laboratory selected one or more backfill samples for batch QC for PEST, PCB, and HERB. Seven confirmation soil samples (four of which were designated by the sampler on the custody record) were used to prepare an MS/PDS for TCLP Lead and six of these were also used for total Arsenic/Lead. With a total of 117 investigative confirmation samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix.

A few recoveries for MS prepared using a sample from the site are outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that if an analyte was detected in the unspiked parent sample at a concentration well above (greater than four times) the concentration of spike added to the sample, thereby rendering the recoveries inconclusive, the check was waived and the validator did not qualify the data. For cases where the MS or MSD recovery is outside the control limits (but greater than the data rejection

limit) and the average MS/MSD recovery is in control, the validator did not qualify the data. Additionally, the validator considered samples of the same media (i.e., backfill or excavation confirmation) and source to be of similar matrix (e.g., if deficiencies were noted for a MS/MSD prepared using a backfill sample from a particular source, all backfill samples from that source in the same analytical batch were qualified).

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all target compounds detected above 50x the method detection limit (MDL). All %differences for SD prepared using a sample from the site are at or below the control limit (10%).

3.2.4 SURROGATE (SU) RECOVERY

The laboratory spiked each organic sample with one or more surrogates before preparation and analysis.

Some surrogate recoveries are outside the control limits and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, comparing sample results to theoretical values, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records, which confirms that sample integrity was maintained. The validator noted the following regarding the custody records and sample log-in at the laboratory:

- For work order 460-100831-1, the documentation indicates that no custody seals were used for the transfer of the samples from the field to the laboratory. The samples were transferred by commercial, overnight courier and were received in good condition, and thus no further action was taken.
- For work order 460-101122-1, the container for ECS-Area 24-H27-F was received with a cracked lid, which was replaced upon receipt. Analyses were performed for metals only, and thus this is not considered to significantly affect data quality and no further action was taken.

The information on the custody record is complete and correct, and agrees with that reported in the analytical results except as follows:

- For work order 460-98874-1, the sampler did not include the sample collection times on the custody record. The laboratory logged in the samples using the times on the sample containers.
- For work order 460-99248-1, the sampler did not indicate any requested tests on the custody record for the trip blank. The laboratory logged in the sample for VOC per the project plan.

- For work order 460-99999-1, the sample IDs for one or more samples were revised from those on the custody record per ENTACT'S request.

All samples were analyzed for the tests requested on the chain-of-custody and one result was reported for each target analyte except as follows:

- For the single backfill composite sample in laboratory work order 460-100389-1, the laboratory reported an original result (preparation batch 320622 09/03/2015 05:30:00) and re-extracted/re-analyzed result (preparation batch 320746 09/03/2015 19:00:00) for Chromium (VI). The sample was re-extracted/ re-analyzed due to deficiencies for the MS/MSD, which was prepared using a sample from another site and thus does not reflect on data quality for the backfill sample. The sample results for both sets are all non-detect and the validator did not find any QC deficiencies for either set. In the EDD, the laboratory reported the original set with a reportable_result of Yes and the second set with a reportable_result of No. The validator confirmed this selection and made no changes.
- For the single backfill composite sample in laboratory work order 460-100886-1, the laboratory reported an original result (preparation batch 322449 09/15/2015 09:09:00) and re-extracted/re-analyzed result (preparation batch 322593 09/15/2015 19:00:00) for Chromium (VI). The sample was re-extracted/ re-analyzed due to deficiencies for the MS/MSD, which was prepared using a sample from another site and thus does not reflect on data quality for the backfill sample. The sample results for both sets are all non-detect and the validator did not find any QC deficiencies for either set. In the EDD, the laboratory reported the original set with a reportable_result of Yes and the second set with a reportable_result of No. The validator confirmed this selection and made no changes.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

All samples were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan, and/or SW-846, which confirms that sample results are not affected by sample degradation, except as follows:

- For work order 460-98763-1, the samples were received at 15.2 C with melted ice. This is above the laboratory's standard receipt requirement of 4+/-2 C. All of the samples in this work order are soil samples analyzed for TCLP Lead and total Arsenic/Lead.

Per the WorkPlan and SW846, soil samples to be analyzed for metals (with the exception of mercury and hexavalent chromium) do not require thermal preservation. Thus, the validator did not qualify the results.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (no. 11452).

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. (In some cases, the method update number used by the laboratory may differ from that in the Workplan. For example, method 8260C was used rather than 8260B for the VOCs for the backfill samples.)

For the backfill samples, the target analyte list includes all DER-10 analytes and the nominal reporting limits (i.e., without dry-weight correction or sample dilution and based on the standard sample weight and final volume) are at or below the levels of concern (i.e., the Allowable Constituent Levels for Imported Fill or Soil (ACLs) from Appendix 5 of the DER-10), except as follows:

- DER-10 Appendix 5 lists m-Cresol(s), o-Cresol(s), and p-Cresol(s). The laboratory reported m & p-Cresols and o-Cresol as it is not possible to separate m-Cresol and p-Cresol using method 8270D.
- DER-10 Appendix 5 lists Chlordane (alpha). The laboratory reported technical Chlordane, which is a commercial mixture that contains alpha-Chlordane and gamma-Chlordane along with other related compounds.
- The laboratory reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) for the backfill samples instead of the DER-10 analytes as requested on the custody record.

None of the backfill samples required dilution, and thus none have elevated reporting limits.

For the excavation confirmation samples, the target analyte list includes total Arsenic, total Lead, and/or TCLP Lead as requested and all Contract Laboratory Program (CLP) metals for the TAL metals. The nominal reporting limits are below the levels of concern (i.e., the remedial goals) for total Arsenic, total Lead, and TCLP Lead. There are no established levels of concern for the TAL metals. The nominal reporting limits comply with the requirements in the ASP for TAL metals with the exception of Iron, which has a nominal reporting limit of 30 mg/kg that is above the ASP reporting limit of 20 mg/kg.

Some of the excavation confirmation samples required dilution, but none has elevated reporting limits for a non-detect result.

(Note: The laboratory dilutes all total metals samples 2-4x before analysis as standard practice. All Revere samples were diluted 4x and thus nominal reporting limits were determined at this dilution rate. The laboratory also dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank (and leachate blank for TCLP) for every analytical batch (maximum 20 samples) and a calibration blank for every 10 metals analyses as required per the analytical methodology. Additionally, a trip blank was included with the each shipment of VOC samples, which meets the Workplan requirement of one for every cooler of VOC samples. (For work order 460-98662-1, two VOC samples are included in this work order but there is no trip blank on the custody record. These samples were shipped in the same container as the backfill VOC samples in work order 460-98659-1. Thus, the trip blank on that custody record applies for the samples in 460-98662-1.) Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used.

Some detects are reported in the laboratory and field blanks and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the validator calculated a blank equivalent concentration taking into account the sample weight, moisture content, and dilution factor for each sample when determining if the contamination in the blank is near that in the sample, and thus if data quality is affected for that sample.

3.3.5 THEORETICAL RESULT VALUES

Several samples were analyzed for both TCLP Lead and total Lead. Based on the relative amounts (100-g soil sample used to prepare 2000-ml leachate), the validator calculated the maximum theoretical TCLP Lead concentration from the total Lead concentration for each sample assuming 100% leachability.

Some TCLP Lead results exceeded the theoretical maximum (indicating a high TCLP result or low total Lead result likely due to a heterogeneous sample matrix) and the validator qualified the associated data as detailed in Table 3, which shows the

QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.3.6 ANALYTICAL PROCEDURES

The analytical procedures (instrument tuning and initial calibration, calibration verification, interference check standards, dual column confirmation, and internal standards), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method with a few exceptions. The validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

No issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes 100 analytical batches. The validator re-calculated sample results and QC check parameters for ten batches and made the following observations from the review of the raw data:

- The laboratory used dual column confirmation for all GC analyses (including PEST, PCB, and HERB). For surrogates and spiked analytes, the laboratory reports the results from both columns in the pdf report. For target analytes in blanks and field samples (and as the reportable result in the EDD for surrogates and spiked analytes), the laboratory reports the result from the column with the higher concentration (unless chromatographic performance is better on one column and it is therefore used for all analyses), provided that the RPD between the two columns is less than 40%. If the RPD is greater than 40%, the column with the lower concentration is reported with a note in the narrative and the result is reported with a P flag. The RPD did not exceed 40% for any field or QC samples in this data set. (All field samples are non-detect.)
- For HERB batch 313550 in work order 460-98662-1, the validator noted that the lowest ICAL level corresponds to 33 µg/kg of Silvex (2,4,5-TP) while the reporting limit (RL) is 17 µg/kg. Thus, detects between the MDL and 33 µg/kg should be considered estimates. All field samples are non-detect to the MDL so no further action is required.
- For SVOC batch 305298 in work order 460-96483-1, the retention time (RT) for the internal standard Perylene-d12 in the continuing calibration verification standard (CCV) is outside the +/-0.5 minute window from the ICAL mid-point standard (13.34 min vs. 13.88 min). The RTs for the field samples and QC samples are within the +/-0.5 minute window from the CCV, which is used to update the library, and thus no corrective action was required per the laboratory's standard operating procedure (SOP). Additionally, the validator noted that all target analytes are identified in the LCS and determined no flagging is required.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The Level 4 data packages and EDD contain all necessary information or the laboratory submitted a revision upon request as detailed in the case narratives, except as follows:

- For work order 460-101506-1, the data package does not include the instrument raw data for the TCLP Lead testing of the three samples in this work order (ECS-AREA25-H28-F, ECS-AREA28-J28-F, and DS-AREA28-J28-SS). The laboratory was unable to retrieve this data. All other QC data including sample leaching and digestion information, blank and spike results, and the sample final results are available.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
All	All laboratory QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.
460-98662-1 460-98659-1 460-99103-1 460-99248-1 460-100886-1	All backfill composite field samples (*c-001 and *c-002)	composite_yn	The validator changed the entry from N to Y based on the custody record.
460-98662-1 460-98659-1 460-99103-1 460-99248-1 460-100389-1 460-100886-1	All backfill composite MD, MS, and MSD samples (*c-001 and *c-002)	composite_yn	The validator changed the entry from N to Y based on the custody record.
All	All 6010C total metals field samples and laboratory QC samples	prep_method	The validator changed the method reference from SW3020B to SW3050B based on the pdf analytical results and as confirmed by the laboratory.
All	All laboratory QC samples	validation_level	For the target analyte (TRG), surrogate (SUR), and spike compound (SC) records (which have validated_yn set to N), the validator changed the entry from UNKNOWN to blank to meet NYSDEC requirements.
All	All field QC samples	validation_level	For the surrogate (SUR) records (which have validated_yn set to N), the validator changed the entry from UNKNOWN to blank to meet NYSDEC requirements.

3.4.3 ANALYTICAL COMPLETENESS

The validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which a target analyte can be

positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which a target analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size and include dry-weight correction for all soil samples as required per Section 5.7.1 of the Workplan. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results for the investigative samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics. (For the 7196A analyses, Chromium III is shown as not dry-weight corrected. Chromium III is calculated from the results for Chromium VI and total Chromium, which are dry-weight corrected, and thus the Chromium III is not directly dry-weight corrected but is on a dry-weight basis.)

The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
July 2015 to September 2015

SAMPLE SUMMARY

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-98659-1	BF-ORI-HS-7g-01	7/27/15	INV	BF	Soil										x		
460-98659-2	BF-ORI-HS-7g-02	7/27/15	INV	BF	Soil										x		
460-98659-3	BF-ORI-HS-7c-01	7/27/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-98659-4	TB-7/27/15	7/27/15	TB	TB	Water										x		
460-98662-1	BF-5L-GF-5g-01	7/27/15	INV	BF	Soil										x		
460-98662-2	BF-5L-GF-5g-02	7/27/15	INV	BF	Soil										x		
460-98662-3	BF-5L-GF-5c-01	7/27/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-98662-3MS	BF-5L-GF-5c-01	7/27/15	MS	BF	Soil									x			
460-98662-3SD	BF-5L-GF-5c-01	7/27/15	MSD	BF	Soil									x			
460-98662-4	BF-5L-GF-6g-01	7/27/15	INV	BF	Soil										x		
460-98662-5	BF-5L-GF-6g-02	7/27/15	INV	BF	Soil										x		
460-98662-6	BF-5L-GF-6c-01	7/27/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-98763-1	ECS-AREA22-M22NE-F	7/29/15	INV	ECS	Soil	x	x										
460-98763-2	DS-AREA22-M22NE-SS	7/29/15	INV	ECS	Soil	x	x										
460-98763-3	ECS-AREA22-M22NW-F	7/29/15	INV	ECS	Soil	x	x										
460-98763-3LR	ECS-AREA22-M22NW-F	7/29/15	MD	ECS	Soil	x											
460-98763-3MS	ECS-AREA22-M22NW-F	7/29/15	MS	ECS	Soil	x											
460-98763-4	DS-AREA22-M22SW-SS	7/29/15	INV	ECS	Soil	x	x										
460-98763-5	ECS-AREA22-M21SW-F	7/29/15	INV	ECS	Soil	x	x										
460-98763-6	ECS-AREA22-M21SE-F	7/29/15	INV	ECS	Soil	x	x										
460-98763-7	ECS-AREA22-M21NE-F	7/29/15	INV	ECS	Soil	x	x										
460-98763-7LR	ECS-AREA22-M21NE-F	7/29/15	MD	ECS	Soil		x										
460-98763-7MS	ECS-AREA22-M21NE-F	7/29/15	MS	ECS	Soil		x										
460-98825-1	ECS-AREA22-L22NE-F	7/30/15	INV	ECS	Soil	x	x										
460-98825-2	ECS-AREA22-L22NE-F-X	7/30/15	FD	ECS	Soil	x	x										
460-98825-3	DS-AREA22-L22SE-SS	7/30/15	INV	ECS	Soil	x	x										
460-98825-4	ECS-AREA22-M21NW-F	7/30/15	INV	ECS	Soil	x		x	x								
460-98825-5	ECS-AREA22-L21SE-F	7/30/15	INV	ECS	Soil	x	x										
460-98825-5LR	ECS-AREA22-L21SE-F	7/30/15	MD	ECS	Soil	x	x										
460-98825-5MS	ECS-AREA22-L21SE-F	7/30/15	MS	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-98825-6	ECS-AREA22-M20SE-F	7/30/15	INV	ECS	Soil	x	x										
460-98825-7	ECS-AREA22-M20NE-F	7/30/15	INV	ECS	Soil	x	x										
460-98825-8	ECS-AREA22-L21NE-F	7/30/15	INV	ECS	Soil	x	x										
460-98874-1	ECS-AREA22-M20NW-F	7/31/15	INV	ECS	Soil	x	x										
460-98874-2	ECS-AREA22-M20SW-F	7/31/15	INV	ECS	Soil	x	x										
460-98931-1	ECS-AREA22-M20NW-SN	8/3/15	INV	ECS	Soil	x	x										
460-98931-1LR	ECS-AREA22-M20NW-SN	8/3/15	MD	ECS	Soil		x										
460-98931-1MS	ECS-AREA22-M20NW-SN	8/3/15	MS	ECS	Soil		x										
460-98931-2	ECS-AREA22-L21NW-SW	8/3/15	INV	ECS	Soil	x	x										
460-98931-3	ECS-AREA2-L20-F	8/3/15	INV	ECS	Soil	x	x										
460-99013-1	ECS-PSTREAM-52+50-F	8/4/15	INV	ECS	Soil	x	x										
460-99013-2	DS-PSTREAM-52+50-SS	8/4/15	INV	ECS	Soil	x	x										
460-99013-3	ECS-PSTREAM-52+00-F	8/4/15	INV	ECS	Soil	x	x										
460-99013-4	DS-PSTREAM-52+00-SS	8/4/15	INV	ECS	Soil	x	x										
460-99013-5	ECS-PSTREAM-51+50-F	8/4/15	INV	ECS	Soil	x	x										
460-99013-6	DS-PSTREAM-51+50-SS	8/4/15	INV	ECS	Soil	x	x										
460-99013-7	ECS-PSTREAM-51+00-F	8/4/15	INV	ECS	Soil	x	x										
460-99013-8	DS-PSTREAM-51+00-SS	8/4/15	INV	ECS	Soil	x	x										
460-99013-9	ECS-PSTREAM-50+50-F	8/4/15	INV	ECS	Soil	x	x										
460-99013-10	DS-PSTREAM-50+50-SS	8/4/15	INV	ECS	Soil	x	x										
460-99097-1	ECS-AREA22-L21SW-F	8/5/15	INV	ECS	Soil	x	x										
460-99097-2	ECS-AREA22-L22NW-F	8/5/15	INV	ECS	Soil	x	x										
460-99097-3	DS-AREA22-L22SW-SS	8/5/15	INV	ECS	Soil	x	x										
460-99097-4	ECS-PSTREAM-50+00-F	8/5/15	INV	ECS	Soil	x	x										
460-99097-5	DS-PSTREAM-50+00-SS	8/5/15	INV	ECS	Soil	x	x										
460-99103-1	BF-5L-GF-7g-01	8/5/15	INV	BF	Soil										x		
460-99103-2	BF-5L-GF-7g-02	8/5/15	INV	BF	Soil										x		
460-99103-3	BF-5L-GF-7c-01	8/5/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-99103-4	BF-5L-GF-7g-01-X	8/5/15	FD	BF	Soil										x		
460-99103-5	BF-5L-GF-7g-02-X	8/5/15	FD	BF	Soil										x		
460-99103-6	BF-5L-GF-7c-01-X	8/5/15	FD	BF	Soil				x	x	x	x	x	x		x	x
460-99103-7	TB-8/5/15	8/5/15	TB	TB	Water										x		
460-99247-1	ECS-Area 2-L21-F	8/7/15	INV	ECS	Soil	x	x										
460-99248-1	BF-ETETZ-GF-2g-01	8/7/15	INV	BF	Soil										x		
460-99248-2	BF-ETETZ-GF-2g-02	8/7/15	INV	BF	Soil										x		
460-99248-3	BF-ETETZ-GF-2c-01	8/7/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-99248-4	TB-8/7/15	8/7/15	TB	TB	Water										x		
460-99873-1	ECS-AREA28-O22/23-F	8/19/15	INV	ECS	Soil	x	x										
460-99873-1LR	ECS-AREA28-O22/23-F	8/19/15	MD	ECS	Soil	x											
460-99873-1MS	ECS-AREA28-O22/23-F	8/19/15	MS	ECS	Soil	x											

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-99873-2	ECS-AREA28-N23-F	8/19/15	INV	ECS	Soil	x	x										
460-99873-3	DS-AREA28-O22-SN	8/19/15	INV	ECS	Soil	x	x										
460-99873-4	DS-AREA28-O23-SS	8/19/15	INV	ECS	Soil	x	x										
460-99873-5	DS-AREA28-N22-SN	8/19/15	INV	ECS	Soil	x	x										
460-99873-6	DS-AREA28-N23-SS	8/19/15	INV	ECS	Soil	x	x										
460-99999-1	ECS-AREA 28-N24-F	8/20/15	INV	ECS	Soil	x		x	x								
460-99999-1LR	ECS-AREA 28-N24-F	8/20/15	MD	ECS	Soil				x								
460-99999-1MS	ECS-AREA 28-N24-F	8/20/15	MS	ECS	Soil				x								
460-99999-2	ECS-AREA 28-M23-F	8/20/15	INV	ECS	Soil	x	x										
460-99999-3	DS-AREA 28-N24-SS	8/20/15	INV	ECS	Soil	x	x										
460-99999-4	ECS-AREA 28-M23-SN	8/20/15	INV	ECS	Soil	x	x										
460-100059-1	ECS-AREA28-M24-F	8/21/15	INV	ECS	Soil	x	x										
460-100059-2	ECS-AREA28-M24-F-X	8/21/15	FD	ECS	Soil	x	x										
460-100059-3	ECS-AREA28-M25-F	8/21/15	INV	ECS	Soil	x	x										
460-100059-4	DS-AREA28-M25-SS	8/21/15	INV	ECS	Soil	x	x										
460-100059-4LR	DS-AREA28-M25-SS	8/21/15	MD	ECS	Soil	x	x										
460-100059-4MS	DS-AREA28-M25-SS	8/21/15	MS	ECS	Soil	x	x										
460-100129-1	ECS-AREA 28-L24-F	8/24/15	INV	ECS	Soil	x		x	x								
460-100129-2	DS-AREA 28-L24-SN	8/24/15	INV	ECS	Soil	x	x										
460-100129-3	ECS-AREA 28-L25-F	8/24/15	INV	ECS	Soil	x	x										
460-100129-4	DS-AREA 28-L26-SS	8/24/15	INV	ECS	Soil	x	x										
460-100129-5	ECS-AREA 28-L26-F	8/24/15	INV	ECS	Soil	x	x										
460-100387-1	ECS-AREA29-E27-F	8/26/15	INV	ECS	Soil	x	x										
460-100387-2	DS-AREA29-E27-SN	8/26/15	INV	ECS	Soil	x	x										
460-100387-3	ECS-AREA29-E27-SW	8/27/15	INV	ECS	Soil	x	x										
460-100387-4	ECS-AREA29-E27-SW-X	8/27/15	FD	ECS	Soil	x	x										
460-100387-5	ECS-AREA29-E28-SW	8/27/15	INV	ECS	Soil	x	x										
460-100387-6	ECS-AREA29-F28-SS	8/27/15	INV	ECS	Soil	x	x										
460-100387-6LR	ECS-AREA29-F28-SS	8/27/15	MD	ECS	Soil	x	x										
460-100387-6MS	ECS-AREA29-F28-SS	8/27/15	MS	ECS	Soil	x	x										
460-100389-1	BF-5L-WT-8g-01	8/27/15	INV	BF	Soil										x		
460-100389-2	BF-5L-WT-8g-02	8/27/15	INV	BF	Soil										x		
460-100389-3	BF-5L-WT-8c-01	8/27/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-100389-3MS	BF-5L-WT-8c-01	8/27/15	MS	BF	Soil							x	x				
460-100389-3SD	BF-5L-WT-8c-01	8/27/15	MSD	BF	Soil							x	x				
460-100389-4	TB-8/27/15	8/27/15	TB	TB	Water										x		
460-100495-1	ECS-AREA 29-E/F28-F	8/31/15	INV	ECS	Soil	x	x										
460-100495-2	ECS-AREA 29-F/G28-F	8/31/15	INV	ECS	Soil	x	x										
460-100495-3	ECS-AREA 29-G28-SS	8/31/15	INV	ECS	Soil	x	x										
460-100495-4	ECS-AREA 29-G27-F	8/31/15	INV	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-100495-5	ECS-AREA 29-F27-F	8/31/15	INV	ECS	Soil	x	x										
460-100831-1	ECS-AREA 27-K25-F	9/8/15	INV	ECS	Soil	x	x										
460-100831-1LR	ECS-AREA 27-K25-F	9/8/15	MD	ECS	Soil	x											
460-100831-1MS	ECS-AREA 27-K25-F	9/8/15	MS	ECS	Soil	x											
460-100831-2	ECS-AREA 27-K24-F	9/8/15	INV	ECS	Soil	x	x										
460-100831-3	DS-AREA 27-K24-SN	9/8/15	INV	ECS	Soil	x	x										
460-100831-4	DS-AREA 27-J24-SN	9/8/15	INV	ECS	Soil	x	x										
460-100831-5	ECS-AREA 27-J25-F	9/8/15	INV	ECS	Soil	x	x										
460-100831-6	DS-AREA 25-I25-SN	9/8/15	INV	ECS	Soil	x	x										
460-100831-7	ECS-AREA 25-I25-F	9/8/15	INV	ECS	Soil	x	x										
460-100831-8	ECS-AREA 28-K26-F	9/8/15	INV	ECS	Soil	x		x	x								
460-100831-9	DS-AREA 28-L27-SS	9/8/15	INV	ECS	Soil	x	x										
460-100831-10	DS-AREA 28-K27-SS	9/8/15	INV	ECS	Soil	x	x										
460-100831-11	ECS-AREA 28-K27-F	9/8/15	INV	ECS	Soil	x	x										
460-100831-12	ECS-AREA 28-J26-F	9/8/15	INV	ECS	Soil	x	x										
460-100831-13	ECS-AREA 25-I26-F	9/8/15	INV	ECS	Soil	x	x										
460-100831-14	ECS-AREA 25-I26-F-X	9/8/15	FD	ECS	Soil	x	x										
460-100886-1	BF-5L-WT-9g-01	9/9/15	INV	BF	Soil										x		
460-100886-2	BF-5L-WT-9g-02	9/9/15	INV	BF	Soil										x		
460-100886-3	BF-5L-WT-9c-01	9/9/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-100886-3MS	BF-5L-WT-9c-01	9/9/15	MS	BF	Soil							x	x				
460-100886-3SD	BF-5L-WT-9c-01	9/9/15	MSD	BF	Soil							x	x				
460-100886-4	TB-9/9/15	9/9/15	TB	TB	Water										x		
460-101122-1	ECS-Area 24-H26-F	9/14/15	INV	ECS	Soil	x	x										
460-101122-2	DS-Area 24-H25-SN	9/14/15	INV	ECS	Soil	x	x										
460-101122-3	ECS-Area 29-G26-F	9/14/15	INV	ECS	Soil	x	x										
460-101122-4	DS-Area 29-G26-SN	9/14/15	INV	ECS	Soil	x	x										
460-101122-5	ECS-Area 24-H27-F	9/14/15	INV	ECS	Soil	x	x										
460-101258-1	ECS-PSTREAM-60+00-F	9/16/15	INV	ECS	Soil	x	x										
460-101258-2	ECS-PSTREAM-60+00-SE	9/16/15	INV	ECS	Soil	x	x										
460-101258-3	ECS-PSTREAM-60+00-SW	9/16/15	INV	ECS	Soil	x	x										
460-101258-4	ECS-PSTREAM-60+50-F	9/16/15	INV	ECS	Soil	x	x										
460-101258-5	ECS-PSTREAM-60+50-SE	9/16/15	INV	ECS	Soil	x	x										
460-101258-6	ECS-PSTREAM-60+50-SW	9/16/15	INV	ECS	Soil	x	x										
460-101258-7	ECS-PSTREAM-61+00-F	9/16/15	INV	ECS	Soil	x	x										
460-101258-8	ECS-PSTREAM-61+00-SE	9/16/15	INV	ECS	Soil	x	x										
460-101258-9	ECS-PSTREAM-61+00-SW	9/16/15	INV	ECS	Soil	x	x										
460-101258-10	ECS-AREA28-K27-F-R	9/16/15	INV	ECS	Soil	x	x										
460-101258-10LR	ECS-AREA28-K27-F-R	9/16/15	MD	ECS	Soil	x	x										
460-101258-10MS	ECS-AREA28-K27-F-R	9/16/15	MS	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-101342-1	ECS-PSTREAM-61+50-F	9/17/15	INV	ECS	Soil	x	x										
460-101342-2	ECS-PSTREAM-61+50-SE	9/17/15	INV	ECS	Soil	x	x										
460-101342-3	ECS-PSTREAM-61+50-SW	9/17/15	INV	ECS	Soil	x	x										
460-101342-4	ECS-PSTREAM-62+00-F	9/17/15	INV	ECS	Soil	x	x										
460-101342-5	ECS-PSTREAM-62+00-SE	9/17/15	INV	ECS	Soil	x	x										
460-101342-6	ECS-PSTREAM-62+00-SW	9/17/15	INV	ECS	Soil	x		x	x								
460-101342-7	ECS-PSTREAM-62+50-F	9/17/15	INV	ECS	Soil	x	x										
460-101342-8	ECS-PSTREAM-62+50-SE	9/17/15	INV	ECS	Soil	x	x										
460-101342-9	ECS-PSTREAM-62+50-SW	9/17/15	INV	ECS	Soil	x	x										
460-101342-10	ECS-PSTREAM-63+00-F	9/17/15	INV	ECS	Soil	x	x										
460-101342-11	ECS-PSTREAM-63+00-SE	9/17/15	INV	ECS	Soil	x	x										
460-101342-12	ECS-PSTREAM-63+00-SW	9/17/15	INV	ECS	Soil	x	x										
460-101342-13	ECS-PSTREAM-62+00-SE-X	9/17/15	FD	ECS	Soil	x	x										
460-101422-1	ECS-AREA27/28-J27-F	9/18/15	INV	ECS	Soil	x	x										
460-101422-2	ECS-AREA27-I27-F	9/18/15	INV	ECS	Soil	x	x										
460-101422-3	ECS-PSTREAM-63+50-F	9/18/15	INV	ECS	Soil	x	x										
460-101422-4	ECS-PSTREAM-63+50-SE	9/18/15	INV	ECS	Soil	x	x										
460-101422-5	ECS-PSTREAM-63+50-SW	9/18/15	INV	ECS	Soil	x	x										
460-101504-1	ECS-PSTREAM-64+00-F	9/19/15	INV	ECS	Soil	x	x										
460-101504-2	ECS-PSTREAM-64+00-SE	9/19/15	INV	ECS	Soil	x	x										
460-101504-3	ECS-PSTREAM-64+00-SW	9/19/15	INV	ECS	Soil	x	x										
460-101506-1	ECS-AREA25-H28-F	9/21/15	INV	ECS	Soil	x	x										
460-101506-2	ECS-AREA28-J28-F	9/21/15	INV	ECS	Soil	x	x										
460-101506-3	DS-AREA28-J28-SS	9/21/15	INV	ECS	Soil	x	x										
460-101572-1	ECS-PSTREAM-60+00-F-R	9/22/15	INV	ECS	Soil	x	x										
460-101572-2	ECS-PSTREAM-60+00-SW-R	9/22/15	INV	ECS	Soil	x	x										
460-101572-3	ECS-PSTREAM-61+00-SE-R	9/22/15	INV	ECS	Soil	x	x										

BF - Backfill Sample
ECS - Excavation Confirmation Sample
FD - Field Duplicate Sample
INV - Investigative Sample
MD – Matrix Duplicate Sample (unspiked)
MS - Matrix Spike Sample
MSD - Matrix Spike Duplicate Sample
TB - Trip Blank

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Pb: 1311/ 3010A/ 6010C for Lead in leachates of soil samples
- Total As and Pb: 3050B/ 6010C for Arsenic and Lead in soil samples
- Total TAL Metals: 3050B/ 6010C for 22 ICP-AES Target Analyte List (TAL) Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc) in soil samples
- Hg: 7471B for total Mercury in soil samples

- Total DER10 Metals: 3050B/ 6010C for 12 ICP-AES NYSDEC DER-10 Appendix 5 Metals (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, Selenium, Silver, and Zinc) in soil samples
- Cr III/VI: 3060A/7196A for Trivalent Chromium and Hexavalent Chromium in soil samples
- PEST: 3546/ 3620C/ 8081B for 15 NYSDEC DER-10 Appendix 5 pesticides plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene in soil samples
- PCB: 3546/ 3665A/ 8082A for 7 Aroclors in soil samples
- HERB: 8151A for Silvex (2,4,5-TP) in soil samples
- VOC: 5035/8260C for 30 NYSDEC DER-10 Appendix 5 volatile organic compounds (VOCs) in soil samples and 5030B/ 8260C for 30 VOCs in aqueous trip blanks
- SVOC: 3546/ 8270D for 20 NYSDEC DER-10 Appendix 5 semivolatile organic compounds (SVOCs) plus Dibenzofuran and Hexachlorobenzene in soil samples
- CN: 9012B for Cyanide in soil samples

TABLE 2
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
July 2015 to September 2015

QC DEFICIENCIES AND DATA QUALIFICATION ACTIONS

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
MATRIX DUPLICATE (MD) PRECISION																	
460-100387-6LR	ECS-AREA29-F28-SS-20150827LR-20150827	LR		3050B	6010C		8/29/15 17:17	8/30/15 16:27	NA	4	LEAD	T			20	Poor lab duplicate precision (27 RPD)	J/UJ to detects/NDs for ECS samples digested in the same batch
FIELD DUPLICATE (FD) PRECISION																	
460-101342-13	ECS-PSTREAM-62+00-SE-X-20150917	N		3050B	6010C		9/19/15 17:27	9/20/15 3:46	NA	4	LEAD					Poor field duplicate precision (71 RPD), use higher result from original sample	J/UJ to detects/NDs for original and duplicate sample
460-101342-13	ECS-PSTREAM-62+00-SE-X-20150917	N	1311	3010A	6010C	9/20/15 18:00	9/21/15 11:45	9/22/15 15:07	NA	5	LEAD					Poor field duplicate precision (150 RPD), use higher result from original sample	J/UJ to detects/NDs for original and duplicate sample
LABORATORY CONTROL SPIKE (LCS) ACCURACY																	
4603143404	4603143404	BD			8260C			8/3/15 15:29	NA	1	CIS-1,2-DICHLORO-ETHYLENE	T	82	121	30	Low laboratory control spike duplicate recovery (80%)	None (recovery within 70-130% data qualification limits)
4603143403	4603143403	BS			8260C			8/3/15 15:04	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	T	58	140		Low laboratory control spike recovery (53%)	J-/UJ to detects/NDs for samples digested in the same batch
4603143404	4603143404	BD			8260C			8/3/15 15:29	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	T	58	140	30	Low laboratory control spike duplicate recovery (51%)	J-/UJ to detects/NDs for samples digested in the same batch

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4603143404	4603143404	BD			8260C			8/3/15 15:29	NA	1	TRANS-1,2-DICHLOROETHENE	T	83	124	30	Low laboratory control spike duplicate recovery (81%)	None (recovery within 70-130% data qualification limits)
4603135374	4603135374	BS			8260C			7/29/15 22:41	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	T	58	140		Low laboratory control spike recovery (52%)	J-/UJ to detects/NDs for samples digested in the same batch
4603135375	4603135375	BD			8260C			7/29/15 23:13	NA	1	METHYL ETHYL KETONE (2-BUTANONE)	T	58	140	30	Low laboratory control spike duplicate recovery (57%)	J-/UJ to detects/NDs for samples digested in the same batch
4603140382A	4603140382A	BS		3546	8270D		8/1/15 2:00	8/4/15 11:51	NA	1	BENZO(G,H,I) PERYLENE	T	43	106		High laboratory control spike recovery (110%)	None (recovery within 70-130% data qualification limits); also samples all ND
4603140382A	4603140382A	BS		3546	8270D		8/1/15 2:00	8/4/15 11:51	NA	1	DIBENZ(A,H) ANTHRACENE	T	43	107		High laboratory control spike recovery (121%)	None (recovery within 70-130% data qualification limits); also samples all ND
4603140382A	4603140382A	BS		3546	8270D		8/1/15 2:00	8/4/15 11:51	NA	1	INDENO(1,2,3-C,D) PYRENE	T	43	109		High laboratory control spike recovery (121%)	None (recovery within 70-130% data qualification limits); also samples all ND
4603159632A	4603159632A	BS		3546	8270D		8/11/15 15:12	8/12/15 11:13	NA	1	BENZO(A)PYRENE	T	36	89		High laboratory control spike recovery (99%)	None (recovery within 70-130% data qualification limits); also samples all ND
4603159632A	4603159632A	BS		3546	8270D		8/11/15 15:12	8/12/15 11:13	NA	1	BENZO(B) FLUORANTHENE	T	33	96		High laboratory control spike recovery (103%)	None (recovery within 70-130% data qualification limits); also samples all ND
4603159642A	4603159642A	BS		3546	8270D		8/11/15 15:19	8/12/15 15:56	NA	1	BENZO(A)PYRENE	T	36	89		High laboratory control spike recovery (92%)	None (recovery within 70-130% data qualification limits); also samples all ND
4603159642A	4603159642A	BS		3546	8270D		8/11/15 15:19	8/12/15 15:56	NA	1	DIBENZ(A,H) ANTHRACENE	T	43	107		High laboratory control spike recovery (111%)	None (recovery within 70-130% data qualification limits); also samples all ND
4603144814A20	4603144814A20	BS		METHOD	9012		8/4/15 9:00	8/4/15 12:27	NA	20	CYANIDE		3.5	121.4		Extremely low soil LCS-SRM recovery (18%) - within vendor limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 100% and 98%.)
4603141504A10	4603141504A10	BS		METHOD	9012		8/2/15 14:35	8/2/15 16:07	NA	10	CYANIDE		3.5	121.4		Extremely low soil LCS-SRM recovery (23.7%) - within vendor limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 106% and 110%.)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
4603152524A10	4603152524A10	BS		METHOD	9012		8/7/15 12:00	8/7/15 15:24	NA	10	CYANIDE		3.5	121.4		Extremely low soil LCS-SRM recovery (24.5%) - within vendor limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 104% and 99%.)
4603154964A10	4603154964A10	BS		METHOD	9012		8/9/15 10:30	8/9/15 13:18	NA	10	CYANIDE		3.5	121.4		Extremely low soil LCS-SRM recovery (24.7%) - within vendor limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 105% and 99%.)
4603204084A20	4603204084A20	BS		METHOD	9012		9/2/15 7:30	9/2/15 15:12	NA	20	CYANIDE		3.5	121.4		Extremely low soil LCS-SRM recovery (20.8%) - within vendor limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 97% and 101%.)
4603225054A10	4603225054A10	BS		METHOD	9012		9/15/15 11:30	9/16/15 13:35	NA	10	CYANIDE		3.5	121.4		Extremely low soil LCS-SRM recovery (18.1%) - within vendor limits but <50%	J-/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 103% and 107%.)
MATRIX SPIKE (MS) ACCURACY																	
460-100059-4MS	DS-AREA28-M25-SS-20150821MS-20150821	MS		3050B	6010C		8/25/15 7:31	8/25/15 16:40	NA	4	LEAD		75	125		Extremely low matrix spike recovery (-86%)	None (check waived because unspiked sample conc > 4x spike amount), PDS passes
460-100387-6MS	ECS-AREA29-F28-SS-20150827MS-20150827	MS		3050B	6010C		8/29/15 17:17	8/30/15 16:23	NA	4	LEAD	N	75	125		Low matrix spike recovery (45%)	J-/UJ to detects/NDs for ECS samples digested in the same batch
460-100886-3MS	BF-5L-WT-9c-01-20150909MS	MS		3546	8082A		9/11/15 20:08	9/13/15 6:47	2C	1	PCB-1260 (AROCLOR 1260)	T	71	150		High matrix spike recovery (152%)	None (average MS/MSD recovery (146%) within control)
460-100886-3SD	BF-5L-WT-9c-01-20150909SD	SD		3546	8082A		9/11/15 20:08	9/13/15 7:02	2C	1	PCB-1260 (AROCLOR 1260)		71	150	30	Passing matrix spike duplicate recovery (140%)	NA
SURROGATE (SU) RECOVERY																	
460-99248-3	BF-ETETZ-GF-2c-01-20150807	N		3546	8270D		8/11/15 15:19	8/13/15 15:45	NA	1	PHENOL-D5	T	41	118		Low acid surrogate recovery (38%)	J-/UJ to detects/NDs for acid analytes in this sample
460-100389-4	TB-8/27/15-20150827	TB			8260C			9/1/15 17:45	NA	1	TOLUENE-D8	T	74	120		High surrogate recovery (123%)	none (deficiency for trip blank, which is ND; no significant additional effect on environmental sample results)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
LABORATORY BLANKS																	
4603144811A	4603144811A	LB		METHOD	9012		8/4/15 9:00	8/4/15 12:24	NA	1	CYANIDE	J				Preparation blank contamination (0.0365 J mg/kg)	U at RL to Js, J+ to detects <10x blank equivalent concentration for samples prepared in the same batch (none)
FIELD BLANKS																	
460-100886-4	TB-9/9/15-20150909	TB			8260C			9/10/15 20:56	NA	1	METHYLENE CHLORIDE					Trip blank contamination (1.1 ug/l)	U at RL to Js, J+ to detects <4x RL or < 2x blank equivalent concentration for samples shipped in the same container (none, all ND)
THEORETICAL RESULT VALUES																	
460-101342-5	ECS-PSTREAM-62+00-SE-20150917	N	1311	3010A	6010C	9/20/15 18:00	9/21/15 9:13	9/22/15 14:24	NA	5	LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-101342-5	ECS-PSTREAM-62+00-SE-20150917	N		3050B	6010C		9/19/15 17:27	9/20/15 3:10	NA	4	LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-99013-8	DS-PSTREAM-51+00-SS-20150804	N	1311	3010A	6010C	8/6/15 17:00	8/7/15 9:27	8/7/15 20:01	NA	50	LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-99013-8	DS-PSTREAM-51+00-SS-20150804	N		3050B	6010C		8/6/15 7:35	8/6/15 17:27	NA	10	LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-99013-9	ECS-PSTREAM-50+50-F-20150804	N	1311	3010A	6010C	8/6/15 17:00	8/7/15 9:27	8/7/15 17:10	NA	5	LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-99013-9	ECS-PSTREAM-50+50-F-20150804	N		3050B	6010C		8/6/15 7:35	8/6/15 15:09	NA	4	LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
CALIBRATION VERIFICATION																	
CCV 460-322678/14	CCV 460-322678/14	CCV			8151A			9/16/15 14:13	1C	1	SILVEX (2,4,5-TP)	*	-15	+15		Calibration drift secondary column (%D= -19.4%)	J- to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all ND)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
CCVIS 460-314340/2	CCVIS 460-314340/2	CCV			8260C			8/3/15 14:39	NA	1	ACETONE		-20	+20		Calibration drift (%D= -29.5%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-314340/2	CCVIS 460-314340/2	CCV			8260C			8/3/15 14:39	NA	1	METHYL ETHYL KETONE (2-BUTANONE)		-20	+20		Calibration drift (%D= -48.3%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-313537/3	CCVIS 460-313537/3	CCV			8260C			7/29/15 22:16	NA	1	ACETONE		-20	+20		Calibration drift (%D= -25.3%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-313537/3	CCVIS 460-313537/3	CCV			8260C			7/29/15 22:16	NA	1	METHYL ETHYL KETONE (2-BUTANONE)		-20	+20		Calibration drift (%D= -47.7%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-321131/2	CCVIS 460-321131/2	CCV			8260C			9/6/15 17:29	NA	1	1,1,1-TRICHLOROETHANE	*	-20	+20		Calibration drift (%D= -23.9%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-321131/2	CCVIS 460-321131/2	CCV			8260C			9/6/15 17:29	NA	1	CARBON TETRACHLORIDE	*	-20	+20		Calibration drift (%D= -26.3%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-314368/2	CCVIS 460-314368/2	CCV			8270D			8/3/15 19:33	NA	1	PENTACHLORO-PHENOL	*	-20	+20		Calibration drift (%D= +22.0%)	J+ to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-314368/2	CCVIS 460-314368/2	CCV			8270D			8/3/15 19:33	NA	1	PHENOL	*	-20	+20		Calibration drift (%D= -28.1%)	J- to detects, UJ to NDs samples analyzed this shift (all ND)

CL – Control Limit
DF – Dilution Factor
LCL – Lower Control Limit
UCL – Upper Control Limit

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
July 2015 to September 2015

QUALIFIED RESULTS FOR FIELD SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
TCLP METALS					
460-98763-6	ECS-AREA22-M21SE-F-20150729	TCLP LEAD	42.3 J ug/l	J	Result between MDL and RL
460-98825-8	ECS-AREA22-L21NE-F-20150730	TCLP LEAD	34.3 J ug/l	J	Result between MDL and RL
460-99013-2	DS-PSTREAM-52+50-SS-20150804	TCLP LEAD	42.7 J ug/l	J	Result between MDL and RL
460-99013-3	ECS-PSTREAM-52+00-F-20150804	TCLP LEAD	21.5 J ug/l	J	Result between MDL and RL
460-99013-5	ECS-PSTREAM-51+50-F-20150804	TCLP LEAD	25.4 J ug/l	J	Result between MDL and RL
460-99013-7	ECS-PSTREAM-51+00-F-20150804	TCLP LEAD	28.2 J ug/l	J	Result between MDL and RL
460-99013-8	DS-PSTREAM-51+00-SS-20150804	TCLP LEAD	318000 ug/l	J	Metals leach-to-total balance greater than theoretical
460-99013-9	ECS-PSTREAM-50+50-F-20150804	TCLP LEAD	2660 ug/l	J	Metals leach-to-total balance greater than theoretical
460-99873-5	DS-AREA28-N22-SN-20150819	TCLP LEAD	23.8 J ug/l	J	Result between MDL and RL
460-100129-1	ECS-AREA 28-L24-F-20150824	TCLP LEAD	25.9 J ug/l	J	Result between MDL and RL
460-100129-3	ECS-AREA 28-L25-F-20150824	TCLP LEAD	28.1 J ug/l	J	Result between MDL and RL
460-100387-3	ECS-AREA29-E27-SW-20150827	TCLP LEAD	22.1 J ug/l	J	Result between MDL and RL
460-100387-5	ECS-AREA29-E28-SW-20150827	TCLP LEAD	26.0 J ug/l	J	Result between MDL and RL
460-100495-3	ECS-AREA 29-G28-SS-20150831	TCLP LEAD	23.6 J ug/l	J	Result between MDL and RL
460-100495-4	ECS-AREA 29-G27-F-20150831	TCLP LEAD	36.4 J ug/l	J	Result between MDL and RL
460-100495-5	ECS-AREA 29-F27-F-20150831	TCLP LEAD	23.1 J ug/l	J	Result between MDL and RL
460-100831-14	ECS-AREA 25-I26-F-X-20150908	TCLP LEAD	27.1 J ug/l	J	Result between MDL and RL
460-101342-4	ECS-PSTREAM-62+00-F-20150917	TCLP LEAD	21.5 J ug/l	J	Result between MDL and RL
460-101342-5	ECS-PSTREAM-62+00-SE-20150917	TCLP LEAD	2560 ug/l	J	Poor field duplicate precision (150 RPD), use higher result from original sample; Metals leach-to-total balance greater than theoretical
460-101342-7	ECS-PSTREAM-62+50-F-20150917	TCLP LEAD	33.0 J ug/l	J	Result between MDL and RL
460-101342-9	ECS-PSTREAM-62+50-SW-20150917	TCLP LEAD	42.5 J ug/l	J	Result between MDL and RL
460-101342-13	ECS-PSTREAM-62+00-SE-X-20150917	TCLP LEAD	347 ug/l	J	Poor field duplicate precision (150 RPD), use higher result from original sample
460-101504-2	ECS-PSTREAM-64+00-SE-20150919	TCLP LEAD	21.0 J ug/l	J	Result between MDL and RL
460-101506-1	ECS-AREA25-H28-F-20150921	TCLP LEAD	39.3 J ug/l	J	Result between MDL and RL
460-101506-3	DS-AREA28-J28-SS-20150921	TCLP LEAD	34.6 J ug/l	J	Result between MDL and RL
460-101572-1	ECS-PSTREAM-60+00-F-R-20150922	TCLP LEAD	21.8 J ug/l	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-101572-2	ECS-PSTREAM-60+00-SW-R-20150922	TCLP LEAD	26.2 J ug/l	J	Result between MDL and RL
TOTAL METALS					
460-98825-4	ECS-AREA22-M21NW-F-20150730	COBALT	9.0 J mg/kg	J	Result between MDL and RL
460-98825-4	ECS-AREA22-M21NW-F-20150730	POTASSIUM	807 J mg/kg	J	Result between MDL and RL
460-98825-4	ECS-AREA22-M21NW-F-20150730	SODIUM	185 J mg/kg	J	Result between MDL and RL
460-99013-8	DS-PSTREAM-51+00-SS-20150804	LEAD	3470 mg/kg	J	Metals leach-to-total balance greater than theoretical
460-99013-9	ECS-PSTREAM-50+50-F-20150804	LEAD	26.5 mg/kg	J	Metals leach-to-total balance greater than theoretical
460-99999-1	ECS-AREA 28-N24-F-20150820	ARSENIC	2.5 J mg/kg	J	Result between MDL and RL
460-99999-1	ECS-AREA 28-N24-F-20150820	COBALT	5.6 J mg/kg	J	Result between MDL and RL
460-99999-1	ECS-AREA 28-N24-F-20150820	POTASSIUM	779 J mg/kg	J	Result between MDL and RL
460-99999-1	ECS-AREA 28-N24-F-20150820	SODIUM	148 J mg/kg	J	Result between MDL and RL
460-100129-1	ECS-AREA 28-L24-F-20150824	CALCIUM	691 J mg/kg	J	Result between MDL and RL
460-100129-1	ECS-AREA 28-L24-F-20150824	COBALT	8.1 J mg/kg	J	Result between MDL and RL
460-100129-1	ECS-AREA 28-L24-F-20150824	POTASSIUM	504 J mg/kg	J	Result between MDL and RL
460-100129-1	ECS-AREA 28-L24-F-20150824	SODIUM	263 J mg/kg	J	Result between MDL and RL
460-100387-6	ECS-AREA29-F28-SS-20150827	LEAD	118 mg/kg	J	Low matrix spike recovery (45%); Poor lab duplicate precision (27 RPD)
460-100495-5	ECS-AREA 29-F27-F-20150831	ARSENIC	3.6 J mg/kg	J	Result between MDL and RL
460-100831-1	ECS-AREA 27-K25-F-20150908	ARSENIC	3.0 J mg/kg	J	Result between MDL and RL
460-100831-8	ECS-AREA 28-K26-F-20150908	CALCIUM	83.7 J mg/kg	J	Result between MDL and RL
460-100831-8	ECS-AREA 28-K26-F-20150908	POTASSIUM	498 J mg/kg	J	Result between MDL and RL
460-100831-8	ECS-AREA 28-K26-F-20150908	THALLIUM	2.7 J mg/kg	J	Result between MDL and RL
460-101342-5	ECS-PSTREAM-62+00-SE-20150917	LEAD	32.4 mg/kg	J	Poor field duplicate precision (71 RPD), use higher result from original sample; Metals leach-to-total balance greater than theoretical
460-101342-6	ECS-PSTREAM-62+00-SW-20150917	COBALT	7.0 J mg/kg	J	Result between MDL and RL
460-101342-6	ECS-PSTREAM-62+00-SW-20150917	POTASSIUM	780 J mg/kg	J	Result between MDL and RL
460-101342-6	ECS-PSTREAM-62+00-SW-20150917	SODIUM	429 J mg/kg	J	Result between MDL and RL
460-101342-13	ECS-PSTREAM-62+00-SE-X-20150917	LEAD	15.5 mg/kg	J	Poor field duplicate precision (71 RPD), use higher result from original sample
460-101504-2	ECS-PSTREAM-64+00-SE-20150919	ARSENIC	2.8 J mg/kg	J	Result between MDL and RL
HERBICIDES (HERB)					
460-100886-3	BF-5L-WT-9c-01-20150909	SILVEX (2,4,5-TP)	22 U ug/kg	UJ	Calibration drift secondary column (%D= -19.4%)
VOLATILE ORGANIC COMPOUNDS (VOC)					
460-98659-1	BF-ORI-HS-7g-01-20150727	ACETONE	5.8 U ug/kg	UJ	Calibration drift (%D= -29.5%)
460-98659-1	BF-ORI-HS-7g-01-20150727	METHYL ETHYL KETONE (2-BUTANONE)	5.8 UT ug/kg	UJ	Low laboratory control spike recovery (53%); Low laboratory control spike duplicate recovery (51%); Calibration drift (%D= -48.3%)
460-98659-2	BF-ORI-HS-7g-02-20150727	ACETONE	6.2 U ug/kg	UJ	Calibration drift (%D= -29.5%)
460-98659-2	BF-ORI-HS-7g-02-20150727	METHYL ETHYL KETONE (2-BUTANONE)	6.2 UT ug/kg	UJ	Low laboratory control spike recovery (53%); Low laboratory control spike duplicate recovery (51%); Calibration drift (%D= -48.3%)

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-98662-1	BF-5L-GF-5g-01-20150727	ACETONE	4.0 U ug/kg	UJ	Calibration drift (%D= -25.3%)
460-98662-1	BF-5L-GF-5g-01-20150727	METHYL ETHYL KETONE (2-BUTANONE)	4.0 UT ug/kg	UJ	Low laboratory control spike recovery (52%); Low laboratory control spike duplicate recovery (57%); Calibration drift (%D= -47.7%)
460-98662-2	BF-5L-GF-5g-02-20150727	ACETONE	3.6 U ug/kg	UJ	Calibration drift (%D= -25.3%)
460-98662-2	BF-5L-GF-5g-02-20150727	METHYL ETHYL KETONE (2-BUTANONE)	3.6 UT ug/kg	UJ	Low laboratory control spike recovery (52%); Low laboratory control spike duplicate recovery (57%); Calibration drift (%D= -47.7%)
460-98662-4	BF-5L-GF-6g-01-20150727	ACETONE	4.1 U ug/kg	UJ	Calibration drift (%D= -25.3%)
460-98662-4	BF-5L-GF-6g-01-20150727	METHYL ETHYL KETONE (2-BUTANONE)	4.1 UT ug/kg	UJ	Low laboratory control spike recovery (52%); Low laboratory control spike duplicate recovery (57%); Calibration drift (%D= -47.7%)
460-98662-5	BF-5L-GF-6g-02-20150727	ACETONE	3.9 U ug/kg	UJ	Calibration drift (%D= -25.3%)
460-98662-5	BF-5L-GF-6g-02-20150727	METHYL ETHYL KETONE (2-BUTANONE)	3.9 UT ug/kg	UJ	Low laboratory control spike recovery (52%); Low laboratory control spike duplicate recovery (57%); Calibration drift (%D= -47.7%)
460-100389-1	BF-5L-WT-8g-01-20150827	1,1,1-TRICHLOROETHANE	0.97 U ug/kg	UJ	Calibration drift (%D= -23.9%)
460-100389-1	BF-5L-WT-8g-01-20150827	CARBON TETRACHLORIDE	0.97 U ug/kg	UJ	Calibration drift (%D= -26.3%)
460-100389-2	BF-5L-WT-8g-02-20150827	1,1,1-TRICHLOROETHANE	0.97 U ug/kg	UJ	Calibration drift (%D= -23.9%)
460-100389-2	BF-5L-WT-8g-02-20150827	CARBON TETRACHLORIDE	0.97 U ug/kg	UJ	Calibration drift (%D= -26.3%)
SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)					
460-98659-3	BF-ORI-HS-7c-01-20150727	BENZO(A)PYRENE	17 J ug/kg	J	Result between MDL and RL
460-98659-3	BF-ORI-HS-7c-01-20150727	CHRYSENE	23 J ug/kg	J	Result between MDL and RL
460-98659-3	BF-ORI-HS-7c-01-20150727	FLUORANTHENE	26 J ug/kg	J	Result between MDL and RL
460-98659-3	BF-ORI-HS-7c-01-20150727	PHENANTHRENE	19 J ug/kg	J	Result between MDL and RL
460-98659-3	BF-ORI-HS-7c-01-20150727	PHENOL	520 U ug/kg	UJ	Calibration drift (%D= -28.1%)
460-98659-3	BF-ORI-HS-7c-01-20150727	PYRENE	27 J ug/kg	J	Result between MDL and RL
460-98662-3	BF-5L-GF-5c-01-20150727	PHENOL	370 U ug/kg	UJ	Calibration drift (%D= -28.1%)
460-98662-6	BF-5L-GF-6c-01-20150727	FLUORANTHENE	26 J ug/kg	J	Result between MDL and RL
460-98662-6	BF-5L-GF-6c-01-20150727	PHENANTHRENE	21 J ug/kg	J	Result between MDL and RL
460-98662-6	BF-5L-GF-6c-01-20150727	PHENOL	380 U ug/kg	UJ	Calibration drift (%D= -28.1%)
460-98662-6	BF-5L-GF-6c-01-20150727	PYRENE	21 J ug/kg	J	Result between MDL and RL
460-99248-3	BF-ETETZ-GF-2c-01-20150807	2-METHYLPHENOL (O-CRESOL)	340 U ug/kg	UJ	Low acid surrogate recovery (38%)
460-99248-3	BF-ETETZ-GF-2c-01-20150807	CRESOLS, M & P	340 U ug/kg	UJ	Low acid surrogate recovery (38%)
460-99248-3	BF-ETETZ-GF-2c-01-20150807	PENTACHLORO-PHENOL	270 U ug/kg	UJ	Low acid surrogate recovery (38%)
460-99248-3	BF-ETETZ-GF-2c-01-20150807	PHENOL	340 U ug/kg	UJ	Low acid surrogate recovery (38%)
460-100389-3	BF-5L-WT-8c-01-20150827	BENZO(G,H,I) PERYLENE	72 J ug/kg	J	Result between MDL and RL
460-100389-3	BF-5L-WT-8c-01-20150827	CHRYSENE	92 J ug/kg	J	Result between MDL and RL
460-100389-3	BF-5L-WT-8c-01-20150827	CRESOLS, M & P	12 J ug/kg	J	Result between MDL and RL
460-100389-3	BF-5L-WT-8c-01-20150827	FLUORANTHENE	150 J ug/kg	J	Result between MDL and RL
460-100389-3	BF-5L-WT-8c-01-20150827	PHENANTHRENE	59 J ug/kg	J	Result between MDL and RL
460-100389-3	BF-5L-WT-8c-01-20150827	PYRENE	140 J ug/kg	J	Result between MDL and RL
460-100886-3	BF-5L-WT-9c-01-20150909	BENZO(A)PYRENE	17 J ug/kg	J	Result between MDL and RL
460-100886-3	BF-5L-WT-9c-01-20150909	BENZO(B) FLUORANTHENE	24 J ug/kg	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-100886-3	BF-5L-WT-9c-01-20150909	CHRYSENE	18 J ug/kg	J	Result between MDL and RL
460-100886-3	BF-5L-WT-9c-01-20150909	CRESOLS, M & P	24 J ug/kg	J	Result between MDL and RL
460-100886-3	BF-5L-WT-9c-01-20150909	FLUORANTHENE	30 J ug/kg	J	Result between MDL and RL
460-100886-3	BF-5L-WT-9c-01-20150909	INDENO(1,2,3-C,D) PYRENE	40 J ug/kg	J	Result between MDL and RL
460-100886-3	BF-5L-WT-9c-01-20150909	PHENANTHRENE	13 J ug/kg	J	Result between MDL and RL
460-100886-3	BF-5L-WT-9c-01-20150909	PYRENE	20 J ug/kg	J	Result between MDL and RL
CYANIDE					
460-98659-3	BF-ORI-HS-7c-01-20150727	CYANIDE	0.54 B mg/kg	J-	Extremely low soil LCS-SRM recovery (18%) - within vendor limits but <50%
460-98662-3	BF-5L-GF-5c-01-20150727	CYANIDE	0.027 J mg/kg	J	Extremely low soil LCS-SRM recovery (23.7%) - within vendor limits but <50%; Result between MDL and RL
460-98662-6	BF-5L-GF-6c-01-20150727	CYANIDE	0.12 U mg/kg	UJ	Extremely low soil LCS-SRM recovery (23.7%) - within vendor limits but <50%
460-99103-3	BF-5L-GF-7c-01-20150805	CYANIDE	0.016 J mg/kg	J	Extremely low soil LCS-SRM recovery (24.5%) - within vendor limits but <50%
460-99103-6	BF-5L-GF-7c-01-X-20150805	CYANIDE	0.020 J mg/kg	J	Extremely low soil LCS-SRM recovery (24.5%) - within vendor limits but <50%
460-99248-3	BF-ETETZ-GF-2c-01-20150807	CYANIDE	0.096 U mg/kg	UJ	Extremely low soil LCS-SRM recovery (24.7%) - within vendor limits but <50%
460-100389-3	BF-5L-WT-8c-01-20150827	CYANIDE	0.24 mg/kg	J-	Extremely low soil LCS-SRM recovery (20.8%) - within vendor limits but <50%
460-100886-3	BF-5L-WT-9c-01-20150909	CYANIDE	0.19 mg/kg	J-	Extremely low soil LCS-SRM recovery (18.1%) - within vendor limits but <50%

TABLE 5
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
July 2015 to September 2015

FIELD DUPLICATE RESULTS

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-98825-1	460-98825-2	ECS-AREA22-L22NE-F-20150730	TCLP LEAD	50.0 U ug/l	50.0 U ug/l	0	100	NA	y
460-98825-1	460-98825-2	ECS-AREA22-L22NE-F-20150730	ARSENIC	8.8 mg/kg	10.2 mg/kg	1.4	5.4	NA	y
460-98825-1	460-98825-2	ECS-AREA22-L22NE-F-20150730	LEAD	14.0 mg/kg	15.3 mg/kg	NA	3.6	8.9	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ARSENIC	6.3 mg/kg	7.1 mg/kg	0.8	6.6	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	BARIUM	55.2 mg/kg	51.0 mg/kg	4.2	88	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	BERYLLIUM	0.70 mg/kg	0.66 mg/kg	0.04	0.88	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	CADMIUM	0.86 U mg/kg	0.88 U mg/kg	0.02	1.76	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	CHROMIUM, TOTAL	18.8 mg/kg	17.6 mg/kg	NA	4.4	6.6	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	COPPER	29.1 mg/kg	25.8 mg/kg	3.3	11	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	LEAD	14.6 mg/kg	13.0 mg/kg	NA	4.4	12	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	MANGANESE	633 mg/kg	630 mg/kg	NA	6.6	0.48	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	NICKEL	27.3 mg/kg	25.1 mg/kg	2.2	17.6	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	SELENIUM	4.3 U mg/kg	4.4 U mg/kg	0.1	8.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	SILVER	2.2 U mg/kg	2.2 U mg/kg	0	4.4	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ZINC	72.2 mg/kg	64.0 mg/kg	NA	13.2	12	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	CHROMIUM, HEXAVALENT	2.2 U mg/kg	2.2 U mg/kg	0	4.4	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	CHROMIUM III	18.8 mg/kg	17.6 mg/kg	NA	4	6.6	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	MERCURY	0.027 mg/kg	0.028 mg/kg	0.001	0.036	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ALDRIN	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	2.2 U ug/kg	2.2 U ug/kg	0	4.4	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ALPHA ENDOSULFAN	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	2.2 U ug/kg	2.2 U ug/kg	0	4.4	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	BETA ENDOSULFAN	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	CHLORDANE	74 U ug/kg	74 U ug/kg	0	148	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	2.2 U ug/kg	2.2 U ug/kg	0	4.4	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	DIELDRIN	2.2 U ug/kg	2.2 U ug/kg	0	4.4	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ENDOSULFAN SULFATE	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ENDRIN	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ENDRIN ALDEHYDE	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ENDRIN KETONE	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	GAMMA BHC (LINDANE)	2.2 U ug/kg	2.2 U ug/kg	0	4.4	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	HEPTACHLOR	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	HEPTACHLOR EPOXIDE	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	METHOXYCHLOR	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	P,P'-DDD	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	P,P'-DDE	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	P,P'-DDT	7.4 U ug/kg	7.4 U ug/kg	0	14.8	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	TOXAPHENE	74 U ug/kg	74 U ug/kg	0	148	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PCB-1016 (AROCLOR 1016)	74 U ug/kg	74 U ug/kg	0	148	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PCB-1221 (AROCLOR 1221)	74 U ug/kg	74 U ug/kg	0	148	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PCB-1232 (AROCLOR 1232)	74 U ug/kg	74 U ug/kg	0	148	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PCB-1242 (AROCLOR 1242)	74 U ug/kg	74 U ug/kg	0	148	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PCB-1248 (AROCLOR 1248)	74 U ug/kg	74 U ug/kg	0	148	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PCB-1254 (AROCLOR 1254)	74 U ug/kg	74 U ug/kg	0	148	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PCB-1260 (AROCLOR 1260)	74 U ug/kg	74 U ug/kg	0	148	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	SILVEX (2,4,5-TP)	19 U ug/kg	19 U ug/kg	0	38	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	2-METHYLPHENOL (O-CRESOL)	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ACENAPHTHENE	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ACENAPHTHYLENE	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	ANTHRACENE	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	BENZO(A)ANTHRACENE	36 U ug/kg	36 U ug/kg	0	72	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	BENZO(A)PYRENE	36 UT ug/kg	36 UT ug/kg	0	72	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	BENZO(B)FLUORANTHENE	36 UT ug/kg	36 UT ug/kg	0	72	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	BENZO(G,H,I)PERYLENE	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	BENZO(K)FLUORANTHENE	36 U ug/kg	36 U ug/kg	0	72	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	CHRYSENE	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	CRESOLS, M & P	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	DIBENZ(A,H)ANTHRACENE	36 U ug/kg	36 U ug/kg	0	72	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	DIBENZOFURAN	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	FLUORANTHENE	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	FLUORENE	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	HEXACHLOROBENZENE	36 U ug/kg	36 U ug/kg	0	72	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	INDENO(1,2,3-C,D)PYRENE	36 U ug/kg	36 U ug/kg	0	72	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	NAPHTHALENE	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PENTACHLOROPHENOL	290 U ug/kg	290 U ug/kg	0	580	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PHENANTHRENE	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PHENOL	360 U ug/kg	360 U ug/kg	0	720	NA	y
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	PYRENE	360 U ug/kg	360 U ug/kg	0	720	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-99103-3	460-99103-6	BF-5L-GF-7c-01-20150805	CYANIDE	0.016 J mg/kg	0.020 J mg/kg	0.004	0.24	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	1,1,1-TRICHLOROETHANE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	1,1-DICHLOROETHANE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	1,1-DICHLOROETHENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	1,2,4-TRIMETHYLBENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	1,2-DICHLOROBENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	1,2-DICHLOROETHANE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	1,3-DICHLOROBENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	1,4-DICHLOROBENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	1,4-DIOXANE (P-DIOXANE)	21 U ug/kg	18 U ug/kg	3	42	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	ACETONE	5.4 U ug/kg	4.5 U ug/kg	0.9	10.8	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	BENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	CARBON TETRACHLORIDE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	CHLOROBENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	CHLOROFORM	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	CIS-1,2-DICHLOROETHYLENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	ETHYLBENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	METHYL ETHYL KETONE (2-BUTANONE)	5.4 U ug/kg	4.5 U ug/kg	0.9	10.8	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	METHYLENE CHLORIDE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	N-BUTYLBENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	N-PROPYLBENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	SEC-BUTYLBENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	T-BUTYLBENZENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	TERT-BUTYL METHYL ETHER	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	TETRACHLOROETHYLENE(PCE)	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	TOLUENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	TRANS-1,2-DICHLOROETHENE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	TRICHLOROETHYLENE (TCE)	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	VINYL CHLORIDE	1.1 U ug/kg	0.89 U ug/kg	0.21	2.2	NA	y
460-99103-1	460-99103-4	BF-5L-GF-7g-01-20150805	XYLENES, TOTAL	2.1 U ug/kg	1.8 U ug/kg	0.3	4.2	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	1,1,1-TRICHLOROETHANE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	1,1-DICHLOROETHANE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	1,1-DICHLOROETHENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	1,2,4-TRIMETHYLBENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	1,2-DICHLOROBENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	1,2-DICHLOROETHANE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	1,3-DICHLOROBENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	1,4-DICHLOROBENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	1,4-DIOXANE (P-DIOXANE)	18 U ug/kg	16 U ug/kg	2	36	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	ACETONE	4.5 U ug/kg	3.9 U ug/kg	0.6	9	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	BENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	CARBON TETRACHLORIDE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	CHLOROBENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	CHLOROFORM	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	CIS-1,2-DICHLOROETHYLENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	ETHYLBENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	METHYL ETHYL KETONE (2-BUTANONE)	4.5 U ug/kg	3.9 U ug/kg	0.6	9	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	METHYLENE CHLORIDE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	N-BUTYLBENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	N-PROPYLBENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	SEC-BUTYLBENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	T-BUTYLBENZENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	TERT-BUTYL METHYL ETHER	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	TETRACHLOROETHYLENE(PCE)	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	TOLUENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	TRANS-1,2-DICHLOROETHENE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	TRICHLOROETHYLENE (TCE)	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	VINYL CHLORIDE	0.91 U ug/kg	0.79 U ug/kg	0.12	1.82	NA	y
460-99103-2	460-99103-5	BF-5L-GF-7g-02-20150805	XYLENES, TOTAL	1.8 U ug/kg	1.6 U ug/kg	0.2	3.6	NA	y
460-100059-1	460-100059-2	ECS-AREA28-M24-F-20150821	TCLP LEAD	50.0 U ug/l	50.0 U ug/l	0	100	NA	y
460-100059-1	460-100059-2	ECS-AREA28-M24-F-20150821	ARSENIC	9.0 mg/kg	6.9 mg/kg	2.1	6.6	NA	y
460-100059-1	460-100059-2	ECS-AREA28-M24-F-20150821	LEAD	13.8 mg/kg	16.3 mg/kg	NA	4.4	17	y
460-100387-3	460-100387-4	ECS-AREA29-E27-SW-20150827	TCLP LEAD	22.1 J ug/l	50.0 U ug/l	27.9	100	NA	y
460-100387-3	460-100387-4	ECS-AREA29-E27-SW-20150827	ARSENIC	7.2 mg/kg	7.6 mg/kg	0.4	5.4	NA	y
460-100387-3	460-100387-4	ECS-AREA29-E27-SW-20150827	LEAD	26.3 mg/kg	34.0 mg/kg	NA	3.6	26	y
460-100831-13	460-100831-14	ECS-AREA 25-I26-F-20150908	TCLP LEAD	50.0 U ug/l	27.1 J ug/l	22.9	100	NA	y
460-100831-13	460-100831-14	ECS-AREA 25-I26-F-20150908	ARSENIC	5.2 mg/kg	5.0 mg/kg	0.2	6.6	NA	y
460-100831-13	460-100831-14	ECS-AREA 25-I26-F-20150908	LEAD	21.2 mg/kg	16.4 mg/kg	NA	4.4	26	y
460-101342-5	460-101342-13	ECS-PSTREAM-62+00-SE-20150917	TCLP LEAD	2560 ug/l	347 ug/l	NA	100	150	NO

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result		Field Duplicate Lab Result		Abs Diff	2xRL	RPD	Pass
460-101342-5	460-101342-13	ECS-PSTREAM-62+00-SE-20150917	ARSENIC	5.5	mg/kg	9.1	mg/kg	3.6	6	NA	y
460-101342-5	460-101342-13	ECS-PSTREAM-62+00-SE-20150917	LEAD	32.4	mg/kg	15.5	mg/kg	NA	4	71	NO

Note: The RPD test (≤35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test (≤ 2x RL) applies.

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting & Refining (Phase 2B ECS/BF Jul-Sept15)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see below
Reviewer: Taryn Scholz	Date Checked: 10/15/15
Parameters: TCLP Pb, Metals, CrIII/VI, Pesticide, PCB, Herbicide, VOC, SVOC, CN	Methods: 1311/6010C, 6010C/7471B, 7196A, 8081B, 8082A, 8151A, 5035/8260C, 8270D, 9012B

ITEM	YES	NO	N/A	(CRITERIA) COMMENT
Laboratory NELAP/ELAP accredited?	x			#11452 for Edison
Signed Narrative included?	x			certification signature on cover page and/or separate cert statement
No narrative issues noted by lab?		x		See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?		x		see Comment no. 1
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required); see Comment no. 2
COCs properly executed and seals used?		x		see Comment no. 3
Samples received within 2 days?	x			(DER10 - recommended)
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL) see Comment no. 4
RLs acceptable?		x		(ASP Exh C Part III and/or DER-10 App 5) see Comment no. 4A
No elevated RLs for NDs?	x			Note: 4x std dilution for total metals in soil, 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D); (5035 used for VOC soils this phase) see Comment no. 5
If analytical cleanup used, method ref included and approved?	x			(ASP Exh D) see Comment no. 6
Sample matrix included?	x			
Soils on dry weight basis?	x*			
Correct and consistent units?	x			Organics in ug/L (TBs) and ug/kg for rest; Inorganics in mg/kg or ug/L (TCLP)
Holding time to analysis not expired?	x**			(P1 WP Table 2, P2A/B WP Table 1/2 or SW846 for those not in table per ASP Exh I, which gives only aq HTs) Hg 28-d, Extr 14/40-d, Cr VI 30/7-d, CN 14-d, VOC 14-d (freeze within 2-d)
Holding time to preparation not expired?	x**			see above
QC Samples (Phase 2B Workplan Section 5.4.7)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory	x			see Comment no. 7
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)		x		Total samples = 117/117 confirmation (TCLP/Total) + 7 BF comp + 14 BF grab = 138; Total FD = 8 (5/5 conf + 1 comp + 2 grab) -> low for BF grab for to-date P2B
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible		x		MS/LR used for metals (ICP, Hg, Cr VI - %R not reported for calc Cr III); 4 field MS/MSD (conf for Total As/Pb and also TCLP) - with lab MS/MSD still one short (plus no TAL) for DER Metals, Cr6, SVOC, CN, and VOC each with no MS/MSD
Completeness criteria met?	x			(P2B WP Section 5.3.3 - 100%) 1481/1481 = 100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-98659-1, 460-98662-1, 460-98763-1, 460-98825-1, 460-98874-1, 460-98931-1, 460-99013-1, 460-99097-1, 460-99103-1, 460-99247-1, 460-99248-1, 460-99873-1, 460-99999-1, 460-100059-1, 460-100129-1, 460-100387-1, 460-100389-1, 460-100495-1, 460-100831-1, 460-100886-1, 460-101122-1, 460-101258-1, 460-101342-1, 460-101422-1, 460-101504-1, 460-101506-1, 460-101572-1

*For the 7196A analyses, Cr III is shown as not dry-weight corrected. However, Cr III is calculated from the results for Cr VI and Total Cr, which are dry-weight corrected, and thus the Cr III is not directly dry-weight corrected but is on a dry-weight basis.
*** The holding time was calculated using dates only without regard to the time of day since all holding times are greater than 24 hours. Also, note that Cr III is a calculated result and the holding time check does not apply for this analyte.*
1. Receipt Temp:
For work order 460-98763-1, the samples were received at 15.2 C with melted ice. This is above the laboratory's standard receipt requirement of 4+/-2 C. All of the samples in this work order are soil samples analyzed for TCLP Lead and total Arsenic/Lead. Per the WP and SW846, soil samples to be analyzed for metals (with the exception of mercury and hexavalent chromium) do not require thermal preservation. Thus, the validator did not qualify the results.
2. Containers/Preservative:
For work order 460-101122-1, the container for ECS-Area 24-H27-F was received with a cracked lid, which was replaced upon receipt. Analyses performed for metals only, and thus this is not considered to significantly affect data quality and no further action was taken.
3. Custody Record
For work order 460-98874-1, the sampler did not include the sample collection times on the custody record. The laboratory logged in the samples using the times on the sample containers.
For work order 460-99248-1, the sampler did not indicate any requested tests on the custody record for the trip blank. The laboratory logged in the sample for VOC per the project plan.
For work order 460-99999-1, the sample IDs for one or more samples were revised from those on the custody record per ENTACT'S request.
For work order 460-100831-1, the documentation indicates that no custody seals were used for the transfer of the samples from the field to the laboratory. The samples were transferred by commercial, overnight courier and were received in good condition, and thus no further action was taken.
4. Analyte List:
P1 WP Table 3, P2A/B WP Table 2/4, and DER10 App5 list m-cresol, o-cresol, and p-cresol separately. The laboratory reported m,p-cresol and o-cresol as it is not possible to separate m-cresol and p-cresol using method 8270D. (P1 WP Table 3, which only lists RLs for the DER-10 metals and not the 23 TAL metals, also mistakenly lists Antimony. This metal does not appear in DER10 Appendix 5 and was not reported by the laboratory for the backfill samples.)
For all BF samples (and the associated QC), the laboratory reported technical Chlordane rather than Chlordane (alpha) as listed in the workplan and DER10 Appendix 5.
For all BF samples (and the associated QC), the laboratory reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of just the DER-10 analytes as requested. Note: These extra analytes are all ND in the samples.
For the LB/BS/BD - the lab reported m,p-Xylene and o-Xylene. For the LB, Xylenes (total) is also reported.
Note: The analyte names in the hardcopy report differ from those in the EDD for some analytes.
4A. The MQL (Unadj) for several DER-10 analytes (metals) is above the CRQL, but in each case, it is below the Allowable Constituent Level in DER10 App 5. Additionally, the MQL (Unadj) for the TAL metal Iron is above the CRQL. There are no action levels for this analyte.
5. Update IV methods (6010C, 7471B, 8260C, 8270D) used instead of Update III as in WP. Prep method for 6010C total metals in soils shown as SW3020B in EDD, validator changed all to SW3050B per the pdf report and as confirmed correct by the laboratory.
6. Per laboratory, Florisil cleanup (SW3620C) used for Pesticide analyses and sulfuric acid cleanup (SW3665A) used for PCB analyses (not indicated in package exc on prep log nor in EDD). No cleanup used for SVOC or Herbicides.
7. For work order 460-98662-1, two VOC samples are included in this work order but there is no trip blank on the custody record. These samples were shipped in the same container as the BF samples in work order 460-98659-1. Thus, the trip blank on that custody record applies for the samples in 460-98662-1.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	Total Metals	All samples	Required 4x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
EN557	460-98659-1	VOC	314340	LCS/D %R out for cis-1,2-DCE, MEK, trans-1,2-DCE; samples ND, data reported	see QC Deficiencies
		VOC	313792/98605-7	MSD RPD hi for 14Dioxane	none required (MSD is non-project, applies for TB only)
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	313550	LCS %R out for 2,4-D; samples ND, data reported	none required (not a target analyte)
		SVOC	314038	LCS %R out for Indeno[1,2,3-cd]pyrene, Benzo[g,h,i]perylene, Dibenz(a,h)anthracene; SOP allows 5 out for this full spike list so no RE, data flagged and reported	see QC Deficiencies
		SVOC	314368/98417-3	MS/D %R hi for Benzo[b]fluoranthene	none required (MS/D is non-project)
		SVOC	314368	CCV %R out for Phenol, PCP; CCVLL in control, samples analyzed per method, detects should be considered estimated	see QC Deficiencies (CCVLL not reported)
		SVOC	314428	CCV %R out for Indeno[1,2,3-cd]pyrene, Benzo[g,h,i]perylene, Dibenz(a,h)anthracene; CCVLL in control, samples analyzed per method, detects should be considered estimated	none required (applies to LCS only, %Rs high, samples assessed based on LCS results)
		Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	314481	Blank contains CN >MDL but <RL, samples >MDL or >RL B-flagged	see QC Deficiencies
EN558	460-98662-1	VOC	313537	LCS/D %R out for MEK; samples ND, data reported	see QC Deficiencies
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	313550	see EN557	see EN557
		SVOC	314038	see EN557	see EN557
		SVOC	314368	see EN557	see EN557
		SVOC	314428	see EN557	see EN557
		Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	NA	nothing noted	NA
EN559	460-98763-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	98707-45	MD RPD hi for Lead	none required (MD is non-project)
		Total Metals	1-6	sample required 10x dilution prior to analysis	none required (only detects reported from dilution)
EN560	460-98825-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
EN561	460-98874-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN562	460-98931-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN563	460-99013-1	TCLP Metals	8	sample required 50x dilution prior to analysis	none required (only detects reported from dilution)
		Total Metals	8	sample required 10x dilution prior to analysis	none required (only detects reported from dilution)
EN564	460-99097-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN565	460-99103-1	VOC	NA	nothing noted	NA
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	315130	LCS %R out for 2,4-D; samples ND, data reported	none required (not a target analyte)

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
		Herb	315512/99066-2	MSD %R low for Silvex	none required (MSD is non-project)
		SVOC	315963	LCS %R out for Benzo[a]pyrene, Benzo[b]fluoranthene; SOP allows 5 out for this full spike list so no RE, data flagged and reported	see QC Deficiencies
		SVOC	316104	CCV RT for Perylene-d12 ISTD outside +/-0.5 min from ICAL midpt; samples within +/-0.5 min from CCV, no corr action required per lab SOP	see GCMS Validation
		Total Metals	316225/99045-1	MS %R hi for Mn	none required (MS is non-project)
		Total Metals	316225/99045-1	MD RPD hi for Mn	none required (MD is non-project)
		Total Metals	315972/99175-2	MS %R low for Cu, Pb	none required (MS is non-project)
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	NA	nothing noted	NA
		%Solids	315457/99047-1	MD RPD hi	none required (MD is non-project)
EN566	460-99247-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	315972/99175-2	see EN565	see EN565
		%Solids	315457/99047-1	see EN565	see EN565
EN567	460-99248-1	VOC	NA	nothing noted	NA
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	NA	nothing noted	NA
		SVOC	315964	LCS %R out for Benzo[a]pyrene, Dibenz[a,h]anthracene; SOP allows 5 out for this full spike list so no RE, data flagged and reported	see QC Deficiencies
		SVOC	3	Phenol-d5 SU %R out; SOP allows one acid and one BN out so no RE, data flagged and reported	see QC Deficiencies
		Total Metals	315972/99282-12	MS %R hi for Mn	none required (MS is non-project)
		Total Metals	315972/99282-12	MD RPD hi for Mn	none required (MD is non-project)
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	NA	nothing noted	NA
EN568	460-99873-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	318109/99947-8 & 11	MS %R hi for Pb	none required (MS is non-project)
		Total Metals	318109/99947-8 & 11	MD RPD hi for Pb	none required (MD is non-project)
EN569	460-99999-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
EN570	460-100059-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	318743/4	MS %R low for Pb; 4-qualifier indicates unspiked conc >4x spike	see QC Deficiencies
EN571	460-100129-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
EN572	460-100387-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	319783/6	MS %R low for Pb	see QC Deficiencies
		Total Metals	319783/6	MD RPD hi for Pb	see QC Deficiencies
EN573	460-100389-1	VOC	321131	CCV %R out for CCl4, 1,1,1-TCA; CCVLL in control, samples analyzed per method, detects should be considered estimated	see QC Deficiencies (CCVLL not reported)
		VOC	320061/LCS	Toluene-d8 SU %R out; remaining 3 in control so no RE	none required (SU hi, LCS applies to TB only, TB ND)
		VOC	320061/4 (TB)	Toluene-d8 SU %R out; remaining 3 in control so no RE	see QC Deficiencies
		VOC	320061	CCV %R out for VC; CCVLL in control, samples analyzed per method, detects should be considered estimated	none required (applies for TB only)
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
		Herb	NA	nothing noted	NA
		SVOC	320439/LCS	2,4,6-TBP SU %R out; SOP allows one acid and one BN out so no RE, data flagged and reported	none required (SU >10% (hi), sample results not significantly affected)
		SVOC	321037/100374-1	MS/D %R and/or RPD out for several TAs	none required (MS/D is non-project)
		SVOC	321155	CCV %R out for Indeno[1,2,3-cd]pyrene, Dibenz(a,h)anthracene; CCVLL in control, samples analyzed per method, detects should be considered estimated	none required (no samples analzyed in this batch)
		Total Metals	319995/100315-1	MS %R hi for Mn	none required (MS is non-project)
		Mercury	NA	nothing noted	NA
		Cr3/6	320740/100198-1	MSS/MSI %R out due to sample matrix; LCSS/LCSI within control	none required (MS is non-project)
		Cr3/6	320766/100198-1	MSS/MSI %R out due to sample matrix; LCSS/LCSI within control; Reprep of 320740, both data sets reported	noted in QA report narrative
		CN	NA	nothing noted	NA
EN574	460-100495-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN575	460-100831-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	3,4,8	sample required 10x-20x dilution prior to analysis	none required (only detects reported from dilution)
		Total Metals	321732/100873-1	MS %R out for Sb, Al, Fe	none required (MS is non-project)
		Total Metals	321901/100880-2	MS %R out for Pb	none required (MS is non-project)
		Mercury	NA	nothing noted	NA
EN576	460-100886-1	VOC	321778	CCV %R hi for CCl4; samples ND, data reported	none required (only trip blank (ND) analyzed in this batch)
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	322678	CCV %R hi for 2,4-D; samples ND, data reported	none required (not a target analyte)
		SVOC	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
		Cr3/6	322572/200-29316-8	MSS/MSI and PDS %R out due to sample matrix; LCSS/LCSI within control	none required (MS is non-project)
		Cr3/6	322596/200-29316-8	MSS/MSI %R out due to sample matrix; LCSS/LCSI within control; Reprep of 322572, both data sets reported	noted in QA report narrative
		CN	NA	nothing noted	NA
EN577	460-101122-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN578	460-101258-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	323552/101296-4	MS %R hi for Pb	none required (MS is non-project)
		Total Metals	323552/101296-4	MS RPD out for Pb	none required (MD is non-project)
EN579	460-101342-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
EN580	460-101422-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN581	460-101504-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN582	460-101506-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN583	460-101572-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA

Data Validation Checklist: Metals (Update IV)/Wet Chem

Client Name: Entact		Project Number/ Manager: E7976H/ Jenny Self			
Site Name: Revere Smelting & Refining (Phase 2B ECS/BF Jul-Sept15)		QC Level: IV			
Laboratory: TestAmerica (Edison)		Laboratory Job No: see DURC			
Reviewer: Taryn Scholz		Date Checked: 10/15/15			
Parameters: TCLP Pb, Metals, CrIII/VI, CN		Methods: 1311/3010A/6010C, 3050B/6010C, 7471B, 3060A/7196A, 9012B			
%PERFORMED/ ITEM		**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package? *	x			
100	Criteria met? (< MDL, ≥ -RL)		x		see QC Deficiencies
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package? *	x			
	All project COCs or TAs included? *	x			
100	%R criteria met?		x		method (lab** but within 50-200%) see QC Def
	Matrix spike data included in lab package? *	x			
100	%R criteria met?		x		method (75-125%) see QC Deficiencies
	Sample duplicate data included in lab package? *	x			as LR
100	RPD criteria met?		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL) see QC Deficiencies
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	correl coeff criteria met? (r > 0.998 ICP, r > 0.995 AA/Hg)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (75-125%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	*Intensities within limits (within ≥ 70% of calib std)?*			x	
10	Analyte quantitation/RLs correct?	x			
10	All target analytes included in ICAL?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

* No QC reported for Chromium III, which is calculated from the Total Chromium and Chromium VI result.

**For SRMs (solid LCS), the manufacturer's established limits as reported by the lab are used. For aqueous LCS, method limit is 80-120%.

TOTAL METALS VS LEACHED - all leach results < max possible except three (see QC Deficiencies)

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting & Refining (Phase 2B ECS/BF Jul-Sept15)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 10/15/15
Parameters: TCLP Pb	Methods: 1311/3010A/6010C

%PERFORMED/ ITEM		YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			pH of fluid not reported until EN568 but initial pH of LB within range
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

Data Validation Checklist: GC (Update IV)

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting & Refining (Phase 2B ECS/BF Jul-Sept15)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 10/15/15
Parameters: Pesticide, PCB, Herbicide	Methods: 3546/8081B, 3546/8082A, 8151A

	%PERFORMED/ ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (<MDL)	x			
100	Criteria met for field blanks? (<MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COIs or TAs included?	x			With the exception of multi-component pesticides Chlordane (technical) and Toxaphene; only two multi-component Aroclors (1016 and 1260) spiked per method recommendations
	%R criteria met?	x			method (lab but within 50-200%)
100	RPD criteria met?			x	
	Matrix spike data included in lab package?	x			
	%R criteria met?		x		method (lab but within 50-200%); see QC Deficiencies
100	RPD criteria met?	x			method (lab but within 40%)
	Surrogate data included in lab package?	x			
	Required surrogates included?	x			
100	%R criteria met?	x			method (lab but within 10-200%)
100	Field dup RPD criteria met? (individual, mean, and overall)	x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Initial calibration documentation included in lab package?	x			5 peaks used for all multi-comp Pest/PCB
100	%RSD criteria met? (≤20%RSD or r ≥ 0.995 **or COD ≥ 0.990**)	x			
100	DDT/Endrin %breakdown max 15%?	x			
	Calibration verification data included in lab package?	x			only beg CCV (no end) for 8082 since IS used
100	**%D criteria met? (<20%)**		x		see QC Deficiencies
100	**Internal standard data included in lab package?**	x			used for 8082A, Form VIII in error (has DCB instead of BNB), validator used raw data to make check
100	**Areas within limits (within -50/+100% of last calib check)?**	x			for samples
100	**RTs within limits (+/-0.07 min from last calib check)?**	x			for samples
100	Dual column/detector confirmation data incl in lab package?	x			
100	%Difference criteria met? (<40%)	x			
10	**Analyte qualitative ID criteria met?**	x			
10	**Analyte quantitation/RLs correct?**	x			
10	All target analytes included in ICAL at min 5 levels w low ≤ RL?		x		see Comment no. 1
10	**IS Areas within limits (within -50/+100% of ICAL midlevel)?**	x			for CCVs
10	**IS RTs within limits (+/-0.07 min from ICAL midlevel)?**	x			for CCVs
10	**QC parameters calculated correctly?**	x			

	Surrogate	Control Limits				
PEST/	Decachlorobiphenyl	**76-149/53-150**				bold updated from P2B 2013 (32-136 for TALBUFF)
PCB	Tetrachloro-m-xylene	**72-136**				bold updated from P2B 2013 (30-124 for TALBUFF)
HERB	2,4-DCPA	**69**-150				

COMMENTS

The validator did not delineate cases where the surrogate has a %D outside the criteria since surrogate recoveries for each analysis are evaluated separately

1. For Silvex, the lowest ICAL level corresponds to 33 ug/kg while the RL is 17 ug/kg. All samples are ND to the MDL so no further action.

Data Validation Checklist: GC/MS (Update IV)

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting & Refining (Phase 2B ECS/BF Jul-Sept15)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 10/15/15
Parameters: VOC, SVOC	Methods: 5035/8260C, 3546/8270D

	%PERFORMED/ ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (<MDL)	x			
100	Criteria met for field blanks? (<MDL		x		see QC Deficiencies
	QC check samples/LCS data included in lab package?	x			
	All project COIs or TAs included?	x			
100	%R criteria met?		x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?	x			method (lab but within 40%)
	Matrix spike data included in lab package?	x			
100	%R criteria met?	x			method (lab but within 50-200%)
100	RPD criteria met?	x			method (lab but within 40%)
	Surrogate data included in lab package?	x			
	Required surrogates included?	x			
100	%R criteria met?		x		method (lab but within 10-200% extr, 20-200% purg) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)	x			20% aq, 35% solid (+/-2RL aq, +/-3RL sol if either≤5RL)
	Instrument Tune (12-hr) for GC/MS included in lab package?	x			
100	Instrument Tune method criteria met?	x			
	Initial calibration documentation included in lab package?	x			
	RRF met (Table 4)? Reject for RRF<0.05 or Table 4, whichever lower	x			
100	**%RSD criteria met? (≤20%RSD or r ≥ 0.995 or COD ≥ 0.990)**	x			
	Calibration verification data included in lab package?	x			
	RRF met (Table 4)? Reject for RRF<0.05 or Table 4, whichever lower	x			
100	%D criteria met for CCC/TAs? (20% max)		x		see QC Deficiencies
100	Internal standard data included in lab package?	x			
100	Areas within limits (within -50/+100% of last calib check)?	x			for samples
100	**RTs within limits (<10/30(8270) s diff from last calib check)?**	x			for samples
10	**Analyte qualitative ID criteria met?**	x			
10	**Analyte quantitation/RLs correct?**	x			
10	All target analytes included in ICAL at min 5 levels w low≤ RL?	x			
10	**IS Areas within limits (within -50/+100% of ICAL midlevel)?**		x		for CCVs, see Comment no. 1
10	**IS RTs within limits (<10/30(8270) s diff from ICAL midlevel)?**	x			for CCVs
10	**QC parameters calculated correctly?**	x			

	Surrogate	Control Limits				
VOC	1,2-Dichloroethane-d4	70-130				
	Toluene-d8	70-130				
	Bromofluorobenzene	70-130				
	Dibromofluoromethane	70-130				
SVOC	2,4,6-Tribromopheno	**19-114 (Oct 2014 10-120)**				Bold updated from P2B 2013 (10-120 TALNASH)
	Terphenyl-d14	**41-145 (Oct 2014 16-151)**				(13-120 TALNASH)
	2-Fluorobipheny	**49-112 (Oct 2014 40-109)**				(29-120 TALNASH)
	Nitrobenzene-d5	**40-106 (Oct 2014 38-105)**				(27-120 TALNASH)
	2-Fluoropheno	**39-103 (Oct 2014 37-125)**				(10-120 TALNASH)
	Phenol-d5	**44-104 (Oct 2014 41-118)**				(10-120 TALNASH)

COMMENTS

1. CCV RT for Perylene-d12 ISTD outside +/-0.5 min from ICAL midpt (13.34 min vs. 13.88 min (13.38-14.38 window); samples and QC within +/-0.5 min from CCV, no corr action required per lab SOP or flagging per validator since all TAs identified in LCS with similar RT

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Post-Stabilization Verification Samples

September 2015 to December 2015

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

January 22, 2016

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 3

3.0 DATA VALIDATION RESULTS 4

3.1 PRECISION 4
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 4
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 4
3.1.3 Field Duplicate (FD) Precision 4
3.2 ACCURACY 4
3.2.1 Laboratory Control Spike (LCS) Accuracy 4
3.2.2 Matrix Spike (MS) Accuracy 5
3.2.3 Serial Dilution (SD) %Difference 5
3.3 REPRESENTATIVENESS 5
3.3.1 Chain-of-Custody and Analysis Requests 5
3.3.2 Sample Preservation and Holding Time 5
3.3.3 Laboratory and Method Selection 5
3.3.4 Blanks (Laboratory and Field) 6
3.3.5 Analytical Procedures 6
3.4 COMPLETENESS 6
3.4.1 Laboratory Deliverables Completeness 6
3.4.2 EDD Correctness 6
3.4.3 Analytical Completeness 6
3.5 COMPARABILITY 7

LIST OF TABLES

Table 1 – Samples Selected for Validation
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – Qualified Results for Validated Samples
Table 4 – Field Duplicate Results for Validated Samples

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The data include two investigative soil samples plus one field duplicate as shown in Table 1. The samples comprise approximately 10% of the Phase II-B post-stabilization verification (PSV) samples collected during September 2015 to December 2015. (A total of fourteen PSV samples were collected during this period.) The PSV samples were collected by ENTACT from the stabilized material stockpiles and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals to ensure that the stabilized material meets the appropriate criteria for disposal in the on-site containment cell.

Per the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, these data are considered Level 2 and require minimal data review. Per ENTACT's request, QAA performed a full validation of the selected samples and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010). QAA completed the validation using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (August 2014), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The validator assessed precision using the laboratory duplicate and field duplicate results. The laboratory prepared an unspiked matrix duplicate (MD) with every analytical batch and reported the RPD for each analyte. As shown in Table 1, one MD was prepared using a sample from the site. The RPDs for the matrix duplicate are within the limits for all metals, which indicates good precision for the analytical technique on the given sample matrix. Additionally, for the samples selected for validation, the sampler collected one field duplicate with the PSV investigative samples, and the RPDs are within the limits for all metals, which indicates good precision for the sampling and analytical technique on the given matrix.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The validator assessed accuracy using the laboratory spikes and matrix spikes. The laboratory prepared a laboratory control spike (LCS) using reagent water with every analytical batch and reported the recoveries for all analytes. The LCS recoveries are within the limits for all metals, which indicates good accuracy for the analytical technique on a sample free of matrix effects. Additionally, the laboratory prepared a matrix spike (MS) with every analytical batch and reported the recoveries for each analyte. As shown in Table 1, one MS was prepared using a sample from the site. The recoveries for the matrix spike are within the limits for all metals, which indicates good accuracy for the analytical technique on the given sample matrix.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative

parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, PSV samples were collected as required in the approved sampling and analysis plan. Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory blanks, and analytical instrument setup (i.e., calibration, interference correction, etc.) For the samples selected for validation, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank and leachate blank with each analytical batch and the blanks show no contamination, which indicates the samples were not affected by laboratory procedures. Additionally, proper analytical techniques were used and calibration results met the method requirements.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. For the samples selected for validation, all analyses produced valid analytical measurements, which gives a completeness of 100%. Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The PSV analytical results are classified as Level 2 data with a full review and validation of at least 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated. Note that results are reported in µg/L for all field samples.

DATA USABILITY

All sample results are acceptable for use. As shown in Table 3, two results are qualified solely because the concentration is between the MDL and RL. The actual value is not expected to exceed the sample RL. No data quality issues were noted.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). For the samples selected for validation, the laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Initial Calibration,
- Continuing Calibration Verification,
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD), and
- Field Duplicates (FD).

Additionally, the validator examined the raw data for one of the two sample batches (randomly selected by the validator) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are 80-120% for laboratory accuracy and 75-125% for matrix accuracy for metals analyses.
- Laboratory Precision – the control limit (20 RPD) as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 40% for laboratory spikes and 30% for matrix spikes was used for these inorganic analyses. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U-flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

No LCSD were analyzed (or required) with the samples selected for validation.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every analytical batch (maximum 20 samples) and reported RPDs for all analytes. The validator only evaluated the MD prepared with a sample from the site (of which there is one), since those prepared with a sample from another site do not reflect data quality for the Revere site. All site MD RPDs are at or below the control limit. Note that non-project MD results are included in the data packages but not in the EDD.

3.1.3 FIELD DUPLICATE (FD) PRECISION

For the period from September 2015 to December 2015, the samplers collected two FD with the fourteen PSV investigative samples, which meets the Workplan requirement of one per 20 or fewer samples per sample matrix. One field duplicate was analyzed with the samples selected for validation. Results for the field duplicate are summarized in Table 4 and are within the criteria.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD) and matrix spikes (MS/MSD) plus serial dilutions (SD). LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

For the samples selected for validation, the laboratory analyzed a LCS for every analytical batch (maximum 20 samples) as required and reported recoveries for all analytes. All LCS recoveries are within the control limits.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS for every analytical batch (maximum 20 samples) and reported recoveries for all analytes. The validator only evaluated the MS prepared with a sample from the site (of which there is one), since those prepared with a sample from another site do not reflect data quality for the Revere site. All site MS recoveries are within the control limits. Note that non-project MS results are included in the data packages but not in the EDD.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all metals detected above 50x the method detection limit (MDL). All SD %differences are at or below the control limit.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples selected for validation were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records and custody seals, which confirms that sample integrity was maintained. Additionally, the information on the custody record is correct and agrees with that reported in the analytical results. No issues were noted during sample log-in at the laboratory, and all field samples were analyzed for the tests requested on the chain-of-custody, except as follows:

- For job number 460-103983-1, the sampler did not check any requested analysis for the samples. The laboratory logged in the samples for TCLP (Sb, As, Cd, Pb) analysis per the project plan and ENTACT's request.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

The samples selected for validation were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan and/or SW-846, which confirms that sample results are not affected by sample degradation.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (TestAmerica-Edison NYSDOH (NELAP) #11452, NYSDOH (ELAP) #11452)

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. The analyte list includes TCLP Antimony, TCLP Arsenic, TCLP Cadmium, and TCLP Lead and the nominal reporting limits are below the levels of concern (i.e., the treatment goals) for each analyte.

(Note: The laboratory dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank and leachate blank for every analytical batch (maximum 20 samples) plus a calibration blank for every 10 metals analyses as required per the analytical methodology. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used. No analytes were detected in the laboratory blanks.

3.3.5 ANALYTICAL PROCEDURES

For the samples selected for validation, the analytical procedures (initial calibration, continuing calibration verification, and interference correction), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method.

Additionally, no issues were found with analyte identification or quantitation of sample results or calculation of QC parameters during validation of the raw data. The data set includes two analytical batches and the validator re-calculated sample results and QC check parameters for one batch (batch 460-334034 in work order 460-103983-1).

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

For the samples selected for validation, the NYSDEC Category B data packages and EDD contain all necessary information.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Job No.	**Sample(s)**	**EDD Field(s)**	**Action**
All	All QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.

3.4.3 ANALYTICAL COMPLETENESS

For the samples selected for validation, the validator did not reject any of the results, which gives a completeness of 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. (Note that in some cases the laboratory used a more recent version of the method specified in the Workplan, e.g. SW846 6010C was used instead of SW846 6010B.) The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which an analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which an analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J-flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results are reported in µg/L and are classified as Level 2 data for TCLP metals with a full review and validation of 10% of the samples as selected by ENTACT. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples
September 2015 to December 2015

SAMPLES SELECTED FOR VALIDATION

Lab ID	Field ID	Sample Date	Type	Media	Matrix	TCLP Sb, As, Cd, Pb
460-101877-1	PSV-448-R	9/28/2015	INV	PSV	Soil	x
460-101877-2	PSV-448-R-X	9/28/2015	FD	PSV	Soil	x
460-103983-1	PSV-459	11/3/2015	INV	PSV	Soil	x
460-103983-1LR	PSV-459	11/3/2015	MD	PSV	Soil	x
460-103983-1MS	PSV-459	11/3/2015	MS	PSV	Soil	x

FD – Field Duplicate
INV - Investigative Sample
MD – Matrix Duplicate Sample
MS – Matrix Spike Sample
PSV – Post-Stabilization Verification Sample

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Metals: 1311/ 3010A/ 6010C for Antimony, Arsenic, Cadmium, and Lead in leachates of soil samples

TABLE 2

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

J- = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

J+ = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples
September 2015 to December 2015

QUALIFIED RESULTS FOR VALIDATED SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-101877-2	PSV-448-R-X-20150928	TCLP LEAD	27.1 J ug/l	J	Result between MDL and RL
460-103983-1	PSV-459-20151103	TCLP ANTIMONY	39.3 J ug/l	J	Result between MDL and RL

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Post-Stabilization Verification Samples
September 2015 to December 2015

FIELD DUPLICATE RESULTS FOR VALIDATED SAMPLES

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result			Field Duplicate Lab Result			Abs Diff	2xRL	RPD	Pass
460-101877-1	460-101877-2	PSV-448-R-20150928	TCLP ANTIMONY	143		ug/l	141		ug/l	2	200	NA	y
460-101877-1	460-101877-2	PSV-448-R-20150928	TCLP ARSENIC	75	U	ug/l	75	U	ug/l	0	150	NA	y
460-101877-1	460-101877-2	PSV-448-R-20150928	TCLP CADMIUM	20	U	ug/l	20	U	ug/l	0	40	NA	y
460-101877-1	460-101877-2	PSV-448-R-20150928	TCLP LEAD	53.7		ug/l	27.1	J	ug/l	26.6	100	NA	y

Note: The RPD test (≤35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test (≤ 2x RL) applies.

ATTACHMENT A

VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact			Project Number/ Manager: E7976H/ Jenny Self	
Site Name: Revere Smelting and Refining (Phase 2B PSV Sept15-Dec15)			QC Level: II	
Laboratory: TestAmerica (Edison, NJ)			Laboratory Job No: 460-103983-1, 460-101877-1	
Reviewer: Taryn Scholz			Date Checked: 1/21/16	
Parameters: TCLP Metals			Methods: 1311/3010A/6010C	
ITEM	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
Laboratory NELAP/ELAP accredited?	x			NYDOH (NELAP) #11452, NYDOH (ELAP) #11452
Signed Narrative included?	x			
No narrative issues noted by lab?	x			
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required)
COCs properly executed and seals used?		x		see Comment no. 1
Samples received within 2 days?	x			
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL)
RLs acceptable?	x			(ASP Exh C Part III and/or DER-10 App 5, WP Remedial Goal)
No elevated RLs for NDs?	x			Note: 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D)
If analytical cleanup used, method ref included and approved?			x	(ASP Exh D)
Sample matrix included?	x			
Soils on dry weight basis?			x	
Correct and consistent units?	x			in ug/L
Holding time to analysis not expired?	x			(Workplan Table 2)
Holding time to preparation not expired?	x			(Workplan Table 2)
QC Samples (Workplan Section 5.3.6 and 2/29/12 mod letter)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory			NA	
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)	x			Total samples = 2 PSV; Total FD = 1
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible	x			Total samples = 2 PSV; Total MS/MD = 1
Completeness criteria met?	x			(Workplan Section 5.3.3 - 100%) 100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP - Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

1. For job number 460-103983-1, the sampler did not check any requested analysis for the samples (PSV-459 along with MS/MD pair). The laboratory logged in the samples for TCLP (Sb, As, Cd, Pb) analysis per the client request.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
EN584	460-101877-1	NA	NA	no issues noted	NA
EN585	460-103983-1	all	all	no analyses checked off on chain	noted in QA report narrative

Data Validation Checklist: Metals/Wet Chem

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV Sept15-Dec15)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 460-103983-1, 460-101877-1
Reviewer: Taryn Scholz	Date Checked: 1/21/16
Parameters: TCLP As,Cd,Pb,Sb and TCLP Pb	Methods: 1311/3010A/6010B

%PERFORMED/	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COCs or TAs included?	x			
100	%R criteria met?	x			method (80-120%)
	Matrix spike data included in lab package?	x			
100	%R criteria met?	x			method (75-125%)
	Sample duplicate data included in lab package?	x			as LR
100	RPD criteria met?	x			method (20% if >10xMDL)
100	Field dup RPD criteria met? (individual, mean, and overall)	x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	All target analytes included?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	Corr coeff (r) criteria met? (≥0.995)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP 90-110%, Hg 80-120%)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (80-120%)
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	Intensities within limits? (min 30-120% of calib std)			x	
10	Analyte quantitation/RLs correct?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting and Refining (Phase 2B PSV Sept15-Dec15)	QC Level: II
Laboratory: TestAmerica (Edison, NJ)	Laboratory Job No: 460-103983-1, 460-101877-1
Reviewer: Taryn Scholz	Date Checked: 1/21/16
Parameters: TCLP As,Cd,Pb,Sb and TCLP Pb	Methods: 1311/3010A/6010C

	%PERFORMED/ ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples

September 2015 to February 2016

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

March 4, 2016

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 6

3.0 DATA VALIDATION RESULTS 8

3.1 PRECISION 8
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 8
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 8
3.1.3 Field Duplicate (FD) Precision 8
3.2 ACCURACY 9
3.2.1 Laboratory Control Spike (LCS) Accuracy 9
3.2.2 Matrix Spike (MS) Accuracy 9
3.2.3 Serial Dilution (SD) %Difference 10
3.2.4 Surrogate (SU) Recovery 10
3.3 REPRESENTATIVENESS 10
3.3.1 Chain-of-Custody and Analysis Requests 10
3.3.2 Sample Preservation and Holding Time 11
3.3.3 Laboratory and Method Selection 11
3.3.4 Blanks (Laboratory and Field) 12
3.3.5 Theoretical Result Values 13
3.3.6 Analytical Procedures 13
3.4 COMPLETENESS 14
3.4.1 Laboratory Deliverables Completeness 14
3.4.2 EDD Correctness 14
3.4.3 Analytical Completeness 15
3.5 COMPARABILITY 15

LIST OF TABLES

Table 1 – Sample Summary
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – QC Deficiencies and Data Qualification Actions
Table 4 – Qualified Results for Field Samples
Table 5 – Field Duplicate Results

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The independent data review was completed in accord with the *Phase II-B Remedial Design/ Remedial Action Workplan* (February 2013), hereinafter called the Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 166 investigative soil samples plus the associated field QC samples, which were collected by ENTACT in September 2015 through February 2016 with the intended use of confirming that backfill materials are suitable for use on-site and verifying that remediation goals have been achieved in excavated grids. A complete listing of the samples collected and tests performed is shown in Table 1. QAA performed a full validation of the data and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) as specified in Section 5.9 of the Workplan. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (August 2014) and *National Functional Guidelines for Superfund Organic Methods Data Review* (August 2014), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The Workplan stipulates that the precision control limits will be dictated by the analytical method. The validator assessed precision using the laboratory and field duplicates, and the limits are 20-35 RPD depending upon the test. The laboratory prepared a laboratory control spike duplicate (LCSD) using reagent water or sand for each VOC analytical batch plus at least one unspiked matrix duplicate (MD) or matrix spike duplicate (MSD) using a sample from the site for each test except Metals, Chromium VI and VOC for the backfill samples. All LCS/LCSD RPDs are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects. The MD/MSD RPDs are also within the limits (or the absolute differences are less than two times the reporting limit for low-level results), which indicates good precision for the analytical technique on the given sample matrix. Additionally, the sampler collected eight field duplicates (FD) for TCLP Lead and total Arsenic/Lead with the 166 investigative samples. The RPDs are within the limits, which indicates good precision for the sampling and analytical technique, or the validator qualified the results for the original and duplicate sample. Two (one for TCLP Lead and one for total Lead) of the twenty-four (24) pairs of results are qualified as estimated (J) based on field duplicate precision.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The Workplan stipulates that the accuracy control limits will be dictated by the analytical method. The validator assessed accuracy using the laboratory spikes and matrix spikes, and the limits are either 75-125%, 80-120%, or the laboratory/manufacturer's established control limit for soils/solid reference materials (which range from 0.1%-201% for this data set). In order to better assess data usability, limits of 50-200% were employed where the method limits for a spiked analyte falls outside these values. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with each analytical batch and reported the recovery for all spiked compounds, which included every target compound except the multi-

component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result). The laboratory also prepared a laboratory control spike duplicate (LCSD) with each VOC analytical batch. The LCS/LCSD recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects, with two exceptions for Cyanide. (In each case the recoveries are within the laboratory limits, and thus laboratory corrective action was not required.) As a result, four Cyanide results of the 1,191 total results for field samples (investigative samples and field duplicates) are qualified as estimated (J or UJ) due to laboratory spike recovery. Additionally, the laboratory prepared nine matrix spike samples (MS) along with nine post digestion spikes (PDS) and serial dilutions (SD) for TCLP Lead, seven MS/PDS/SD for total Arsenic/Lead, two MS/PDS/SD for TAL Metals, two MS/SD for Mercury, two MS along with two matrix spike duplicate samples (MSD) for SVOC, and one MS/MSD for PEST, PCB, HERB, and Cyanide using a sample from the site. All SD %differences are within the laboratory limits, which indicates there is no matrix interference affecting the accuracy of metals results that are substantially above the reporting limit. The MS/MSD/PDS recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix, or the validator qualified the results for similar samples in the same analytical batch as the spike samples. Two results (the non-detects for Pentachlorophenol in CC-PSL-4c-001 and CC-PSL-5c-001) are qualified as rejected (R) due to extremely low matrix spike recovery (<20%). These are the only rejected results for the data set. Of the remaining 1,189 total results for field samples, twenty-one (21) results (for Antimony, Calcium, and various SVOC analytes) are qualified as estimated (J, L, or UJ) based on matrix spike recovery. Additionally, the laboratory utilized one or more surrogate spikes for each organic analysis. The surrogate recoveries are within the laboratory limits for all field samples.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, investigative samples were collected as required in the approved sampling and analysis plans. (Note that sampling has been an on-going process at the site and all samples may not be reflected in this validation batch.) Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory and field QC blanks, theoretical result values, and analytical instrument setup (i.e., tuning, calibration, interference correction, etc.) For all samples, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank with each analytical batch and the sampler collected trip blanks with the VOC samples. The laboratory and field QC blanks show no contamination, which indicates the samples were not affected by laboratory or field procedures. The validator also assessed representativeness by comparing the TCLP Lead results to the total Lead results and determined that the TCLP Lead result is above the theoretical maximum for four of the 146 pairs. Thus, four TCLP Lead results and four total Lead results are qualified as estimated (J). Proper analytical procedures were used and calibration results met the method requirements or the validator qualified the affected samples. Two non-detect results for Pentachlorophenol are qualified as estimated (UJ) due to calibration drift. (Since the %difference was outside the limits for only a small percentage of the total number of target analytes for the test, laboratory corrective action was not required.)

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. All analyses produced valid

analytical measurements for this data set, with the exception of two non-detect results for Pentachlorophenol. With 1,191 total results for field samples, this gives a completeness of 99.8%. (Completeness to-date for all Phase II-B backfill and post-excavation confirmation samples is also 99.8%.) Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results for all field samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics.

DATA USABILITY

The following non-detect results are qualified as rejected (R):

Lab ID	Field ID	Test	Analyte	Result	DVQ	QC Issue
460-104045-3	CC-PSL-4c-001	SVOC	Pentachlorophenol	280 U µg/kg	R	Extremely low average MS/MSD recovery (18%)
460-104045-6	CC-PSL-4c-001	SVOC	Pentachlorophenol	280 U µg/kg	R	Extremely low average MS/MSD recovery (18%)

For each of these two results, the absence or presence of the analyte cannot be confirmed in the sample due to serious QC issues, and thus it is not suitable for use.

All other results for the samples are acceptable for use with the qualifications shown in Table 4, as follows:

- Nineteen (19) results for 2-Methylphenol (o-Cresol), Acenaphthene, Acenaphthylene, Anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzofuran, Fluorene, Hexachlorobenzene, Pentachlorophenol, or Phenanthrene in the backfill samples are qualified with a J (estimated, for detects between the method detection limit and the reporting limit), L (biased low, for detects above the reporting limit), or UJ (estimated, for non-detects) due to low matrix spike recovery and/or negative calibration drift. These results can be used for determining the absence or presence of the analyte; however, the concentration reported for detects or the reporting limit for non-detects is likely biased low. In each case, the result is well below (more than ten times) the DER-10 Appendix 5 Allowable Constituent Level for Imported Fill or Soil (ACL), and thus there is negligible effect on data quality, except as follows:

Lab ID	Field ID	Test	Analyte	Result	MDL	ACL	Units	DVQ	QC Issue
460-103314-6	BF-5L-GF-8c-01	SVOC	2-Methylphenol (o-Cresol)	370 U	16	330	µg/kg	UJ	Low average MS/MSD recovery (55.5%)
460-103314-6	BF-5L-GF-8c-01	SVOC	Pentachlorophenol	290 U	44	800	µg/kg	UJ	Calibration drift (%D= -21.3%); Low average MS/MSD recovery (21.5%)
460-103314-3	BF-5L-WT-10c-01	SVOC	Pentachlorophenol	380 U	57	800	µg/kg	UJ	Calibration drift (%D= -21.3%)

Though these non-detects are reported at the sample reporting limit (RL) as requested, the samples were evaluated to the method detection limit (MDL). In each case, the MDL is well below (more than ten times) the ACL and thus the potential low bias has negligible effect on data quality.

- Four results for Cyanide in the backfill samples are qualified with a J (estimated, for detects between the MDL and RL) or UJ (estimated, for non-detects) due to extremely low (less than 40%) laboratory control spike recovery for the vendor-supplied standard reference material (SRM) LCS with acceptable recovery for the low level and high level LCS. These results can be used for determining the absence or presence of the analyte; however, the concentration reported for detects or the reporting limit for non-detects is likely biased low. In each case, the laboratory control spike recovery is greater than 15% and the result (which range from 0.025 mg/kg to 0.12 mg/kg) is well below (more than ten times) the ACL (27 mg/kg) and thus the potential low bias has negligible effect on data quality.

- Two detects for TCLP Lead and two detects for total Lead in the confirmation samples are qualified with a J (estimated) due to field duplicate precision, as follows:

Lab ID	Field ID	Test	Analyte	Result	MDL	Comparison Criteria	Units	DVQ	QC Issue
460-102990-1	DS-AREA 29-F26-SN	TCLP Metals	TCLP Lead	267	20.8	5,000	µg/l	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from original sample
460-102990-2	DS-AREA 29-F26-SN-X	TCLP Metals	TCLP Lead	62.3	20.8	5,000	µg/l	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from original sample
460-103393-2	ECS-AREA36-H37-F	Total Metals	Lead	13.5	0.74	400	mg/kg	J	Poor field duplicate precision (36 RPD), use higher result from field duplicate
460-103393-3	ECS-AREA36-H37-F-X	Total Metals	Lead	19.4	0.80	400	mg/kg	J	Poor field duplicate precision (36 RPD), use higher result from field duplicate

For results qualified due to field duplicate precision, the higher result (i.e., from either the original or duplicate sample) should be used for project decisions. This gives a conservative approach relative to protection of the environment. (For field duplicate pairs that pass the precision criteria, the value should be selected based on accepted convention for the site and/or agency requirements, e.g., select the value reported for the original sample, the average of the two values, etc.) Thus, for DS-AREA 29-F26-SN (which is a documentation sample (DS) intended to document the concentrations remaining in place (i.e., in areas where remediation was terminated, e.g., a sample from the excavation sidewall of the railroad right-of-way) as compared to the source material soil cleanup objective (SCO) of 5,000 µg/l), the result from the original sample (267 µg/l) is considered more representative. Likewise, for ECS-AREA36-H37-F, which is an excavation confirmation sample, the result from the field duplicate sample (19.4 mg/kg) is considered more representative for comparison to the remedial goal of 400 mg/kg.

- Four detects for TCLP Lead and four detects for total Lead in the confirmation samples are qualified with a J (estimated) because the result is outside the theoretical leach-to-total balance, as follows:

Lab ID	Field ID	Test	Analyte	Result	MDL	Remedial Goal	Units	DVQ	QC Issue
460-103083-1	ECS-WSTREAM-37+00-F	TCLP Metals	TCLP Lead	1940	20.8	5000	µg/l	J	Metals leach-to-total balance greater than theoretical
460-103083-1	ECS-WSTREAM-37+00-F	Total Metals	Lead	12.1	0.98	400	mg/kg	J	Metals leach-to-total balance greater than theoretical
460-103967-6	ECS-WSTREAM-45+00-SW	TCLP Metals	TCLP Lead	3220	20.8	5000	µg/l	J	Metals leach-to-total balance greater than theoretical
460-103967-6	ECS-WSTREAM-45+00-SW	Total Metals	Lead	15.2	0.83	400	mg/kg	J	Metals leach-to-total balance greater than theoretical

Lab ID	Field ID	Test	Analyte	Result	MDL	Remedial Goal	Units	DVQ	QC Issue
460-103970-3	ECS-AREA 37-I37-SE	TCLP Metals	TCLP Lead	1420	20.8	5000	µg/l	J	Metals leach-to-total balance greater than theoretical
460-103970-3	ECS-AREA 37-I37-SE	Total Metals	Lead	19.4	1.0	400	mg/kg	J	Metals leach-to-total balance greater than theoretical
460-104950-2	ECS-AREA 35-I35-SE	TCLP Metals	TCLP Lead	648	20.8	5000	µg/l	J	Metals leach-to-total balance greater than theoretical
460-104950-2	ECS-AREA 35-I35-SE	Total Metals	Lead	9.3	0.77	400	mg/kg	J	Metals leach-to-total balance greater than theoretical

These results can be used for determining the presence of the analyte; however, the concentration reported may be either high or low. In each case, the TCLP Lead result is above the maximum leachate concentration possible based on the total Lead concentration, and the relative amounts of soil used and leachate prepared per the analytical method, assuming 100% leachability. Thus, the TCLP Lead results are potentially biased high while the total Lead results are potentially biased low. All four TCLP Lead results are below the remedial goal of 5,000 µg/l and thus the potential high bias has no effect. All four total Lead results are well below (more the ten times) the remedial goal of 400 mg/kg and thus the potential low bias has negligible effect on data quality.

- Two results for Antimony and one result for Calcium in the confirmation samples are qualified with a L (biased low, for detects above the reporting limit), or UJ (estimated, for non-detects) due to low matrix spike recovery, as follows:

Lab ID	Field ID	Test	Analyte	Result	DVQ	QC Issue
460-101657-1	ECS-AREA29-G26-F-R	Total Metals	Antimony	4.3 U mg/kg	UJ	Low matrix spike recovery (51%)
460-102990-3	ECS-WSTREAM-36+50-F	Total Metals	Antimony	3.9 U mg/kg	UJ	Low matrix spike recovery (62%)
460-102990-3	ECS-WSTREAM-36+50-F	Total Metals	Calcium	2910 mg/kg	L	Low matrix spike recovery (63%)

These results can be used for determining the absence or presence of the analyte; however, the concentration reported for detects or the reporting limit for non-detects is likely biased low. There is no remedial goal or other comparison criteria for these metals.

- The remaining 147 results with J flags are qualified solely because the concentration is between the MDL and RL. In each case, the actual value is not expected to exceed the sample RL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include pdf data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Instrument Tuning and Initial Calibration,
- Calibration Verification,
- Interference Check Standards (ICS),
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD),
- Field Duplicates (FD),
- Dual Column Confirmation,
- Surrogates (SU), and
- Internal Standards (IS).

Additionally, the validator examined the raw data for 10% of the sample batches (randomly selected by the validator across the various analysis dates and tests) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not less than 50% lower limit or greater than 200% upper limit)
- Laboratory Precision – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not greater than 40%)
- Field Precision – an RPD control limit of 35% (if both results are greater than 5x the reporting limit) or a control limit of $\pm$2x the reporting limit for the difference in the two results (if either result is less than or equal to 5x the reporting limit), which is considered typical for data quality assessment of soil samples.

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator

considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 40% and 30% for inorganics laboratory and matrix spikes, and 30%, 20% and 10% for organics laboratory, matrix and surrogate spikes were used. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

The laboratory analyzed an LCSD and reported RPDs for all target compounds for each VOC batch (maximum 20 samples). All LCSD RPDs are at or below the criteria.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every inorganics analytical batch (maximum 20 samples) and an MSD for every organics analytical batch (maximum 20 samples) except VOC batches and reported RPDs for MD and MSD prepared using a sample from the site or another site. MD/MSD prepared with a sample from another site were not evaluated, since they do not reflect data quality for the site. No soil samples were designated by the sampler for MD/MSD for the backfill samples; however, the laboratory selected one or more backfill samples for batch QC for PEST, PCB, HERB, SVOC, and Cyanide. Nine confirmation soil samples (six of which were designated by the sampler on the custody record) were used to prepare an MD for TCLP Lead. Seven confirmation soil samples (five of which were designated by the sampler on the custody record) were also used to prepare an MD for total Arsenic/Lead and two confirmation soil samples (one of which was designated by the sampler on the custody record) were also used for TAL Metals including Mercury. With a total of 166 investigative confirmation samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix.

Two of the RPDs for MD prepared using a sample from the site are above the criteria; however, data qualification was not required per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Note that, for cases where either result for the duplicate pair is non-detect, the check does not apply and the laboratory reported the RPD as NC (not calculable) in the pdf report and as 0 in the EDD.

3.1.3 FIELD DUPLICATE (FD) PRECISION

The samplers collected eight FD with the 166 investigative confirmation samples, which is slightly below the Workplan requirement of one per 20 or fewer samples per sample matrix for this event. The following shows the breakdown of all field duplicates for Phase II-B:

PHASE II-B TOTAL NUMBER OF SAMPLES

Sample Type	Investigative Samples	Field Duplicate Samples
Confirmation Sample (TCLP Metals)	502	24
Confirmation Samples (Total Metals)	692	34
Backfill Composite Samples (Metals, Cr III/VI, PEST, PCB, HERB, VOC, SVOC, Cyanide)	69	4
Backfill Grab Samples (VOC)	165	5

Results for the field duplicates for this event are summarized in Table 5. Two pairs of results are outside the field precision criteria and the validator qualified the data as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that the remaining twenty-two (22) pairs of FD results meet the criteria, which indicates good overall precision, and thus the validator only qualified the original and duplicate sample for the FD deficiencies.

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD), matrix spikes including post digestion spikes (MS/MSD/PDS), serial dilutions (SD), and surrogate (SU) spikes. LCS/LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD/PDS are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit. Surrogates are added to each sample before preparation and analysis and provide an indication of accuracy for each individual sample analysis.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS and/or LCSD for every analytical batch (maximum 20 samples) as required and reported recoveries for all target compounds except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result).

Two LCS recoveries for Cyanide are within the laboratory limits but outside the data qualification criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS/PDS for every inorganics analytical batch (maximum 20 samples) and an MS/MSD for every organics analytical batch (maximum 20 samples) and reported recoveries for MS/PDS/MSD prepared using a sample from the site or another site. MS/PDS/MSD prepared with a sample from another site were not evaluated, since they do not reflect data quality for the site. No soil samples were designated by the sampler for MS/PDS/MSD for the backfill samples; however, the laboratory selected one or more backfill samples for batch QC for PEST, PCB, HERB, SVOC, and Cyanide. Nine confirmation soil samples (six of which were designated by the sampler on the custody record) were used to prepare an MS/PDS for TCLP Lead. Seven confirmation soil samples (five of which were designated by the sampler on the custody record) were also used to prepare an MS/PDS for total Arsenic/Lead and two confirmation soil samples (one of which was designated by the sampler on the custody record) were also used for TAL Metals including Mercury. With a total of 166 investigative confirmation samples, this meets the Workplan requirement of one per 20 or fewer samples per sample matrix.

Some recoveries for MS/MSD prepared using a sample from the site are outside the criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples. Note that if an analyte was detected in the unspiked parent sample at a concentration well above (greater than four times) the concentration of spike added to the sample, thereby rendering the recoveries inconclusive, the check was waived and the validator did not

qualify the data. For cases where the MS or MSD recovery is outside the control limits (but greater than the data rejection limit) and the average MS/MSD recovery is in control, the validator did not qualify the data. Additionally, the validator considered samples of the same media (i.e., backfill or excavation confirmation) and source to be of similar matrix (e.g., if deficiencies were noted for a MS/MSD prepared using a backfill sample from a particular source, all backfill samples from that source in the same analytical batch were qualified).

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all target compounds detected above 50x the method detection limit (MDL). All %differences for SD prepared using a sample from the site are at or below the control limit (10%).

3.2.4 SURROGATE (SU) RECOVERY

The laboratory spiked each organic sample with one or more surrogates before preparation and analysis. All surrogate recoveries for field samples are within the criteria. Additionally, all surrogate recoveries for QC samples are above the data rejection limit and thus no qualification of field samples is deemed necessary.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination, comparing sample results to theoretical values, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records, which confirms that sample integrity was maintained, except as follows:

- For work order 460-102383-1, the sampler entered a company name and date but did not sign or enter a time upon sample relinquishment. The custody record includes the samplers' names and the samples were relinquished to a commercial carrier with custody seals intact and received at the laboratory with no evidence of tampering, and thus no further action was taken.
- For work orders 460-460-103796-1, 460-103860-1, and 460-104045-1, the sampler entered a date but no time upon sample relinquishment. The samples were relinquished to a commercial carrier with custody seals intact and received at the laboratory with no evidence of tampering, and thus no further action was taken.

Additionally, the validator noted the following regarding the custody records and sample log-in at the laboratory:

- For work order 460-103314-1, one of the VOA vials for BF-5L-GF-8g-02 was leaking when received by the laboratory. Analysis was performed using the remaining vials, and thus no action is required.
- For work orders 460-103322-1, 460-103391-1 and 460-103552-1, one of the two containers for one or more of the samples was received broken, and the laboratory salvaged the sample volume into a new container. Analyses were performed using the remaining uncompromised container and/or for metals only, and thus this is not considered to significantly affect data quality and no further action was taken.

- For work order 460-103967-1, the sole container for ECS-WSTREAM-45+00-SW was received broken. The laboratory salvaged the sample volume into a new container with minimal or no sample loss. Analyses were performed for metals only, and thus this is not considered to significantly affect data quality and no further action was taken.
- For work order 460-102202-1, the samples were received three days after collection, which is beyond the recommended period of two days. The samples were received in good condition at proper temperature, and were analyzed within the established holding times, and thus no further action was taken.

The information on the custody record is complete and correct, and agrees with that reported in the analytical results except as follows:

- For work orders 460-101657-1 and 460-102990-1, the sampler only recorded the sample date for the first sample on the custody record (i.e., there is no down arrow to extend the date to the remaining samples). The laboratory logged in the samples using the date for the first sample, which corresponds with the date on each sample container.
- For work orders 460-102990-1 and 460-103796-1, the laboratory sample receipt checklist indicates that no custody seal was used for transfer of the samples from the field to the laboratory; however, a custody seal was used as confirmed by the seal number entered on the custody record by the laboratory.
- For work order 460-103552-1, the custody record indicates a sample time of 16:35 for ECS-AREA35-H36-SS, while the sample labels indicate a sample time of 16:25. The laboratory logged in the sample using the time on the custody record. The sample date (10/27/15) on the custody record matches that on the sample labels and the holding time pass/fail status is not affected, and thus no further action was taken.

All samples were analyzed for the tests requested on the chain-of-custody and one result was reported for each target analyte except as follows:

- For work order 460-102990-1, sample number 3 is marked for both Total As/Pb and TAL Metals on the custody record. Arsenic and Lead are included in the TAL list, so no additional analysis was needed or performed.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

All samples were properly preserved and analyzed within the holding times listed in Table 2 of the Workplan, and/or SW-846, which confirms that sample results are not affected by sample degradation. Note that the holding time was calculated using dates only without regard to the time of day since all holding times are greater than 24-hours. Also, note that Chromium III is a calculated result and the holding time check does not apply for this analyte.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (no. 11452).

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 2 of the Workplan were used for the sample analyses. (In some cases, the method update number used by the laboratory may differ from that in the Workplan. For example, method 8260C was used rather than 8260B for the VOCs for the backfill samples.)

For the backfill samples, the target analyte list includes all DER-10 analytes, except as follows:

- DER-10 Appendix 5 lists m-Cresol(s), o-Cresol(s), and p-Cresol(s). The laboratory reported m & p-Cresols and o-Cresol as it is not possible to separate m-Cresol and p-Cresol using method 8270D.
- DER-10 Appendix 5 lists Chlordane (alpha). The laboratory reported technical Chlordane, which is a commercial mixture that contains alpha-Chlordane and gamma-Chlordane along with other related compounds.
- The laboratory reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) for the backfill samples instead of the DER-10 analytes as requested on the custody record.

Additionally, the nominal reporting limits (i.e., without dry-weight correction or sample dilution and based on the standard sample weight and final volume) are at or below the levels of concern (i.e., the Allowable Constituent Levels for Imported Fill or Soil (ACLs) from Appendix 5 of the DER-10), except as follows:

Analyte	Commercial or Industrial Use ACL (mg/kg)	Unrestricted Use ACL (mg/kg)	Nominal RL (mg/kg)	MDL (mg/kg)
Selenium	4	3.9	4	1.4
Chromium VI	19	1	2	0.81
Aldrin	0.19	0.005	0.0067	0.00081
4,4'-DDD	14	0.0033	0.0067	0.00088
4,4'-DDE	17	0.0033	0.0067	0.00097
4,4'-DDT	47	0.0033	0.0067	0.00069

For these six analytes, the nominal RL is at or below the Commercial or Industrial Use ACL but above the Unrestricted Use ACL. In each case, the method detection limit (MDL) is below both the Commercial or Industrial Use ACL and the Unrestricted Use ACL. Though non-detects are reported at the sample reporting limit (RL) as requested, the samples were evaluated to the (MDL).

None of the backfill samples required dilution, and thus none have elevated reporting limits.

For the excavation confirmation samples, the target analyte list includes total Arsenic, total Lead, and/or TCLP Lead as requested and all Contract Laboratory Program (CLP) metals for the TAL metals. The nominal reporting limits are below the levels of concern (i.e., the remedial goals) for total Arsenic, total Lead, and TCLP Lead. There are no established levels of concern for the TAL metals. The nominal reporting limits comply with the requirements in the ASP for TAL metals with the exception of Iron, which has a nominal reporting limit of 30 mg/kg that is above the ASP reporting limit of 20 mg/kg.

Some of the excavation confirmation samples required dilution, but none has elevated reporting limits for a non-detect result.

(Note: The laboratory dilutes all total metals samples 2-4x before analysis as standard practice. All Revere samples were diluted 4x and thus nominal reporting limits were determined at this dilution rate. The laboratory also dilutes all TCLP metals samples 5x before analysis as standard practice and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank (and leachate blank for TCLP) for every analytical batch (maximum 20 samples) and a calibration blank for every 10 metals analyses as required per the analytical methodology. Additionally, a trip

blank was included with the each shipment of VOC samples, which meets the Workplan requirement of one for every cooler of VOC samples. Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used. No detects are reported in the laboratory or trip blanks.

Note: For work order 460-102494-1, Form III Instrument Blanks includes a continuing calibration blank (CCB) for analytical batch 328555 that contains Lead above the reporting limit at 10.75 µg/L. This blank was analyzed on 10/14/15 at 02:37 and does not apply to any of the samples or QC for the site, and thus is not included as a deficiency.

3.3.5 THEORETICAL RESULT VALUES

Several samples were analyzed for both TCLP Lead and total Lead. Based on the relative amounts (100-g soil sample used to prepare 2000-ml leachate), the validator calculated the maximum theoretical TCLP Lead concentration from the total Lead concentration for each sample assuming 100% leachability.

Some TCLP Lead results exceeded the theoretical maximum (indicating a high TCLP result or low total Lead result likely due to a heterogeneous sample matrix) and the validator qualified the associated data as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.3.6 ANALYTICAL PROCEDURES

The analytical procedures (instrument tuning and initial calibration, calibration verification, interference check standards, dual column confirmation, and internal standards), including the leaching procedures for the method-defined parameter TCLP, met the requirements in the analytical method with a few exceptions for calibration verification. The validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

The data set includes 77 analytical batches and the validator randomly selected eight batches for a detailed raw data review including re-calculation of sample results and QC check parameters. No issues were found with analyte identification or quantitation of sample results or calculation of QC parameters, except as follows:

- For PCB batch 325682 in work order 460-103314-1, the validator noted the presence of small peaks with a potential Aroclor pattern on the chromatogram for sample BF-5L-WT-10c-01, which was reported as non-detect for all Aroclors. Upon request, the laboratory re-evaluated the sample and determined that Aroclor 1248 is present at a concentration between the MDL and RL (at 0.062 mg/kg). A revised report was submitted. The validator examined the chromatograms for all of the other PCB samples for this event, and found no suspect peaks.

Additionally, the validator made the following observations from the review of the raw data:

- The laboratory used dual column confirmation for all GC analyses (including PEST, PCB, and HERB). For surrogates and spiked analytes, the laboratory reports the results from both columns in the pdf report. For target analytes in blanks and field samples (and as the reportable result in the EDD for surrogates and spiked analytes), the laboratory reports the result from the column with the higher concentration (unless chromatographic performance is better on one column and it is therefore used for all analyses), provided that the RPD between the two columns is less than 40%. If the RPD is greater than 40%, the column with the lower concentration is reported with a note in the narrative and the result is reported with a P flag. The RPD did not exceed 40% for any field or QC samples in this data set. (All field samples are non-detect.)

- For HERB batch 325695 in work order 460-104045-1, the validator noted that the lowest ICAL level corresponds to 33 µg/kg of Silvex (2,4,5-TP) while the reporting limit (RL) is 17 µg/kg. Thus, detects between the MDL and 33 µg/kg should be considered estimates. All field samples are non-detect to the MDL so no further action is required.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The Level 4 data packages and EDD contain all necessary information or the laboratory submitted a revision upon request as detailed in the case narratives, except as follows:

- For work orders 460-103391-1 and 460-103393-1, Form 5B (PDS) for preparation batch 331486 (contains sample 460-103391-3) is missing the Spike Added and thus %Recovery. The MS for this batch passes and thus a PDS is not required. Additionally, using the standard amount (2500-ppb) for Spike Added, the %Recovery calculates as 95%, which is within the PDS control limits (80-120%).
- For work order 460-103552-1, the raw data is missing for TCLP Lead analytical batch 333037 (11/3/15 11:31 to 11/3/15 22:57). This data is available in work order 460-103667-1, and thus no further action was taken.
- For work order 460-103796-1, the instrument raw data is missing for TCLP Lead analytical batch 333241 from 11/4/15 19:09 to 11/4/15 19:54. This time range only includes the leachate blank for leach batch 332779 and the subsequent CCV/CCB/CCVL. The leachate blank (and all others for this data set) is non-detect, which means no sample results were qualified based on the blank results, and thus no further action was taken.
- For work order 460-103967-1, the laboratory report includes results for the QC samples (preparation blank, LCS, MS, MD, SD, and PDS) run under analytical batch 333465 (11/5/15) and also under analytical batch 335675 (11/16/15). The 11/16/15 PDS results appear to be in error for the Spike Amount, Result and thus %Recovery. All of the associated site samples were analyzed in batch 333465 on 11/5/15, and thus no further action was taken.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
All	All laboratory QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.
460-103314-1 460-104045-1 460-108300-1	All backfill composite field samples (*c-001 and *c-002)	composite_yn	The validator changed the entry from N to Y based on the custody record.
460-103314-1 460-104045-1	All backfill composite MS and MSD samples (*c-001 and *c-002)	composite_yn	The validator changed the entry from N to Y based on the custody record.

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
All	All 6010C total metals field samples and laboratory QC samples	prep_method	The validator changed the method reference from SW3020B to SW3050B based on the pdf analytical results and as confirmed by the laboratory.
All	All laboratory QC samples	validation_level	For the target analyte (TRG), surrogate (SUR), and spike compound (SC) records (which have validated_yn set to N), the validator changed the entry from UNKNOWN to blank to meet NYSDEC requirements.
All	All field QC samples	validation_level	For the surrogate (SUR) records (which have validated_yn set to N), the validator changed the entry from UNKNOWN to blank to meet NYSDEC requirements.

3.4.3 ANALYTICAL COMPLETENESS

The validator rejected two non-detect results for Pentachlorophenol due to extremely low matrix spike recovery. With 1,191 total results for field samples (investigative samples and field duplicates), this gives a completeness of 99.8%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which a target analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which a target analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size and include dry-weight correction for all soil samples as required per Section 5.7.1 of the Workplan. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results for the investigative samples are reported in mg/kg with dry-weight correction for total metals and inorganics, in µg/L for TCLP metals, and in µg/kg with dry-weight correction for organics. (For the 7196A analyses, Chromium III is shown as not dry-weight corrected. Chromium III is calculated from the results for Chromium VI and total Chromium, which are dry-weight corrected, and thus the Chromium III is not directly dry-weight corrected but is on a dry-weight basis.)

The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
September 2015 to February 2016

SAMPLE SUMMARY

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-101657-1	ECS-AREA29-G26-F-R	9/23/15	INV	ECS	Soil	x		x	x								
460-101657-1LR	ECS-AREA29-G26-F-R	9/23/15	MD	ECS	Soil			x	x								
460-101657-1MS	ECS-AREA29-G26-F-R	9/23/15	MS	ECS	Soil			x	x								
460-101657-2	ECS-AREA27-I28-F	9/23/15	INV	ECS	Soil	x	x										
460-101657-2LR	ECS-AREA27-I28-F	9/23/15	MD	ECS	Soil		x										
460-101657-2MS	ECS-AREA27-I28-F	9/23/15	MS	ECS	Soil		x										
460-101657-3	ECS-AREA27-I28-F-X	9/23/15	FD	ECS	Soil	x	x										
460-101657-4	DS-AREA28-J29-SS	9/23/15	INV	ECS	Soil	x	x										
460-101657-4LR	DS-AREA28-J29-SS	9/23/15	MD	ECS	Soil	x	x										
460-101657-4MS	DS-AREA28-J29-SS	9/23/15	MS	ECS	Soil	x	x										
460-101657-5	ECS-AREA28-I/J29-F	9/23/15	INV	ECS	Soil	x	x										
460-102202-1	ECS-AREA 33-H34-SN	10/2/15	INV	ECS	Soil	x	x										
460-102202-2	ECS-AREA 33-G/H34-F	10/2/15	INV	ECS	Soil	x	x										
460-102202-3	ECS-AREA 33-G34-SN	10/2/15	INV	ECS	Soil	x	x										
460-102202-4	ECS-AREA 33-F35-SW	10/2/15	INV	ECS	Soil	x	x										
460-102319-1	ECS-Area 2-R19S-SS	10/6/15	INV	ECS	Soil		x										
460-102319-2	ECS-AREA 33-G35-F	10/6/15	INV	ECS	Soil	x	x										
460-102383-1	ECS-AREA 33-G36-F	10/7/15	INV	ECS	Soil	x	x										
460-102383-1LR	ECS-AREA 33-G36-F	10/7/15	MD	ECS	Soil	x											
460-102383-1MS	ECS-AREA 33-G36-F	10/7/15	MS	ECS	Soil	x											
460-102383-2	ECS-AREA 33-G36-F-X	10/7/15	FD	ECS	Soil	x	x										
460-102383-3	ECS-AREA 33-G36-SW	10/7/15	INV	ECS	Soil	x	x										
460-102383-4	ECS-AREA 33-H35-F	10/7/15	INV	ECS	Soil	x	x										
460-102383-5	ECS-AREA 33-H36-SS	10/7/15	INV	ECS	Soil	x		x	x								
460-102494-1	ECS-WSTREAM-30+00-F	10/8/15	INV	ECS	Soil	x	x										
460-102494-2	ECS-WSTREAM-30+00-SW	10/8/15	INV	ECS	Soil	x	x										
460-102494-3	ECS-WSTREAM-30+00-SE	10/8/15	INV	ECS	Soil	x	x										
460-102494-4	ECS-WSTREAM-30+50-F	10/8/15	INV	ECS	Soil	x	x										
460-102494-5	ECS-WSTREAM-30+50-SW	10/8/15	INV	ECS	Soil	x	x										
460-102494-6	ECS-WSTREAM-30+50-SE	10/8/15	INV	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-102494-7	ECS-WSTREAM-31+00-F	10/8/15	INV	ECS	Soil	x	x										
460-102494-8	ECS-WSTREAM-31+00-SW	10/8/15	INV	ECS	Soil	x	x										
460-102494-9	ECS-WSTREAM-31+00-SE	10/8/15	INV	ECS	Soil	x	x										
460-102494-10	ECS-WSTREAM-31+50-F	10/8/15	INV	ECS	Soil	x	x										
460-102494-11	ECS-WSTREAM-31+50-SW	10/8/15	INV	ECS	Soil	x	x										
460-102494-12	ECS-WSTREAM-31+50-SE	10/8/15	INV	ECS	Soil	x	x										
460-102494-13	ECS-WSTREAM-32+00-F	10/8/15	INV	ECS	Soil	x	x										
460-102494-14	ECS-WSTREAM-32+00-SW	10/8/15	INV	ECS	Soil	x	x										
460-102494-15	ECS-WSTREAM-32+00-SE	10/8/15	INV	ECS	Soil	x	x										
460-102494-16	ECS-AREA 29-G26-F-R2	10/8/15	INV	ECS	Soil	x	x										
460-102570-1	ECS-WSTREAM-32+50-F	10/9/15	INV	ECS	Soil	x	x										
460-102570-2	ECS-WSTREAM-32+50-SW	10/9/15	INV	ECS	Soil	x	x										
460-102570-3	ECS-WSTREAM-32+50-SE	10/9/15	INV	ECS	Soil	x	x										
460-102570-4	ECS-WSTREAM-33+00-F	10/9/15	INV	ECS	Soil	x	x										
460-102570-5	ECS-WSTREAM-33+00-SW	10/9/15	INV	ECS	Soil	x	x										
460-102570-6	ECS-WSTREAM-33+00-SE	10/9/15	INV	ECS	Soil	x	x										
460-102570-7	ECS-WSTREAM-33+50-F	10/9/15	INV	ECS	Soil	x	x										
460-102570-8	ECS-WSTREAM-33+50-SW	10/9/15	INV	ECS	Soil	x	x										
460-102570-9	ECS-WSTREAM-33+50-SE	10/9/15	INV	ECS	Soil	x	x										
460-102683-1	ECS-WSTREAM-34+00-SW	10/12/15	INV	ECS	Soil	x	x										
460-102683-2	ECS-WSTREAM-34+00-F	10/12/15	INV	ECS	Soil	x	x										
460-102683-3	ECS-WSTREAM-34+00-SE	10/12/15	INV	ECS	Soil	x	x										
460-102683-4	ECS-WSTREAM-34+50-SW	10/12/15	INV	ECS	Soil	x	x										
460-102683-5	ECS-WSTREAM-34+50-F	10/12/15	INV	ECS	Soil	x	x										
460-102683-6	ECS-WSTREAM-34+50-SE	10/12/15	INV	ECS	Soil	x	x										
460-102683-7	ECS-WSTREAM-35+00-SW	10/12/15	INV	ECS	Soil	x	x										
460-102683-8	ECS-WSTREAM-35+00-F	10/12/15	INV	ECS	Soil	x	x										
460-102683-9	ECS-WSTREAM-35+00-SE	10/12/15	INV	ECS	Soil	x	x										
460-102683-10	ECS-WSTREAM-35+50-SW	10/12/15	INV	ECS	Soil	x	x										
460-102683-11	ECS-WSTREAM-35+50-F	10/12/15	INV	ECS	Soil	x	x										
460-102683-12	ECS-WSTREAM-35+50-SE	10/12/15	INV	ECS	Soil	x	x										
460-102683-13	ECS-WSTREAM-36+00-SW	10/12/15	INV	ECS	Soil	x	x										
460-102683-14	ECS-WSTREAM-36+00-F	10/12/15	INV	ECS	Soil	x	x										
460-102683-15	ECS-WSTREAM-36+00-SE	10/12/15	INV	ECS	Soil	x	x										
460-102990-1	DS-AREA 29-F26-SN	10/16/15	INV	ECS	Soil	x		x	x								
460-102990-2	DS-AREA 29-F26-SN-X	10/16/15	FD	ECS	Soil	x	x										
460-102990-3	ECS-WSTREAM-36+50-F	10/16/15	INV	ECS	Soil	x		x	x								
460-102990-3LR	ECS-WSTREAM-36+50-F	10/16/15	MD	ECS	Soil	x		x	x								
460-102990-3MS	ECS-WSTREAM-36+50-F	10/16/15	MS	ECS	Soil	x		x	x								
460-102990-4	ECS-WSTREAM-36+50-SE	10/16/15	INV	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-102990-5	ECS-WSTREAM-36+50-SW	10/16/15	INV	ECS	Soil	x	x										
460-103083-1	ECS-WSTREAM-37+00-F	10/19/15	INV	ECS	Soil	x	x										
460-103083-2	ECS-WSTREAM-37+00-SE	10/19/15	INV	ECS	Soil	x	x										
460-103083-3	ECS-WSTREAM-37+00-SW	10/19/15	INV	ECS	Soil	x	x										
460-103083-4	ECS-WSTREAM-37+00-SW-X	10/19/15	FD	ECS	Soil	x	x										
460-103083-5	ECS-WSTREAM-37+50-F	10/19/15	INV	ECS	Soil	x	x										
460-103083-5LR	ECS-WSTREAM-37+50-F	10/19/15	MD	ECS	Soil	x	x										
460-103083-5MS	ECS-WSTREAM-37+50-F	10/19/15	MS	ECS	Soil	x	x										
460-103083-6	ECS-WSTREAM-37+50-SE	10/19/15	INV	ECS	Soil	x	x										
460-103083-7	ECS-WSTREAM-37+50-SW	10/19/15	INV	ECS	Soil	x		x	x								
460-103083-8	ECS-AREA29-G26-F-R3	10/19/15	INV	ECS	Soil	x	x										
460-103314-1	BF-5L-WT-10g-01	10/22/15	INV	BF	Soil										x		
460-103314-2	BF-5L-WT-10g-02	10/22/15	INV	BF	Soil										x		
460-103314-3	BF-5L-WT-10c-01	10/22/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-103314-4	BF-5L-GF-8g-01	10/22/15	INV	BF	Soil										x		
460-103314-5	BF-5L-GF-8g-02	10/22/15	INV	BF	Soil										x		
460-103314-6	BF-5L-GF-8c-01	10/22/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-103314-6MS	BF-5L-GF-8c-01	10/22/15	MS	BF	Soil											x	
460-103314-6SD	BF-5L-GF-8c-01	10/22/15	MSD	BF	Soil											x	
460-103314-7	TB-10/22/15	10/22/15	TB	TB	Water										x		
460-103322-1	ECS-WSTREAM-38+00-F	10/22/15	INV	ECS	Soil	x	x										
460-103322-2	ECS-WSTREAM-38+00-SE	10/22/15	INV	ECS	Soil	x	x										
460-103322-3	ECS-WSTREAM-38+00-SW	10/22/15	INV	ECS	Soil	x	x										
460-103322-4	ECS-WSTREAM-38+50-F	10/22/15	INV	ECS	Soil	x	x										
460-103322-5	ECS-WSTREAM-38+50-SE	10/22/15	INV	ECS	Soil	x	x										
460-103322-6	ECS-WSTREAM-38+50-SW	10/22/15	INV	ECS	Soil	x	x										
460-103391-1	ECS-WSTREAM-39+00-F	10/23/15	INV	ECS	Soil	x	x										
460-103391-2	ECS-WSTREAM-39+00-SE	10/23/15	INV	ECS	Soil	x	x										
460-103391-3	ECS-WSTREAM-39+00-SW	10/23/15	INV	ECS	Soil	x	x										
460-103391-3LR	ECS-WSTREAM-39+00-SW	10/23/15	MD	ECS	Soil	x											
460-103391-3MS	ECS-WSTREAM-39+00-SW	10/23/15	MS	ECS	Soil	x											
460-103391-4	ECS-WSTREAM-39+50-F	10/23/15	INV	ECS	Soil	x	x										
460-103391-5	ECS-WSTREAM-39+50-SE	10/23/15	INV	ECS	Soil	x	x										
460-103391-6	ECS-WSTREAM-39+50-SW	10/23/15	INV	ECS	Soil	x	x										
460-103393-1	ECS-AREA2-O16-SW-R	10/23/15	INV	ECS	Soil		x										
460-103393-2	ECS-AREA36-H37-F	10/23/15	INV	ECS	Soil	x	x										
460-103393-3	ECS-AREA36-H37-F-X	10/23/15	FD	ECS	Soil	x	x										
460-103393-4	ECS-AREA36-H37-SN	10/23/15	INV	ECS	Soil	x	x										
460-103393-5	ECS-AREA36-I38-SS	10/23/15	INV	ECS	Soil	x		x	x								
460-103393-6	ECS-AREA36-H37-SW	10/23/15	INV	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-103533-1	ECS-WSTREAM-40+00-F	10/26/15	INV	ECS	Soil	x	x										
460-103533-1LR	ECS-WSTREAM-40+00-F	10/26/15	MD	ECS	Soil	x	x										
460-103533-1MS	ECS-WSTREAM-40+00-F	10/26/15	MS	ECS	Soil	x	x										
460-103533-2	ECS-WSTREAM-40+00-SE	10/26/15	INV	ECS	Soil	x	x										
460-103533-3	ECS-WSTREAM-40+00-SW	10/26/15	INV	ECS	Soil	x	x										
460-103533-4	ECS-WSTREAM-40+50-F	10/26/15	INV	ECS	Soil	x		x	x								
460-103533-5	ECS-WSTREAM-40+50-SE	10/26/15	INV	ECS	Soil	x	x										
460-103533-6	ECS-WSTREAM-40+50-SW	10/26/15	INV	ECS	Soil	x	x										
460-103533-7	ECS-WSTREAM-41+00-F	10/26/15	INV	ECS	Soil	x	x										
460-103533-8	ECS-WSTREAM-41+00-SE	10/26/15	INV	ECS	Soil	x	x										
460-103533-9	ECS-WSTREAM-41+00-SE-X	10/26/15	FD	ECS	Soil	x	x										
460-103533-10	ECS-WSTREAM-41+00-SW	10/26/15	INV	ECS	Soil	x	x										
460-103552-1	ECS-WSTREAM-41+50-F	10/27/15	INV	ECS	Soil	x	x										
460-103552-2	ECS-WSTREAM-41+50-SE	10/27/15	INV	ECS	Soil	x	x										
460-103552-2LR	ECS-WSTREAM-41+50-SE	10/27/15	MD	ECS	Soil	x	x										
460-103552-2MS	ECS-WSTREAM-41+50-SE	10/27/15	MS	ECS	Soil	x	x										
460-103552-3	ECS-WSTREAM-41+50-SW	10/27/15	INV	ECS	Soil	x	x										
460-103552-4	ECS-WSTREAM-42+00-F	10/27/15	INV	ECS	Soil	x	x										
460-103552-5	ECS-WSTREAM-42+00-SE	10/27/15	INV	ECS	Soil	x	x										
460-103552-6	ECS-WSTREAM-42+00-SW	10/27/15	INV	ECS	Soil	x	x										
460-103552-7	ECS-WSTREAM-42+50-F	10/27/15	INV	ECS	Soil	x	x										
460-103552-8	ECS-WSTREAM-42+50-SE	10/27/15	INV	ECS	Soil	x	x										
460-103552-8LR	ECS-WSTREAM-42+50-SE	10/27/15	MD	ECS	Soil		x										
460-103552-8MS	ECS-WSTREAM-42+50-SE	10/27/15	MS	ECS	Soil		x										
460-103552-9	ECS-WSTREAM-42+50-SW	10/27/15	INV	ECS	Soil	x	x										
460-103552-10	ECS-WSTREAM-43+00-F	10/27/15	INV	ECS	Soil	x	x										
460-103552-11	ECS-WSTREAM-43+00-SE	10/27/15	INV	ECS	Soil	x	x										
460-103552-12	ECS-WSTREAM-43+00-SW	10/27/15	INV	ECS	Soil	x	x										
460-103552-13	ECS-AREA35-H35-F	10/27/15	INV	ECS	Soil	x		x	x								
460-103552-14	ECS-AREA35-H36-SS	10/27/15	INV	ECS	Soil	x	x										
460-103552-15	ECS-AREA35-H35-SN	10/27/15	INV	ECS	Soil	x	x										
460-103667-1	ECS-WSTREAM-43+50-F	10/28/15	INV	ECS	Soil	x	x										
460-103667-2	ECS-WSTREAM-43+50-SS	10/28/15	INV	ECS	Soil	x	x										
460-103667-3	ECS-WSTREAM-43+50-SN	10/28/15	INV	ECS	Soil	x	x										
460-103667-4	ECS-WSTREAM-44+00-F	10/28/15	INV	ECS	Soil	x	x										
460-103667-5	ECS-WSTREAM-44+00-SS	10/28/15	INV	ECS	Soil	x	x										
460-103667-6	ECS-WSTREAM-44+00-SS-X	10/28/15	FD	ECS	Soil	x	x										
460-103667-7	ECS-WSTREAM-44+00-SN	10/28/15	INV	ECS	Soil	x	x										
460-103796-1	ECS-WSTREAM-39+00-F-R	10/30/15	INV	ECS	Soil	x	x										
460-103796-2	ECS-WSTREAM-39+00-SE-R	10/30/15	INV	ECS	Soil	x	x										

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-103860-1	ECS-WSTREAM-42+00-SW-R	11/2/15	INV	ECS	Soil	x	x										
460-103860-2	ECS-WSTREAM-43+00-SE-R	11/2/15	INV	ECS	Soil	x	x										
460-103967-1	ECS-WSTREAM-44+50-SN	11/3/15	INV	ECS	Soil	x	x										
460-103967-2	ECS-WSTREAM-44+50-F	11/3/15	INV	ECS	Soil	x	x										
460-103967-3	ECS-WSTREAM-44+50-SS	11/3/15	INV	ECS	Soil	x	x										
460-103967-4	ECS-WSTREAM-45+00-F	11/3/15	INV	ECS	Soil	x	x										
460-103967-5	ECS-WSTREAM-45+00-SE	11/3/15	INV	ECS	Soil	x	x										
460-103967-6	ECS-WSTREAM-45+00-SW	11/3/15	INV	ECS	Soil	x	x										
460-103967-7	ECS-WSTREAM-45+50-F	11/3/15	INV	ECS	Soil	x	x										
460-103967-8	ECS-WSTREAM-45+50-SW	11/3/15	INV	ECS	Soil	x	x										
460-103967-9	ECS-WSTREAM-45+50-SE	11/3/15	INV	ECS	Soil	x	x										
460-103967-10	ECS-WSTREAM-46+00-F	11/3/15	INV	ECS	Soil	x	x										
460-103967-11	ECS-WSTREAM-46+00-F-X	11/3/15	FD	ECS	Soil	x	x										
460-103967-12	ECS-WSTREAM-46+00-SE	11/3/15	INV	ECS	Soil	x	x										
460-103967-13	ECS-WSTREAM-46+00-SW	11/3/15	INV	ECS	Soil	x	x										
460-103967-14	ECS-WSTREAM-46+50-F	11/3/15	INV	ECS	Soil	x	x										
460-103967-15	ECS-WSTREAM-46+50-SE	11/3/15	INV	ECS	Soil	x	x										
460-103967-15LR	ECS-WSTREAM-46+50-SE	11/3/15	MD	ECS	Soil	x	x										
460-103967-15MS	ECS-WSTREAM-46+50-SE	11/3/15	MS	ECS	Soil	x	x										
460-103967-16	ECS-WSTREAM-46+50-SW	11/3/15	INV	ECS	Soil	x	x										
460-103967-17	ECS-WSTREAM-47+00-F	11/3/15	INV	ECS	Soil	x	x										
460-103967-18	ECS-WSTREAM-47+00-SE	11/3/15	INV	ECS	Soil	x	x										
460-103967-19	ECS-WSTREAM-47+00-SW	11/3/15	INV	ECS	Soil	x	x										
460-103970-1	ECS-AREA 37-I37-F	11/3/15	INV	ECS	Soil	x	x										
460-103970-2	ECS-AREA 37-I37-SS	11/3/15	INV	ECS	Soil	x		x	x								
460-103970-3	ECS-AREA 37-I37-SE	11/3/15	INV	ECS	Soil	x	x										
460-104045-1	CC-PSL-4g-001	11/4/15	INV	BF	Soil										x		
460-104045-2	CC-PSL-4g-002	11/4/15	INV	BF	Soil										x		
460-104045-3	CC-PSL-4c-001	11/4/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-104045-3MS	CC-PSL-4c-001	11/4/15	MS	BF	Soil							x	x	x		x	x
460-104045-3SD	CC-PSL-4c-001	11/4/15	MSD	BF	Soil							x	x	x		x	x
460-104045-4	CC-PSL-5g-001	11/4/15	INV	BF	Soil										x		
460-104045-5	CC-PSL-5g-002	11/4/15	INV	BF	Soil										x		
460-104045-6	CC-PSL-5c-001	11/4/15	INV	BF	Soil				x	x	x	x	x	x		x	x
460-104045-7	TB-11/4/15	11/4/15	TB	TB	Water										x		
460-104379-1	ECS-AREA 29-G26-F-R4	11/10/15	INV	ECS	Soil	x	x										
460-104950-1	DS-AREA 28-I29-SS	11/19/15	INV	ECS	Soil	x	x										
460-104950-2	ECS-AREA 35-I35-SE	11/19/15	INV	ECS	Soil	x	x										
460-105921-1	ECS-EFA T PAD GRID 57-F	12/8/15	INV	ECS	Soil	x											
460-105921-1LR	ECS-EFA T PAD GRID 57-F	12/8/15	MD	ECS	Soil	x											

Lab ID	Field ID	Date	Type	Media	Matrix	TCLP Pb	Total As and Pb	Total TAL Metals	Hg	Total DER10 Metals	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-105921-1MS	ECS-EFA T PAD GRID 57-F	12/8/15	MS	ECS	Soil	x											
460-105921-2	ECS-EFA T PAD GRID 48-F	12/8/15	INV	ECS	Soil	x											
460-105921-3	ECS-EFA T PAD GRID 49-F	12/8/15	INV	ECS	Soil	x											
460-105921-4	ECS-EFA T PAD GRID 47-F	12/8/15	INV	ECS	Soil	x											
460-105921-5	ECS-EFA T PAD GRID 63-F	12/8/15	INV	ECS	Soil	x											
460-105921-6	ECS-EFA T PAD GRID 53-F	12/8/15	INV	ECS	Soil	x											
460-105921-7	ECS-EFA T PAD GRID 52-F	12/8/15	INV	ECS	Soil	x											
460-105921-8	ECS-EFA T PAD GRID 54-F	12/8/15	INV	ECS	Soil	x											
460-105921-9	ECS-EFA T PAD GRID 59-F	12/8/15	INV	ECS	Soil	x											
460-105921-10	ECS-EFA T PAD GRID 58-F	12/8/15	INV	ECS	Soil	x											
460-105921-11	ECS-EFA T PAD GRID 64-F	12/8/15	INV	ECS	Soil	x											
460-105921-12	ECS-EFA T PAD GRID 65-F	12/8/15	INV	ECS	Soil	x											
460-108300-1	BF-ORI-WT-2C-01-R1	2/1/16	INV	BF	Soil											x	
460-108300-2	BF-ORI-WT-2C-01-R2	2/1/16	INV	BF	Soil											x	

BF - Backfill Sample
ECS - Excavation Confirmation Sample
FD - Field Duplicate Sample
INV - Investigative Sample
MD – Matrix Duplicate Sample (unspiked)
MS - Matrix Spike Sample
MSD - Matrix Spike Duplicate Sample
TB - Trip Blank

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- TCLP Pb: 1311/ 3010A/ 6010C for Lead in leachates of soil samples
- Total As and Pb: 3050B/ 6010C for Arsenic and Lead in soil samples
- Total TAL Metals: 3050B/ 6010C for 22 ICP-AES Target Analyte List (TAL) Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc) in soil samples
- Hg: 7471B for total Mercury in soil samples
- Total DER10 Metals: 3050B/ 6010C for 12 ICP-AES NYSDEC DER-10 Appendix 5 Metals (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, Selenium, Silver, and Zinc) in soil samples
- Cr III/VI: 3060A/7196A for Trivalent Chromium and Hexavalent Chromium in soil samples
- PEST: 3546/ 3620C/ 8081B for 15 NYSDEC DER-10 Appendix 5 pesticides plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene in soil samples
- PCB: 3546/ 3665A/ 8082A for 7 Aroclors in soil samples
- HERB: 8151A for Silvex (2,4,5-TP) in soil samples
- VOC: 5035/8260C for 30 NYSDEC DER-10 Appendix 5 volatile organic compounds (VOCs) in soil samples and 5030B/ 8260C for 30 VOCs in aqueous trip blanks
- SVOC: 3546/ 8270D for 20 NYSDEC DER-10 Appendix 5 semivolatile organic compounds (SVOCs) plus Dibenzofuran and Hexachlorobenzene in soil samples
- CN: 9012B for Cyanide in soil samples

TABLE 2
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

L = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

H = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>J-/J+ and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
September 2015 to February 2016

QC DEFICIENCIES AND DATA QUALIFICATION ACTIONS

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
MATRIX DUPLICATE (MD) PRECISION																	
460-102990-3LR	ECS-WSTREAM-36+50-F-20151016LR	LR		3050B	6010C		10/17/15 18:47:00	10/18/15 13:32:00	NA	4	CALCIUM				20	Poor matrix duplicate precision (29 RPD)	none (results <5xRL and absolute difference <2xRL)
460-103552-2LR	ECS-WSTREAM-41+50-SE-20151027LR	LR		3050B	6010C		10/29/15 19:07:00	10/30/15 11:04:00	NA	4	ARSENIC	J			20	Poor matrix duplicate precision (29 RPD)	none (results <5xRL and absolute difference <2xRL)
FIELD DUPLICATE (FD) PRECISION																	
460-102990-2	DS-AREA 29-F26-SN-X-20151016	FD	1311	3010A	6010C	10/18/15 17:00:00	10/19/15 10:59:00	10/19/15 23:12:00	NA	5	TCLP LEAD				35	Poor field duplicate precision (absolute difference > 2xRL), use higher value from original sample	J/UJ to detects/NDs for original and duplicate sample
460-103393-3	ECS-AREA36-H37-F-X-20151023	FD		3050B	6010C		10/25/15 16:17:00	10/26/15 12:14:00	NA	4	LEAD				35	Poor field duplicate precision (36 RPD), use higher result from field duplicate	J/UJ to detects/NDs for original and duplicate sample
LABORATORY CONTROL SPIKE (LCS) ACCURACY																	
4603311344A20	4603311344A20	BS		METHOD	9012		10/25/15 11:23:00	10/25/15 13:08:00	NA	20	CYANIDE		3.5	121.4		Extremely low LCS-SRM recovery (19%) - within vendor limits but <50%	L/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 105% and 100%.)
4603338494A20	4603338494A20	BS		METHOD	9012		11/07/15 09:00:00	11/07/15 10:40:00	NA	20	CYANIDE		3.5	121.4		Extremely low LCS-SRM recovery (19.6%) - within vendor limits but <50%	L/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 108% and 102%.)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
MATRIX SPIKE (MS) ACCURACY																	
460-101657-4MS	DS-AREA28-J29-SS-20150923MS-20150923	MS		3050B	6010C		09/25/15 17:10:00	09/26/15 19:18:00	NA	4	LEAD		75	125		High matrix spike recovery (131%)	None (check waived because unspiked sample conc > 4x spike amount), PDS also waived, SD passes at 3.7%
460-101657-1MS	ECS-AREA29-G26-F-R-20150923MS	MS		3050B	6010C		09/25/15 07:28:00	09/26/15 13:32:00	NA	4	ALUMINUM		75	125		High matrix spike recovery (1374%)	None (check waived because unspiked sample conc > 4x spike amount), PDS also waived, SD passes at 0.37%
460-101657-1MS	ECS-AREA29-G26-F-R-20150923MS	MS		3050B	6010C		09/25/15 07:28:00	09/26/15 13:32:00	NA	4	ANTIMONY	N	75	125		Low matrix spike recovery (51%)	L/UJ to detects/NDs for ECS samples digested in the same batch (PDS passes at 94%)
460-101657-1MS	ECS-AREA29-G26-F-R-20150923MS	MS		3050B	6010C		09/25/15 07:28:00	09/26/15 13:32:00	NA	4	IRON		75	125		High matrix spike recovery (3199%)	None (check waived because unspiked sample conc > 4x spike amount), PDS also waived, SD passes at 2.2%
460-101657-1MS	ECS-AREA29-G26-F-R-20150923MS	MS		3050B	6010C		09/25/15 07:28:00	09/26/15 13:32:00	NA	4	MANGANESE		75	125		Low matrix spike recovery (23%)	None (check waived because unspiked sample conc > 4x spike amount), PDS passes at 110%
460-102990-3MS	ECS-WSTREAM-36+50-F-20151016MS	MS		3050B	6010C		10/17/15 18:47:00	10/18/15 13:28:00	NA	4	ALUMINUM		75	125		High matrix spike recovery (127%)	None (check waived because unspiked sample conc > 4x spike amount), PDS also waived, SD passes at 1.2%
460-102990-3MS	ECS-WSTREAM-36+50-F-20151016MS	MS		3050B	6010C		10/17/15 18:47:00	10/18/15 13:28:00	NA	4	ANTIMONY	N	75	125		Low matrix spike recovery (62%)	L/UJ to detects/NDs for ECS samples digested in the same batch (PDS passes at 83%)
460-102990-3MS	ECS-WSTREAM-36+50-F-20151016MS	MS		3050B	6010C		10/17/15 18:47:00	10/18/15 13:28:00	NA	4	CALCIUM	N	75	125		Low matrix spike recovery (63%)	L/UJ to detects/NDs for ECS samples digested in the same batch (PDS passes at 89%)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-102990-3MS	ECS-WSTREAM-36+50-F-20151016MS	MS		3050B	6010C		10/17/15 18:47:00	10/18/15 13:28:00	NA	4	IRON		75	125		Low matrix spike recovery (-123%)	None (check waived because unspiked sample conc > 4x spike amount), PDS also waived, SD passes at 2.4%
460-102990-3MS	ECS-WSTREAM-36+50-F-20151016MS	MS		3050B	6010C		10/17/15 18:47:00	10/18/15 13:28:00	NA	4	MANGANESE		75	125		Low matrix spike recovery (-129%)	None (check waived because unspiked sample conc > 4x spike amount), PDS passes at 81%
460-103533-1MS	ECS-WSTREAM-40+00-F-20151026MS	MS		3050B	6010C		10/29/15 04:50:00	10/29/15 12:06:00	NA	4	LEAD		75	125		High matrix spike recovery (167%)	None (check waived because unspiked sample conc > 4x spike amount), PDS passes at 87%
460-103314-6SD	BF-5L-GF-8c-01-20151022SD	SD		3546	8270D		10/28/15 09:40:00	10/29/15 11:30:00	NA	1	2-METHYLPHENOL (O-CRESOL)	T	56	99	30	Low average MS/MSD recovery (55.5%)	L/UJ to detects/NDs for BF-5L-GF samples digested in the same batch
460-103314-6SD	BF-5L-GF-8c-01-20151022SD	SD		3546	8270D		10/28/15 09:40:00	10/29/15 11:30:00	NA	1	BENZO(B) FLUORANTHENE	T	67	116	30	Low average MS/MSD recovery (66.5%)	L/UJ to detects/NDs for BF-5L-GF samples digested in the same batch
460-103314-6MS	BF-5L-GF-8c-01-20151022MS/SD	MS/SD		3546	8270D		10/28/15 09:40:00	10/29/15 11:06:00	NA	1	BENZO(K) FLUORANTHENE	T	65	114		Low average MS/MSD recovery (61%)	L/UJ to detects/NDs for BF-5L-GF samples digested in the same batch
460-103314-6SD	BF-5L-GF-8c-01-20151022SD	SD		3546	8270D		10/28/15 09:40:00	10/29/15 11:30:00	NA	1	DIBENZOFURAN	T	62	102	30	Low matrix spike duplicate recovery (61%)	None (average MS/MSD recovery (62%) within laboratory limits)
460-103314-6MS	BF-5L-GF-8c-01-20151022MS/SD	MS/SD		3546	8270D		10/28/15 09:40:00	10/29/15 11:06:00	NA	1	FLUORENE	T	65	108		Low average MS/MSD recovery (62%)	L/UJ to detects/NDs for BF-5L-GF samples digested in the same batch
460-103314-6SD	BF-5L-GF-8c-01-20151022SD	SD		3546	8270D		10/28/15 09:40:00	10/29/15 11:30:00	NA	1	HEXACHLORO BENZENE	T	65	117	30	Low average MS/MSD recovery (64%)	L/UJ to detects/NDs for BF-5L-GF samples digested in the same batch
460-103314-6MS	BF-5L-GF-8c-01-20151022MS/SD	MS/SD		3546	8270D		10/28/15 09:40:00	10/29/15 11:06:00	NA	1	PENTACHLORO PHENOL	T	47	115		Low average MS/MSD recovery (21.5%)	L/UJ to detects/NDs for BF-5L-GF samples digested in the same batch
460-103314-6SD	BF-5L-GF-8c-01-20151022SD	SD		3546	8270D		10/28/15 09:40:00	10/29/15 11:30:00	NA	1	PHENOL	T	55	99	30	Low matrix spike duplicate recovery (54%)	None (average MS/MSD recovery (55%) within laboratory limits)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-104045-3MS	CC-PSL-4c-001-20151104MS/SD	MS/SD		3546	8270D		11/12/15 14:45:00	11/13/15 07:05:00	NA	1	ACENAPHTHENE	T	59	102		Low average MS/MSD recovery (51%)	L/UJ to detects/NDs for CC-PSL samples digested in the same batch
460-104045-3MS	CC-PSL-4c-001-20151104MS/SD	MS/SD		3546	8270D		11/12/15 14:45:00	11/13/15 07:05:00	NA	1	ACENAPHTHYLENE	T	63	102		Low average MS/MSD recovery (59.5%)	L/UJ to detects/NDs for CC-PSL samples digested in the same batch
460-104045-3SD	CC-PSL-4c-001-20151104SD	SD		3546	8270D		11/12/15 14:45:00	11/13/15 07:31:00	NA	1	ANTHRACENE	T	66	105	30	Low average MS/MSD recovery (65.5%)	L/UJ to detects/NDs for CC-PSL samples digested in the same batch
460-104045-3MS	CC-PSL-4c-001-20151104MS/SD	MS/SD		3546	8270D		11/12/15 14:45:00	11/13/15 07:05:00	NA	1	DIBENZOFURAN	T	62	102		Low average MS/MSD recovery (57%)	L/UJ to detects/NDs for CC-PSL samples digested in the same batch
460-104045-3MS	CC-PSL-4c-001-20151104MS/SD	MS/SD		3546	8270D		11/12/15 14:45:00	11/13/15 07:05:00	NA	1	FLUORENE	T	65	108		Low average MS/MSD recovery (56%)	L/UJ to detects/NDs for CC-PSL samples digested in the same batch
460-104045-3SD	CC-PSL-4c-001-20151104SD	SD		3546	8270D		11/12/15 14:45:00	11/13/15 07:31:00	NA	1	NAPHTHALENE	T	64	99	30	Low matrix spike duplicate recovery (63%)	None (average MS/MSD recovery (64%) within laboratory limits)
460-104045-3MS	CC-PSL-4c-001-20151104MS/SD	MS/SD		3546	8270D		11/12/15 14:45:00	11/13/15 07:05:00	NA	1	PENTACHLORO PHENOL	T	47	115		Extremely low average MS/MSD recovery (18%)	L/R to detects/NDs for CC samples digested in the same batch
460-104045-3SD	CC-PSL-4c-001-20151104SD	SD		3546	8270D		11/12/15 14:45:00	11/13/15 07:31:00	NA	1	PHENANTHRENE	T	66	105	30	Low average MS/MSD recovery (65%)	L/UJ to detects/NDs for CC-PSL samples digested in the same batch
THEORETICAL RESULT VALUES																	
460-103083-1	ECS-WSTREAM-37+00-F-20151019	N	1311	3010A	6010C	10/21/15 17:30:00	10/22/15 22:07:00	10/23/15 13:21:00	NA	5	TCLP LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-103083-1	ECS-WSTREAM-37+00-F-20151019	N		3050B	6010C		10/21/15 07:30:00	10/21/15 16:53:00	NA	4	LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-103967-6	ECS-WSTREAM-45+00-SW-20151103	N	1311	3010A	6010C	11/06/15 17:30:00	11/07/15 17:37:00	11/08/15 20:46:00	NA	5	TCLP LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-103967-6	ECS-WSTREAM-45+00-SW-20151103	N		3050B	6010C		11/05/15 07:35:00	11/05/15 23:41:00	NA	4	LEAD					Metals leach-to-total balance greater than theoretical	J to this detect

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
460-103970-3	ECS-AREA 37-I37-SE-20151103	N	1311	3010A	6010C	11/05/15 17:00:00	11/09/15 09:42:00	11/09/15 22:24:00	NA	5	TCLP LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-103970-3	ECS-AREA 37-I37-SE-20151103	N		3050B	6010C		11/05/15 07:39:00	11/06/15 10:16:00	NA	4	LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-104950-2	ECS-AREA 35-I35-SE-20151119	N	1311	3010A	6010C	11/22/15 17:30:00	3/4/16 08:29:00	3/4/16 20:02:00	NA	5	TCLP LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
460-104950-2	ECS-AREA 35-I35-SE-20151119	N		3050B	6010C		11/21/15 13:27:00	11/22/15 13:32:00	NA	4	LEAD					Metals leach-to-total balance greater than theoretical	J to this detect
CALIBRATION VERIFICATION																	
CCV 460-331517/12	CCV 460-331517/12	CCV			8151A			10/27/15 12:58:00	2C	1	SILVEX (2,4,5-TP)	*	-15	+15		Calibration drift secondary column (%D= +16.0%)	H to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-331545/12	CCV 460-331545/12	CCV			8151A			10/27/15 12:58:00	2C	1	SILVEX (2,4,5-TP)	*	-15	+15		Calibration drift secondary column (%D= +16.0%)	H to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCV 460-331545/22	CCV 460-331545/22	CCV			8151A			10/27/15 15:48:00	2C	1	SILVEX (2,4,5-TP)	*	-15	+15		Calibration drift secondary column (%D= +20.2%)	H to detects quantitated on this column for samples analyzed after and before this CCV (none)
CCVIS 460-334634/2	CCVIS 460-334634/2	CCV			8260C			11/11/15 09:38:00	NA	1	1,4-DIOXANE (P-DIOXANE)		-20	+20		Calibration drift (%D= +21.7%)	H to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-331907/2	CCVIS 460-331907/2	CCV			8270D			10/29/15 01:19:00	NA	1	PENTACHLORO PHENOL	*	-20	+20		Calibration drift (%D= -21.3%)	L to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-335113/2	CCVIS 460-335113/2	CCV			8270D			11/13/15 03:58:00	NA	1	INDENO(1,2,3-C,D) PYRENE	*	-20	+20		Calibration drift (%D= +34.0%)	H to detects only since < +40% for samples analyzed this shift (none)

CL – Control Limit
DF – Dilution Factor
LCL – Lower Control Limit
UCL – Upper Control Limit

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
September 2015 to February 2016

QUALIFIED RESULTS FOR FIELD SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
TCLP METALS					
460-101657-1	ECS-AREA29-G26-F-R-20150923	TCLP LEAD	31.2 J ug/l	J	Result between MDL and RL
460-101657-2	ECS-AREA27-I28-F-20150923	TCLP LEAD	35.5 J ug/l	J	Result between MDL and RL
460-101657-3	ECS-AREA27-I28-F-X-20150923	TCLP LEAD	43.7 J ug/l	J	Result between MDL and RL
460-101657-5	ECS-AREA28-I/J29-F-20150923	TCLP LEAD	26.2 J ug/l	J	Result between MDL and RL
460-102202-4	ECS-AREA 33-F35-SW-20151002	TCLP LEAD	30.7 J ug/l	J	Result between MDL and RL
460-102319-2	ECS-AREA 33-G35-F-20151006	TCLP LEAD	36.4 J ug/l	J	Result between MDL and RL
460-102383-1	ECS-AREA 33-G36-F-20151007	TCLP LEAD	27.0 J ug/l	J	Result between MDL and RL
460-102383-4	ECS-AREA 33-H35-F-20151007	TCLP LEAD	22.1 J ug/l	J	Result between MDL and RL
460-102383-5	ECS-AREA 33-H36-SS-20151007	TCLP LEAD	30.9 J ug/l	J	Result between MDL and RL
460-102494-15	ECS-WSTREAM-32+00-SE-20151008	TCLP LEAD	24.0 J ug/l	J	Result between MDL and RL
460-102494-2	ECS-WSTREAM-30+00-SW-20151008	TCLP LEAD	47.6 J ug/l	J	Result between MDL and RL
460-102494-7	ECS-WSTREAM-31+00-F-20151008	TCLP LEAD	41.3 J ug/l	J	Result between MDL and RL
460-102570-7	ECS-WSTREAM-33+50-F-20151009	TCLP LEAD	35.4 J ug/l	J	Result between MDL and RL
460-102683-15	ECS-WSTREAM-36+00-SE-20151012	TCLP LEAD	38.4 J ug/l	J	Result between MDL and RL
460-102683-2	ECS-WSTREAM-34+00-F-20151012	TCLP LEAD	35.5 J ug/l	J	Result between MDL and RL
460-102683-8	ECS-WSTREAM-35+00-F-20151012	TCLP LEAD	34.3 J ug/l	J	Result between MDL and RL
460-102683-9	ECS-WSTREAM-35+00-SE-20151012	TCLP LEAD	37.3 J ug/l	J	Result between MDL and RL
460-102990-1	DS-AREA 29-F26-SN-20151016	TCLP LEAD	267 ug/l	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from original sample
460-102990-2	DS-AREA 29-F26-SN-X-20151016	TCLP LEAD	62.3 ug/l	J	Poor field duplicate precision (absolute difference > 2xRL), use higher value from original sample
460-102990-5	ECS-WSTREAM-36+50-SW-20151016	TCLP LEAD	37.9 J ug/l	J	Result between MDL and RL
460-103083-1	ECS-WSTREAM-37+00-F-20151019	TCLP LEAD	1940 ug/l	J	Metals leach-to-total balance greater than theoretical
460-103083-3	ECS-WSTREAM-37+00-SW-20151019	TCLP LEAD	32.2 J ug/l	J	Result between MDL and RL
460-103322-2	ECS-WSTREAM-38+00-SE-20151022	TCLP LEAD	27.6 J ug/l	J	Result between MDL and RL
460-103322-4	ECS-WSTREAM-38+50-F-20151022	TCLP LEAD	23.0 J ug/l	J	Result between MDL and RL
460-103322-5	ECS-WSTREAM-38+50-SE-20151022	TCLP LEAD	23.3 J ug/l	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result			DVQ	QC Issue
460-103391-4	ECS-WSTREAM-39+50-F-20151023	TCLP LEAD	27.2	J	ug/l	J	Result between MDL and RL
460-103391-6	ECS-WSTREAM-39+50-SW-20151023	TCLP LEAD	25.2	J	ug/l	J	Result between MDL and RL
460-103393-3	ECS-AREA36-H37-F-X-20151023	TCLP LEAD	25.1	J	ug/l	J	Result between MDL and RL
460-103393-5	ECS-AREA36-I38-SS-20151023	TCLP LEAD	28.0	J	ug/l	J	Result between MDL and RL
460-103533-3	ECS-WSTREAM-40+00-SW-20151026	TCLP LEAD	25.7	J	ug/l	J	Result between MDL and RL
460-103533-4	ECS-WSTREAM-40+50-F-20151026	TCLP LEAD	26.6	J	ug/l	J	Result between MDL and RL
460-103533-5	ECS-WSTREAM-40+50-SE-20151026	TCLP LEAD	23.8	J	ug/l	J	Result between MDL and RL
460-103533-6	ECS-WSTREAM-40+50-SW-20151026	TCLP LEAD	25.0	J	ug/l	J	Result between MDL and RL
460-103533-7	ECS-WSTREAM-41+00-F-20151026	TCLP LEAD	48.6	J	ug/l	J	Result between MDL and RL
460-103552-14	ECS-AREA35-H36-SS-20151027	TCLP LEAD	35.1	J	ug/l	J	Result between MDL and RL
460-103552-15	ECS-AREA35-H35-SN-20151027	TCLP LEAD	46.8	J	ug/l	J	Result between MDL and RL
460-103552-2	ECS-WSTREAM-41+50-SE-20151027	TCLP LEAD	33.3	J	ug/l	J	Result between MDL and RL
460-103552-4	ECS-WSTREAM-42+00-F-20151027	TCLP LEAD	23.0	J	ug/l	J	Result between MDL and RL
460-103552-5	ECS-WSTREAM-42+00-SE-20151027	TCLP LEAD	38.5	J	ug/l	J	Result between MDL and RL
460-103552-6	ECS-WSTREAM-42+00-SW-20151027	TCLP LEAD	43.7	J	ug/l	J	Result between MDL and RL
460-103667-1	ECS-WSTREAM-43+50-F-20151028	TCLP LEAD	42.2	J	ug/l	J	Result between MDL and RL
460-103667-3	ECS-WSTREAM-43+50-SN-20151028	TCLP LEAD	31.2	J	ug/l	J	Result between MDL and RL
460-103667-7	ECS-WSTREAM-44+00-SN-20151028	TCLP LEAD	36.1	J	ug/l	J	Result between MDL and RL
460-103860-1	ECS-WSTREAM-42+00-SW-R-20151102	TCLP LEAD	31.2	J	ug/l	J	Result between MDL and RL
460-103967-16	ECS-WSTREAM-46+50-SW-20151103	TCLP LEAD	22.9	J	ug/l	J	Result between MDL and RL
460-103967-6	ECS-WSTREAM-45+00-SW-20151103	TCLP LEAD	3220		ug/l	J	Metals leach-to-total balance greater than theoretical
460-103967-7	ECS-WSTREAM-45+50-F-20151103	TCLP LEAD	28.3	J	ug/l	J	Result between MDL and RL
460-103970-1	ECS-AREA 37-I37-F-20151103	TCLP LEAD	31.8	J	ug/l	J	Result between MDL and RL
460-103970-3	ECS-AREA 37-I37-SE-20151103	TCLP LEAD	1420		ug/l	J	Metals leach-to-total balance greater than theoretical
460-104950-2	ECS-AREA 35-I35-SE-20151119	TCLP LEAD	648		ug/l	J	Metals leach-to-total balance greater than theoretical
460-105921-10	ECS-EFA T PAD GRID 58-F-20151208	TCLP LEAD	30.9	J	ug/l	J	Result between MDL and RL
460-105921-4	ECS-EFA T PAD GRID 47-F-20151208	TCLP LEAD	36.0	J	ug/l	J	Result between MDL and RL
460-105921-5	ECS-EFA T PAD GRID 63-F-20151208	TCLP LEAD	27.8	J	ug/l	J	Result between MDL and RL
460-105921-6	ECS-EFA T PAD GRID 53-F-20151208	TCLP LEAD	45.8	J	ug/l	J	Result between MDL and RL
460-105921-8	ECS-EFA T PAD GRID 54-F-20151208	TCLP LEAD	21.4	J	ug/l	J	Result between MDL and RL
460-105921-9	ECS-EFA T PAD GRID 59-F-20151208	TCLP LEAD	34.2	J	ug/l	J	Result between MDL and RL
TOTAL METALS							

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-101657-1	ECS-AREA29-G26-F-R-20150923	ANTIMONY	4.3 U mg/kg	UJ	Low matrix spike recovery (51%)
460-101657-1	ECS-AREA29-G26-F-R-20150923	CALCIUM	305 J mg/kg	J	Result between MDL and RL
460-101657-1	ECS-AREA29-G26-F-R-20150923	COBALT	6.9 J mg/kg	J	Result between MDL and RL
460-101657-1	ECS-AREA29-G26-F-R-20150923	POTASSIUM	736 J mg/kg	J	Result between MDL and RL
460-102383-4	ECS-AREA 33-H35-F-20151007	ARSENIC	2.6 J mg/kg	J	Result between MDL and RL
460-102383-5	ECS-AREA 33-H36-SS-20151007	POTASSIUM	540 J mg/kg	J	Result between MDL and RL
460-102383-5	ECS-AREA 33-H36-SS-20151007	SODIUM	109 J mg/kg	J	Result between MDL and RL
460-102494-13	ECS-WSTREAM-32+00-F-20151008	ARSENIC	2.2 J mg/kg	J	Result between MDL and RL
460-102494-8	ECS-WSTREAM-31+00-SW-20151008	ARSENIC	2.3 J mg/kg	J	Result between MDL and RL
460-102570-4	ECS-WSTREAM-33+00-F-20151009	ARSENIC	2.4 J mg/kg	J	Result between MDL and RL
460-102570-5	ECS-WSTREAM-33+00-SW-20151009	ARSENIC	2.3 J mg/kg	J	Result between MDL and RL
460-102570-7	ECS-WSTREAM-33+50-F-20151009	ARSENIC	2.2 J mg/kg	J	Result between MDL and RL
460-102570-9	ECS-WSTREAM-33+50-SE-20151009	ARSENIC	2.2 J mg/kg	J	Result between MDL and RL
460-102683-1	ECS-WSTREAM-34+00-SW-20151012	ARSENIC	1.5 J mg/kg	J	Result between MDL and RL
460-102683-10	ECS-WSTREAM-35+50-SW-20151012	ARSENIC	2.7 J mg/kg	J	Result between MDL and RL
460-102683-11	ECS-WSTREAM-35+50-F-20151012	ARSENIC	2.1 J mg/kg	J	Result between MDL and RL
460-102683-12	ECS-WSTREAM-35+50-SE-20151012	ARSENIC	2.5 J mg/kg	J	Result between MDL and RL
460-102683-13	ECS-WSTREAM-36+00-SW-20151012	ARSENIC	2.1 J mg/kg	J	Result between MDL and RL
460-102683-14	ECS-WSTREAM-36+00-F-20151012	ARSENIC	2.0 J mg/kg	J	Result between MDL and RL
460-102683-15	ECS-WSTREAM-36+00-SE-20151012	ARSENIC	2.9 J mg/kg	J	Result between MDL and RL
460-102683-3	ECS-WSTREAM-34+00-SE-20151012	ARSENIC	1.2 J mg/kg	J	Result between MDL and RL
460-102683-4	ECS-WSTREAM-34+50-SW-20151012	ARSENIC	1.6 J mg/kg	J	Result between MDL and RL
460-102683-5	ECS-WSTREAM-34+50-F-20151012	ARSENIC	1.3 J mg/kg	J	Result between MDL and RL
460-102683-6	ECS-WSTREAM-34+50-SE-20151012	ARSENIC	1.3 J mg/kg	J	Result between MDL and RL
460-102683-8	ECS-WSTREAM-35+00-F-20151012	ARSENIC	1.6 J mg/kg	J	Result between MDL and RL
460-102990-1	DS-AREA 29-F26-SN-20151016	COBALT	5.6 J mg/kg	J	Result between MDL and RL
460-102990-1	DS-AREA 29-F26-SN-20151016	POTASSIUM	731 J mg/kg	J	Result between MDL and RL
460-102990-1	DS-AREA 29-F26-SN-20151016	SELENIUM	2.9 J mg/kg	J	Result between MDL and RL
460-102990-3	ECS-WSTREAM-36+50-F-20151016	ANTIMONY	3.9 U mg/kg	UJ	Low matrix spike recovery (62%)
460-102990-3	ECS-WSTREAM-36+50-F-20151016	CALCIUM	2910 mg/kg	L	Low matrix spike recovery (63%)
460-102990-3	ECS-WSTREAM-36+50-F-20151016	POTASSIUM	905 J mg/kg	J	Result between MDL and RL
460-102990-3	ECS-WSTREAM-36+50-F-20151016	SODIUM	82.7 J mg/kg	J	Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-102990-5	ECS-WSTREAM-36+50-SW-20151016	ARSENIC	2.8 J mg/kg	J	Result between MDL and RL
460-103083-1	ECS-WSTREAM-37+00-F-20151019	LEAD	12.1 mg/kg	J	Metals leach-to-total balance greater than theoretical
460-103083-5	ECS-WSTREAM-37+50-F-20151019	ARSENIC	3.3 J mg/kg	J	Result between MDL and RL
460-103083-7	ECS-WSTREAM-37+50-SW-20151019	POTASSIUM	1010 J mg/kg	J	Result between MDL and RL
460-103083-7	ECS-WSTREAM-37+50-SW-20151019	SELENIUM	2.6 J mg/kg	J	Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	BARIUM	41.8 J mg/kg	J	Result between MDL and RL
460-103393-2	ECS-AREA36-H37-F-20151023	LEAD	13.5 mg/kg	J	Poor field duplicate precision (36 RPD), use higher result from field duplicate
460-103393-3	ECS-AREA36-H37-F-X-20151023	LEAD	19.4 mg/kg	J	Poor field duplicate precision (36 RPD), use higher result from field duplicate
460-103393-5	ECS-AREA36-I38-SS-20151023	ARSENIC	3.0 J mg/kg	J	Result between MDL and RL
460-103393-5	ECS-AREA36-I38-SS-20151023	BARIUM	37.6 J mg/kg	J	Result between MDL and RL
460-103393-5	ECS-AREA36-I38-SS-20151023	BERYLLIUM	0.36 J mg/kg	J	Result between MDL and RL
460-103393-5	ECS-AREA36-I38-SS-20151023	CALCIUM	335 J mg/kg	J	Result between MDL and RL
460-103393-5	ECS-AREA36-I38-SS-20151023	COBALT	3.6 J mg/kg	J	Result between MDL and RL
460-103393-5	ECS-AREA36-I38-SS-20151023	NICKEL	8.3 J mg/kg	J	Result between MDL and RL
460-103393-5	ECS-AREA36-I38-SS-20151023	POTASSIUM	294 J mg/kg	J	Result between MDL and RL
460-103533-4	ECS-WSTREAM-40+50-F-20151026	BARIUM	35.3 J mg/kg	J	Result between MDL and RL
460-103533-4	ECS-WSTREAM-40+50-F-20151026	COBALT	8.6 J mg/kg	J	Result between MDL and RL
460-103533-4	ECS-WSTREAM-40+50-F-20151026	POTASSIUM	939 J mg/kg	J	Result between MDL and RL
460-103533-5	ECS-WSTREAM-40+50-SE-20151026	ARSENIC	2.3 J mg/kg	J	Result between MDL and RL
460-103533-6	ECS-WSTREAM-40+50-SW-20151026	ARSENIC	2.0 J mg/kg	J	Result between MDL and RL
460-103533-7	ECS-WSTREAM-41+00-F-20151026	ARSENIC	1.6 J mg/kg	J	Result between MDL and RL
460-103533-9	ECS-WSTREAM-41+00-SE-X-20151026	ARSENIC	1.5 J mg/kg	J	Result between MDL and RL
460-103552-12	ECS-WSTREAM-43+00-SW-20151027	ARSENIC	2.2 J mg/kg	J	Result between MDL and RL
460-103552-13	ECS-AREA35-H35-F-20151027	COBALT	4.8 J mg/kg	J	Result between MDL and RL
460-103552-13	ECS-AREA35-H35-F-20151027	COPPER	4.5 J mg/kg	J	Result between MDL and RL
460-103552-13	ECS-AREA35-H35-F-20151027	POTASSIUM	653 J mg/kg	J	Result between MDL and RL
460-103552-15	ECS-AREA35-H35-SN-20151027	ARSENIC	2.6 J mg/kg	J	Result between MDL and RL
460-103552-4	ECS-WSTREAM-42+00-F-20151027	ARSENIC	1.7 J mg/kg	J	Result between MDL and RL
460-103667-1	ECS-WSTREAM-43+50-F-20151028	ARSENIC	2.7 J mg/kg	J	Result between MDL and RL
460-103667-7	ECS-WSTREAM-44+00-SN-20151028	ARSENIC	2.8 J mg/kg	J	Result between MDL and RL
460-103967-6	ECS-WSTREAM-45+00-SW-20151103	LEAD	15.2 mg/kg	J	Metals leach-to-total balance greater than theoretical
460-103970-1	ECS-AREA 37-I37-F-20151103	ARSENIC	3.5 J mg/kg	J	Result between MDL and RL
460-103970-2	ECS-AREA 37-I37-SS-20151103	ARSENIC	2.9 J mg/kg	J	Result between MDL and RL
460-103970-2	ECS-AREA 37-I37-SS-20151103	COBALT	10.4 J mg/kg	J	Result between MDL and RL
460-103970-2	ECS-AREA 37-I37-SS-20151103	POTASSIUM	809 J mg/kg	J	Result between MDL and RL
460-103970-3	ECS-AREA 37-I37-SE-20151103	ARSENIC	2.8 J mg/kg	J	Result between MDL and RL
460-103970-3	ECS-AREA 37-I37-SE-20151103	LEAD	19.4 mg/kg	J	Metals leach-to-total balance greater than theoretical

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-104045-6	CC-PSL-5c-001-20151104	BARIUM	38.7 J mg/kg	J	Result between MDL and RL
460-104950-2	ECS-AREA 35-I35-SE-20151119	LEAD	9.3 mg/kg	J	Metals leach-to-total balance greater than theoretical
MERCURY					
460-103083-7	ECS-WSTREAM-37+50-SW-20151019	MERCURY	0.018 J mg/kg	J	Result between MDL and RL
460-104045-3	CC-PSL-4c-001-20151104	MERCURY	0.013 J mg/kg	J	Result between MDL and RL
460-104045-6	CC-PSL-5c-001-20151104	MERCURY	0.013 J mg/kg	J	Result between MDL and RL
POLYCHLORINATED BIPHENYLS (PCB)					
460-103314-3	BF-5L-WT-10c-01-20151022	PCB-1248 (AROCLOR 1248)	62 J ug/kg	J	Result between MDL and RL
VOLATILE ORGANIC COMPOUNDS (VOC)					
460-104045-2	CC-PSL-4g-002-20151104	1,2,4-TRIMETHYLBENZENE	0.85 J ug/kg	J	Result between MDL and RL
460-104045-2	CC-PSL-4g-002-20151104	1,3,5-TRIMETHYLBENZENE (MESITYLENE)	0.33 J ug/kg	J	Result between MDL and RL
SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)					
460-103314-3	BF-5L-WT-10c-01-20151022	BENZO(G,H,I) PERYLENE	38 J ug/kg	J	Result between MDL and RL
460-103314-3	BF-5L-WT-10c-01-20151022	BENZO(K) FLUORANTHENE	37 J ug/kg	J	Result between MDL and RL
460-103314-3	BF-5L-WT-10c-01-20151022	CHRYSENE	54 J ug/kg	J	Result between MDL and RL
460-103314-3	BF-5L-WT-10c-01-20151022	CRESOLS, M & P	16 J ug/kg	J	Result between MDL and RL
460-103314-3	BF-5L-WT-10c-01-20151022	FLUORANTHENE	83 J ug/kg	J	Result between MDL and RL
460-103314-3	BF-5L-WT-10c-01-20151022	INDENO(1,2,3-C,D) PYRENE	39 J ug/kg	J	Result between MDL and RL
460-103314-3	BF-5L-WT-10c-01-20151022	NAPHTHALENE	210 J ug/kg	J	Result between MDL and RL
460-103314-3	BF-5L-WT-10c-01-20151022	PENTACHLORO PHENOL	380 U ug/kg	UJ	Calibration drift (%D= -21.3%)
460-103314-3	BF-5L-WT-10c-01-20151022	PHENANTHRENE	46 J ug/kg	J	Result between MDL and RL
460-103314-3	BF-5L-WT-10c-01-20151022	PYRENE	100 J ug/kg	J	Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	2-METHYLPHENOL (O-CRESOL)	370 U ug/kg	UJ	Low average MS/MSD recovery (55.5%)
460-103314-6	BF-5L-GF-8c-01-20151022	ACENAPHTHENE	20 J ug/kg	J	Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	ACENAPHTHYLENE	9.9 J ug/kg	J	Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	BENZO(B) FLUORANTHENE	82 ug/kg	L	Low average MS/MSD recovery (66.5%)
460-103314-6	BF-5L-GF-8c-01-20151022	BENZO(G,H,I) PERYLENE	42 J ug/kg	J	Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	BENZO(K) FLUORANTHENE	28 J ug/kg	J	Low average MS/MSD recovery (61%); Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	CHRYSENE	90 J ug/kg	J	Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	DIBENZOFURAN	15 J ug/kg	J	Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	FLUORANTHENE	190 J ug/kg	J	Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	FLUORENE	29 J ug/kg	J	Low average MS/MSD recovery (62%); Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	HEXACHLORO BENZENE	37 U ug/kg	UJ	Low average MS/MSD recovery (64%)
460-103314-6	BF-5L-GF-8c-01-20151022	NAPHTHALENE	190 J ug/kg	J	Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	PENTACHLORO PHENOL	290 U ug/kg	UJ	Calibration drift (%D= -21.3%); Low average MS/MSD recovery (21.5%)
460-103314-6	BF-5L-GF-8c-01-20151022	PHENANTHRENE	180 J ug/kg	J	Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	PYRENE	150 J ug/kg	J	Result between MDL and RL
460-104045-3	CC-PSL-4c-001-20151104	ACENAPHTHENE	340 U ug/kg	UJ	Low average MS/MSD recovery (51%)

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-104045-3	CC-PSL-4c-001-20151104	ACENAPHTHYLENE	340 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-104045-3	CC-PSL-4c-001-20151104	ANTHRACENE	340 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-104045-3	CC-PSL-4c-001-20151104	DIBENZOFURAN	340 U ug/kg	UJ	Low average MS/MSD recovery (57%)
460-104045-3	CC-PSL-4c-001-20151104	FLUORENE	340 U ug/kg	UJ	Low average MS/MSD recovery (56%)
460-104045-3	CC-PSL-4c-001-20151104	PENTACHLORO PHENOL	280 U ug/kg	R	Extremely low average MS/MSD recovery (18%)
460-104045-3	CC-PSL-4c-001-20151104	PHENANTHRENE	340 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-104045-6	CC-PSL-5c-001-20151104	ACENAPHTHENE	350 U ug/kg	UJ	Low average MS/MSD recovery (51%)
460-104045-6	CC-PSL-5c-001-20151104	ACENAPHTHYLENE	350 U ug/kg	UJ	Low average MS/MSD recovery (59.5%)
460-104045-6	CC-PSL-5c-001-20151104	ANTHRACENE	350 U ug/kg	UJ	Low average MS/MSD recovery (65.5%)
460-104045-6	CC-PSL-5c-001-20151104	DIBENZOFURAN	350 U ug/kg	UJ	Low average MS/MSD recovery (57%)
460-104045-6	CC-PSL-5c-001-20151104	FLUORENE	350 U ug/kg	UJ	Low average MS/MSD recovery (56%)
460-104045-6	CC-PSL-5c-001-20151104	PENTACHLORO PHENOL	280 U ug/kg	R	Extremely low average MS/MSD recovery (18%)
460-104045-6	CC-PSL-5c-001-20151104	PHENANTHRENE	350 U ug/kg	UJ	Low average MS/MSD recovery (65%)
460-108300-1	BF-ORI-WT-2C-01-R1-20160201	BENZO(G,H,I) PERYLENE	160 J ug/kg	J	Result between MDL and RL
460-108300-1	BF-ORI-WT-2C-01-R1-20160201	CHRYSENE	160 J ug/kg	J	Result between MDL and RL
460-108300-1	BF-ORI-WT-2C-01-R1-20160201	DIBENZ(A,H) ANTHRACENE	48 J ug/kg	J	Result between MDL and RL
460-108300-1	BF-ORI-WT-2C-01-R1-20160201	FLUORANTHENE	73 J ug/kg	J	Result between MDL and RL
460-108300-1	BF-ORI-WT-2C-01-R1-20160201	PHENANTHRENE	20 J ug/kg	J	Result between MDL and RL
460-108300-1	BF-ORI-WT-2C-01-R1-20160201	PYRENE	66 J ug/kg	J	Result between MDL and RL
460-108300-2	BF-ORI-WT-2C-01-R2-20160201	BENZO(G,H,I) PERYLENE	120 J ug/kg	J	Result between MDL and RL
460-108300-2	BF-ORI-WT-2C-01-R2-20160201	CHRYSENE	120 J ug/kg	J	Result between MDL and RL
460-108300-2	BF-ORI-WT-2C-01-R2-20160201	FLUORANTHENE	88 J ug/kg	J	Result between MDL and RL
460-108300-2	BF-ORI-WT-2C-01-R2-20160201	PHENANTHRENE	21 J ug/kg	J	Result between MDL and RL
460-108300-2	BF-ORI-WT-2C-01-R2-20160201	PYRENE	56 J ug/kg	J	Result between MDL and RL
CYANIDE					
460-103314-3	BF-5L-WT-10c-01-20151022	CYANIDE	0.12 J mg/kg	J	Extremely low LCS-SRM recovery (19%) - within vendor limits but <50%; Result between MDL and RL
460-103314-6	BF-5L-GF-8c-01-20151022	CYANIDE	0.025 J mg/kg	J	Extremely low LCS-SRM recovery (19%) - within vendor limits but <50%; Result between MDL and RL
460-104045-3	CC-PSL-4c-001-20151104	CYANIDE	0.097 U mg/kg	UJ	Extremely low LCS-SRM recovery (19.6%) - within vendor limits but <50%
460-104045-6	CC-PSL-5c-001-20151104	CYANIDE	0.027 J mg/kg	J	Extremely low LCS-SRM recovery (19.6%) - within vendor limits but <50%; Result between MDL and RL

TABLE 5
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase II-B Remedial Design/ Remedial Action
Backfill and Post-Excavation Confirmation Samples
September 2015 to February 2016

FIELD DUPLICATE RESULTS

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-101657-2	460-101657-3	ECS-AREA27-I28-F-20150923	ARSENIC	9.4 mg/kg	10.6 mg/kg	1.2	5.2	NA	y
460-101657-2	460-101657-3	ECS-AREA27-I28-F-20150923	LEAD	22.4 mg/kg	24.7 mg/kg	NA	3.4	9.8	y
460-101657-2	460-101657-3	ECS-AREA27-I28-F-20150923	TCLP LEAD	35.5 J ug/l	43.7 J ug/l	8.2	100	NA	y
460-102383-1	460-102383-2	ECS-AREA 33-G36-F-20151007	ARSENIC	6.2 mg/kg	4.7 mg/kg	1.5	7	NA	y
460-102383-1	460-102383-2	ECS-AREA 33-G36-F-20151007	LEAD	14.5 mg/kg	13.5 mg/kg	NA	4.6	7.1	y
460-102383-1	460-102383-2	ECS-AREA 33-G36-F-20151007	TCLP LEAD	27.0 J ug/l	58.3 ug/l	31.3	100	NA	y
460-102990-1	460-102990-2	DS-AREA 29-F26-SN-20151016	ARSENIC	24.8 mg/kg	25.3 mg/kg	NA	6.4	2.00	y
460-102990-1	460-102990-2	DS-AREA 29-F26-SN-20151016	LEAD	797 mg/kg	983 mg/kg	NA	4.4	21	y
460-102990-1	460-102990-2	DS-AREA 29-F26-SN-20151016	TCLP LEAD	267 ug/l	62.3 ug/l	204.7	100	NA	NO
460-103083-3	460-103083-4	ECS-WSTREAM-37+00-SW-20151019	ARSENIC	8.6 mg/kg	6.0 mg/kg	2.6	6.2	NA	y
460-103083-3	460-103083-4	ECS-WSTREAM-37+00-SW-20151019	LEAD	12.6 mg/kg	9.4 mg/kg	3.2	4.2	NA	y
460-103083-3	460-103083-4	ECS-WSTREAM-37+00-SW-20151019	TCLP LEAD	32.2 J ug/l	50.0 U ug/l	17.8	100	NA	y
460-103393-2	460-103393-3	ECS-AREA36-H37-F-20151023	ARSENIC	3.9 mg/kg	5.3 mg/kg	1.4	6.2	NA	y
460-103393-2	460-103393-3	ECS-AREA36-H37-F-20151023	LEAD	13.5 mg/kg	19.4 mg/kg	NA	4	36	NO
460-103393-2	460-103393-3	ECS-AREA36-H37-F-20151023	TCLP LEAD	50.0 U ug/l	25.1 J ug/l	24.9	100	NA	y
460-103533-8	460-103533-9	ECS-WSTREAM-41+00-SE-20151026	ARSENIC	3.9 U mg/kg	1.5 J mg/kg	2.4	8	NA	y

Original Sample Lab ID	Field Duplicate Lab ID	Field ID-Date	Analyte	Original Sample Lab Result	Field Duplicate Lab Result	Abs Diff	2xRL	RPD	Pass
460-103533-8	460-103533-9	ECS-WSTREAM-41+00-SE-20151026	LEAD	7.4 mg/kg	12.5 mg/kg	5.1	5.4	NA	y
460-103533-8	460-103533-9	ECS-WSTREAM-41+00-SE-20151026	TCLP LEAD	51.2 ug/l	56.8 ug/l	5.6	100	NA	y
460-103667-5	460-103667-6	ECS-WSTREAM-44+00-SS-20151028	ARSENIC	4.0 mg/kg	4.1 mg/kg	0.1	6.6	NA	y
460-103667-5	460-103667-6	ECS-WSTREAM-44+00-SS-20151028	LEAD	10.2 mg/kg	10.1 mg/kg	0.1	4.4	NA	y
460-103667-5	460-103667-6	ECS-WSTREAM-44+00-SS-20151028	TCLP LEAD	50.0 U ug/l	50.0 U ug/l	0	100	NA	y
460-103967-10	460-103967-11	ECS-WSTREAM-46+00-F-20151103	ARSENIC	6.1 mg/kg	5.6 mg/kg	0.5	7	NA	y
460-103967-10	460-103967-11	ECS-WSTREAM-46+00-F-20151103	LEAD	11.3 mg/kg	11.4 mg/kg	0.1	4.6	NA	y
460-103967-10	460-103967-11	ECS-WSTREAM-46+00-F-20151103	TCLP LEAD	50.0 U ug/l	50.0 U ug/l	0	100	NA	y

Note: The RPD test ($\leq$35%) applies if both results are greater than 5x RL. Otherwise, the absolute difference test ($\leq$ 2x RL) applies.

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting & Refining (Ph 2B ECS/BF Sept15-Feb16)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see below
Reviewer: Taryn Scholz	Date Checked: 1/25/16
Parameters: TCLP Pb, Metals, CrIII/VI, Pesticide, PCB, Herbicide, VOC, SVOC, CN	Methods: 1311/6010C, 6010C/7471B, 7196A, 8081B, 8082A, 8151A, 5035/8260C, 8270D, 9012B

ITEM	YES	NO	N/A	(CRITERIA) COMMENT
Laboratory NELAP/ELAP accredited?	x			#11452 for Edison
Signed Narrative included?	x			certification signature on cover page
No narrative issues noted by lab?		x		See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required); see Comment no. 1
COCs properly executed and seals used?		x		see Comment no. 2
Samples received within 2 days?		x		(DER10 - recommended); see Comment no. 3
Analytical Results				
All requested analyses reported?	x			see Comment no. 4
Field, Laboratory, and Batch ID included?	x			see Comment no. 4A
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported. Note: 108300 in slightly different format than other work orders
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL) see Comment no. 5
RLs acceptable?		x		(ASP Exh C Part III and/or DER-10 App 5) see Comment no. 6
No elevated RLs for NDs?	x			Note: 4x std dilution for total metals in soil, 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D); (5035 used for VOC soils this phase) see Comment no. 7
If analytical cleanup used, method ref included and approved?	x			(ASP Exh D) see Comment no. 8
Sample matrix included?	x			
Soils on dry weight basis?	x*			
Correct and consistent units?	x			Organics in ug/L (TBs) and ug/kg for rest; Inorganics in mg/kg or ug/L (TCLP)
Holding time to analysis not expired?	x**			(P1 WP Table 2, P2A/B WP Table 1/2 or SW846 for those not in table per ASP Exh I, which gives only aq HTs) Hg 28-d, Extr 14/40-d, Cr VI 30/7-d, CN 14-d, VOC 14-d (freeze within 2-d)
Holding time to preparation not expired?	x**			see above
QC Samples (Phase 2B Workplan Section 5.4.7)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory	x			
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)		x		Total samples = 140/150 confirmation (Total/TCLP) + 4 BF comp + 8 BF grab = 166; Total FD = 8 (8/8 conf + 0 comp + 0 grab) -> low for BF grab for to-date P2B
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible		x		MS/LR used for metals (ICP, Hg, Cr VI - %R not reported for calc Cr III); 6/3 field/lab MS/MSD (7 conf for Total As/Pb with 2 conf for TAL and all 9 also TCLP) - with lab MS/MSD still one short for DER Metals, Cr6, and VOC each with no MS/MSD
Completeness criteria met?	x			(P2B WP Section 5.3.3 - 100%) 1189/1191 = 99.8%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-101657-1, 460-102202-1, 460-102319-1, 460-102383-1, 460-102494-1, 460-102570-1, 460-102683-1, 460-102990-1, 460-103083-1, 460-103314-1, 460-103322-1, 460-103391-1, 460-103393-1, 460-103533-1, 460-103552-1, 460-103667-1, 460-103796-1, 460-103860-1, 460-103967-1, 460-103970-1, 460-104045-1, 460-104379-1, 460-104950-1, 460-105921-1, 460-108300-1

*For the 7196A analyses, Cr III is shown as not dry-weight corrected. However, Cr III is calculated from the results for Cr VI and Total Cr, which are dry-weight corrected, and thus the Cr III is not directly dry-weight corrected but is on a dry-weight basis.

** The holding time was calculated using dates only without regard to the time of day since all holding times are greater than 24 hours. Also, note that Cr III is a calculated result and the holding time check does not apply for this analyte.

1. Containers/Preservative:

For work order 460-103314-1, one of the VOA vials for BF-5L-GF-8g-02 was leaking when received by the laboratory. Analysis performed using remaining vials per lab email.

For work orders 460-103322-1, 460-103391-1, 460-103552-1, one of the two containers for one or more of the samples was received broken, and the laboratory salvaged the sample volume into a new container. Analyses performed using remaining uncompromised container and/or for metals only, and thus this is not considered to significantly affect data quality and no further action was taken.

For work order 460-103967-1, the sole container for ECS-WSTREAM-45+00-SW was received broken. The laboratory salvaged the sample volume into a new container with minimal or no sample loss. Analyses performed for metals only, and thus this is not considered to significantly affect data quality and no further action was taken.

2. Custody Record

For work orders 460-101657-1, 460-102990-1, the sampler only recorded the sample date for the first sample on the custody record (i.e, there is no down arrow to extend the date to the remaining samples). The laboratory logged in the samples using the date for the first sample, which corresponds with the date on each container.

For work order 460-102383-1, the sampler did not sign or enter a time upon sample relinquishment. The custody record includes the samplers' names and a date of relinquishment, and the samples were relinquished to a commercial carrier with custody seals intact and received at the laboratory with no evidence of tampering. No further action was taken.

For work orders 460-460-103796-1, 460-103860-1, and 460-104045-1, the sampler entered a date but no time upon sample relinquishment. The samples were relinquished to a commercial carrier with custody seals intact and received at the laboratory with no evidence of tampering, and thus no further action was taken.

For work orders 460-102990-1, 460-103796-1, the laboratory sample receipt checklist indicates that no custody seal was used for transfer of the samples from the field to the laboratory; however, a custody seal was used as confirmed by the seal number entered by the laboratory on the custody record.

For work order 460-103552-1, the custody record indicates a sample time of 16:35 for ECS-AREA35-H36-SS, while the sample labels indicate a sample time of 16:25. The laboratory logged in the sample using the time on the custody record. The sample date (10/27/15) on the custody record matches that on the sample labels and the holding time pass/fail status is not affected, and thus no further action was taken.

3. Sample Receipt - For work order 460-102202-1, the samples were received three days after collection, which is beyond the recommended period of two days. The samples were received in good condition at proper temperature, and were analyzed within the established holding times, and thus no further action was taken.

4. Requested Tests

For work order 460-102990-1, sample number 3 is marked for both Total As/Pb and TAL Metals on the custody record. Arsenic and Lead are included in the TAL list, so no additional analysis was needed or performed.

4A. Batch Numbers - Batch numbers are given along with batch date/times on the analytical data sheets (except for 108300) and QA Association Summary in the pdf report, but only the batch date/times are given in the EDD. The prep dates/times are consistent across all samples and can be used to assign batches for most batches but some have varying times for one batch. All samples with unexpected batch time were checked against the prep batch worksheets to verify correct batch assignment.

5. Analyte List:

P1 WP Table 3, P2A/B WP Table 2/4, and DER10 App5 list m-cresol, o-cresol, and p-cresol separately. The laboratory reported m,p-cresol and o-cresol as it is not possible to separate m-cresol and p-cresol using method 8270D. (P1 WP Table 3, which only lists RLs for the DER-10 metals and not the 23 TAL metals, also mistakenly lists Antimony. This metal does not appear in DER10 Appendix 5 and was not reported by the laboratory for the backfill samples.)

For all BF samples (and the associated QC), the laboratory reported technical Chlordane rather than Chlordane (alpha) as listed in the workplan and DER10 Appendix 5.

For all BF samples (and the associated QC), the laboratory reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of just the DER-10 analytes as requested. Note: These extra analytes are all ND in the samples.

For the LB/BS/BD - the lab reported m,p-Xylene and o-Xylene. For the LB, Xylenes (total) is also reported.

Note: The analyte names in the hardcopy report differ from those in the EDD for some analytes.

6. The MQL (Unadj) for several DER-10 analytes (metals) is above the CRQL, but in each case, it is below the Allowable Constituent Level in DER10 App 5. Additionally, the MQL (Unadj) for the TAL metal Iron is above the CRQL. There are no action levels for this analyte.

7. Update IV methods (6010C, 7471B, 8260C, 8270D) used instead of Update III as in WP. Prep method for 6010C total metals in soils shown as SW3020B in EDD, validator changed all to SW3050B per the pdf report and as confirmed correct by the laboratory.

8. Per laboratory, Florisil cleanup (SW3620C) used for Pesticide analyses and sulfuric acid cleanup (SW3665A) used for PCB analyses (not indicated in package exc on prep log nor in EDD). No cleanup used for SVOC or Herbicides.

NOTES:

For work order 460-102494-1, Form III Instrument Blanks includes a CCB for analysis batch 328555 that contains Lead above the RL at 10.75 ug/L. This blank was analyzed on 10/14/15 at 02:37 and does not apply to any of the samples or QC for the site.

For work orders 460-103391-1 and 460-103393-1, Form 5B (PDS) for prep batch 331486 (sample 460-103391-3) is missing the Spike Added and thus %recovery. The MS for this batch passes and thus a PDS is not required. Additionally, using the standard 2500 ppb Spike Added, the %recovery calculates as
For work order 460-103552-1 , the raw data is missing for TCLP Pb analytical batch 333037 (11/3/15 11:31-22:57). This data is available in 460-103667-1, and thus no further action was taken.
For work order 460-103796-1, the raw data is missing for TCLP Pb analytical batch 333241 from 11/4 19:09-19:54. This time range only includes the TCLP Pb 332779 and subsequent CCV/CCB/CCVL. The LB is non-detect, which means no data was qualified based on this LB, and thus no further action was taken.
For work order 460-103967-1, the lab report includes results for the QC samples (LB, BS, MS, MD, SD, and PDS) run under analysis batch 333465 (11/5/15) and also under analysis batch 335675 (11/16/15). The 11/16 PDS results appear to be in error for the Spike Amount, Result and thus %Recovery. All of the associated site samples were analyzed in batch 333465 on 11/5/15, and thus no further action was taken. *Note: this report required revision and the original report/EDD only included batch 333465. Since batch 335675 does not apply to the site samples, the EDD was not updated*

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	TCLP Metals	All samples (not noted for all)	Required 5x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
		Total Metals	All samples	Required 4x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
EN586	460-101657-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	324963/1	MS %R low for Sb and Mn, high for Al and Fe; 4-qualifier indicates unspiked conc >4x spike	see QC Deficiencies
		Total Metals	324963/4	MS %R low for Pb; 4-qualifier indicates unspiked conc >4x spike	see QC Deficiencies
		Mercury	NA	nothing noted	NA
EN587	460-102202-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN588	460-102319-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN589	460-102383-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	328019/102421-10	MS %R low for Sb, high for Al and Fe; 4-qualifier indicates unspiked conc >4x spike	none required (MS is non-project)
		Total Metals	328019/102421-10	MD RPD hi for Se	none required (MD is non-project)
		Total Metals	5	sample required 10x dilution prior to analysis	none required (only detects reported from dilution)
		Mercury	NA	nothing noted	NA
EN590	460-102494-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN591	460-102570-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		%Moisture	NA/102560-13	MD RPD hi for %M	none required (MD is non-project)
EN592	460-102683-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN593	460-102990-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	329645/102902-2	MS %R low for Sb,Ca,Mn and high for Al and Fe; 4-qualifier indicates unspiked conc >4x spike	none required (MS is non-project)
		Total Metals	329645/3	MS %R low for Sb,Ca,Fe,Mn and high for Al; 4-qualifier indicates unspiked conc >4x spike	see QC Deficiencies
		Total Metals	4	sample required 10x dilution prior to analysis	none required (only detects reported from dilution)
		Mercury	NA	nothing noted	NA
		%Moisture	329864/102996-24	MD RPD hi for %M	none required (MD is non-project)
EN594	460-103083-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
EN595	460-103314-1	VOC	NA	nothing noted	NA
		SVOC	331907	CCV %R out for PCP; CCVLL in control, samples analyzed per method, detects should be considered estimated	see QC Deficiencies (CCVLL not reported)
		SVOC	331926/6	MS %R low for Bz(k)F, Fluorene, PCP and MSD %R low for several TAs; 4-qualifier indicates unspiked conc >4x spike (none)	see QC Deficiencies
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
		Herb	331517	CCV %R high for Silvex on secondary column; samples ND, data reported	see QC Deficiencies
		Total Metals	331827/103351-1	MS/D %R high for Mn	none required (MS/D is non-project)
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	NA	nothing noted	NA
EN596	460-103322-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN597	460-103391-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN598	460-103393-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	331331/103167-22	MS %R low for Sb,Cd,Fe,Mn and high for Al; 4-qualifier indicates unspiked conc >4x spike	none required (MS is non-project)
		Mercury	NA	nothing noted	NA
EN599	460-103533-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	332064/1	MS %R high for Pb; 4-qualifier indicates unspiked conc >4x spike	see QC Deficiencies
		Mercury	NA	nothing noted	NA
EN600	460-103552-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	332064/103573-12	MS %R low for Sb and high for Al and Fe; 4-qualifier indicates unspiked conc >4x spike	none required (MS is non-project)
		Total Metals	NA/2	MD RPD high for As	see QC Deficiencies
		Mercury	NA	nothing noted	NA
EN601	460-103667-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN602	460-103796-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN603	460-103860-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA/103679-10	MD RPD high for Pb	none required (MD is non-project)
EN604	460-103967-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN605	460-103970-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	333703/103862-1	MS %R low for Sb,Mn and high for Al,Ca,Fe,Mg; 4-qualifier indicates unspiked conc >4x spike	none required (MS is non-project)
		Total Metals	333703/103862-1	MD RPD high for Ca,Co,Mg,Mn	none required (MD is non-project)
		Mercury	NA	nothing noted	NA
EN606	460-104045-1	VOC	NA	nothing noted	NA
		SVOC	335113	CCV %R out for Indeno[1,2,3-cd]pyrene; CCVLL in control, samples analyzed per method, detects should be considered estimated	see QC Deficiencies (CCVLL not reported)
		SVOC	335113/3	MS/D %R low for several TAs	see QC Deficiencies
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	NA	nothing noted	NA
		Total Metals	335494/104117-7	MS %R high for Mn	none required (MS is non-project)
		Mercury	NA	nothing noted	NA

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
		Cr3/6	NA	nothing noted	NA
		CN	NA	nothing noted	NA
EN607	460-104379-1	TCLP Metals	335269/104252-1	MS %R low for Pb; 4-qualifier indicates unspiked conc >4x spike	none required (MS is non-project)
		Total Metals	NA	nothing noted	NA
EN608	460-104950-1	TCLP Metals	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
EN609	460-105921-1	TCLP Metals	NA	nothing noted	NA
EN610	460-108300-1	SVOC	349064/LCS	2,4,6-TBP SU %R high; SOP allows one acid and one BN out so n	none required (SU >10% (hi), sample
				RE, data flagged and reported	results not significantly affected)
		SVOC	350561/108414-2	2,4,6-TBP and 2-FP SU %R low for MS/D	none required (MS/D is non-project)
		SVOC	350561/108414-2	MS/D %R low for several TAs	none required (MS/D is non-project)
		SVOC	350561/108414-2	MSD out for phenol	none required (MS/D is non-project)

Data Validation Checklist: Metals (Update IV)/Wet Chem

Client Name: Entact		Project Number/ Manager: E7976H/ Jenny Self			
Site Name: Revere Smelting & Refining (Ph 2B ECS/BF Sept15-Feb16)		QC Level: IV			
Laboratory: TestAmerica (Edison)		Laboratory Job No: see DURC			
Reviewer: Taryn Scholz		Date Checked: 1/25/16			
Parameters: TCLP Pb, Metals, CrIII/VI, CN		Methods: 1311/3010A/6010C, 3050B/6010C, 7471B, 3060A/7196A, 9012B			
%PERFORMED/	**ITEM**	**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package? *	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package? *	x			
	All project COCs or TAs included? *	x			
100	%R criteria met?		x		method (lab** but within 50-200%) see QC Def
	Matrix spike data included in lab package? *	x			
100	%R criteria met?		x		method (lab*** but within 50-200%) see QC
	Sample duplicate data included in lab package? *	x			as LR
100	RPD criteria met?		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL) see QC Deficiencies
100	Field dup RPD criteria met? (individual, mean, and overall)		x		ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL) see QC Deficiencies
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	correl coeff criteria met? (r > 0.998 ICP, r > 0.995 AA/Hg)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP/Cr 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP/Cr 90-110,Hg 80-120,CN 85-115)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)	x			
100	Post digestion spike included?	x			
100	%R criteria met?	x			method (80-120%)****
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	*Intensities within limits (within ≥ 70% of calib std)?*			x	
10	Analyte quantitation/RLs correct?	x			
10	All target analytes included in ICAL?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

* No QC reported for Chromium III, which is calculated from the Total Chromium and Chromium VI result.

**For SRMs (solid LCS), the manufacturer's established limits as reported by the lab are used. For aqueous LCS, method limit is 80-120% for metals and 90-110% for CN.

***For MS, the method limits are used for metals (75-125%) and Hg (80-120%) and the manufacturer's established limits are used for CN

****PDS deficiencies not delineated if waived (sample result > 4x spike added)

TOTAL METALS VS LEACHED - all leach results < max possible except three (see QC Deficiencies)

Data Validation Checklist: Leachates

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting & Refining (Ph 2B ECS/BF Sept15-Feb16)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 1/25/16
Parameters: TCLP Pb	Methods: 1311/3010A/6010C

%PERFORMED/ ITEM		YES	NO	N/A	(CRITERIA) COMMENT
	Was a ZHE vessel without leaks used for VOAs?			x	
	Was particle size reduced as necessary? (capable of passing through a 9.5 mm (0.375 inch) standard sieve)			x	
	Were multi-phasic waste samples properly analyzed? (if <0.5% solids->analyze filtered waste, if >0.5%->leach solids, combine with filtered liquid if compatible or analyze separately			x	
	Was the correct extraction fluid used? (TCLP - #1 for VOA and if pH<5 before or after add 3.5 mL 1N HCl, #2 if pH>5; SPLP - #1 for soils E of Mississippi, #2 if west, #1 for wastes, #3 for any with CN-)	x			No. 1 for all
	Was the pH of the fluid correct? (TCLP #1 4.88-4.98, #2 2.83-2.93; SPLP #1 4.15-4.25, #2 4.95-5.05, #3 reagent water)	x			pH of fluid not reported until EN568 but initial pH of LB within range
	Appropriate sample weight? (VOA < 25-g, rest about 100-g)	x			
	Was the correct weight of fluid used? (20x solid weight)	x			
100	Leaching conditions correct? (30±2 rpm, 18±2 hrs, 23±2 C)	x			
	No preservation for aqueous sample aliquots?			x	
	Proper preservation for leachates?	x			(method pH <2)
100	Holding time to leaching not expired?	x			(method 180-days)
	Leach blank data included in Lab Package? (1/20)	x			
100	Criteria met? (< MDL)	x			

COMMENTS

Data Validation Checklist: GC (Update IV)

Client Name: Entact			Project Number/ Manager: E7976H/ Jenny Self			
Site Name: Revere Smelting & Refining (Ph 2B ECS/BF Sept15-Feb16)			QC Level: IV			
Laboratory: TestAmerica (Edison)			Laboratory Job No: see DURC			
Reviewer: Taryn Scholz			Date Checked: 1/25/16			
Parameters: Pesticide, PCB, Herbicide			Methods: 3546/8081B, 3546/8082A, 8151A			
%PERFORMED/	**ITEM**		**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)		x			
100	Criteria met for field blanks? (<MDL)				x	
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			With the exception of multi-component pesticides Chlordane (technical) and Toxaphene; only two multi-component Aroclors (1016 and 1260) spiked per method recommendations
	%R criteria met?		x			method (lab but within 50-200%)
100	RPD criteria met?				x	
	Matrix spike data included in lab package?		x			
	%R criteria met?		x			method (lab but within 50-200%)
100	RPD criteria met?		x			method (lab but within 40%)
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?		x			method (lab but within 10-200%)
100	Field dup RPD criteria met? (individual, mean, and overall)		x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Initial calibration documentation included in lab package?		x			5 peaks used for all multi-comp Pest/PCB
100	%RSD criteria met? (≤20%RSD or r ≥ 0.995 or COD ≥ 0.990)		x			
100	DDT/Endrin %breakdown max 15%?		x			
	Calibration verification data included in lab package?		x			only beg CCV (no end) for 8082/8081 (104045) since IS used
100	%D criteria met? (<20%,<15% for 8151)			x		see QC Deficiencies
100	Internal standard data included in lab package?		x			used for 8082A both work orders and 8081B for 104045
100	Areas within limits (within -50/+100% of last calib check)?		x			for samples
100	RTs within limits (+/-0.07 min from last calib check)?		x			for samples
100	Dual column/detector confirmation data incl in lab package?		x			
100	%Difference criteria met? (<40%)		x			
10	Analyte qualitative ID criteria met?		x			see Comment no. 1
10	Analyte quantitation/RLs correct?		x			
10	All target analytes included in ICAL at min 5 levels w low< RL?			x		see Comment no. 2
10	IS Areas within limits (within -50/+100% of ICAL midlevel)?		x			for CCVs
10	IS RTs within limits (+/-0.05(Pest)-0.07(PCB) min from ICAL midlevel)?		x			for CCVs
10	QC parameters calculated correctly?		x			
	Surrogate	Control Limits				
PEST/	Decachlorobiphenyl	55-148/47-150				bold updated from P2B 2013, red updated from P2P Jul-Sept15
PCB	Tetrachloro-m-xylene	55-139				bold updated from P2B 2013, red updated from P2P Jul-Sept15
HERB	2,4-DCPA	83-150				bold updated from P2B 2013, red updated from P2P Jul-Sept15

COMMENTS

The validator did not delineate cases where the surrogate has a %D outside the criteria since surrogate recoveries for each analysis are evaluated separately

1. Chromatogram shows potential PCB near MDL for sample 103314-3. Lab confirmation of ND requested 2/16 and revised report with Aroclor-1248 J-value submitted on 3/2/16. Validator examined the chromatograms for all other BF samples analyzed for PCB this event, and found no suspect peaks.
2. For Silvex, the lowest ICAL level corresponds to 33 ug/kg while the RL is 17 ug/kg. All samples are ND to the MDL so no further action

Data Validation Checklist: GC/MS (Update IV)

Client Name: Entact	Project Number/ Manager: E7976H/ Jenny Self
Site Name: Revere Smelting & Refining (Ph 2B ECS/BF Sept15-Feb16)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 1/25/16
Parameters: VOC, SVOC	Methods: 5035/8260C, 3546/8270D

	%PERFORMED/ ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (<MDL)	x			
100	Criteria met for field blanks? (<MDL	x			
	QC check samples/LCS data included in lab package?	x			
	All project COIs or TAs included?	x			
100	%R criteria met?	x			method (lab but within 50-200%)
100	RPD criteria met?	x			method (lab but within 40%)
	Matrix spike data included in lab package?	x			
100	%R criteria met?		x		method (lab but within 50-200%) see QC Deficiencies
100	RPD criteria met?	x			method (lab but within 40%)
	Surrogate data included in lab package?	x			
	Required surrogates included?	x			
100	%R criteria met?	x			method (lab but within 10-200% extr, 20-200% purg)
100	Field dup RPD criteria met? (individual, mean, and overall)	x			20% aq, 35% solid (+/-2RL aq, +/-3RL sol if either≤5RL)
	Instrument Tune (12-hr) for GC/MS included in lab package?	x			
100	Instrument Tune method criteria met?	x			
	Initial calibration documentation included in lab package?	x			
	RRF met (Table 4)? Reject for RRF<Table 4 or min (0.01) from NFG 2014	x			
100	%RSD criteria met? (≤20%RSD or r ≥ 0.995 or COD ≥ 0.990)	x			
	Calibration verification data included in lab package	x			
	RRF met (Table 4)? Reject for RRF<Table 4 or min (0.01) from NFG 2014	x			
100	%D criteria met for CCC/TAs? (20% max)		x		see QC Deficiencies
100	Internal standard data included in lab package?	x			
100	Areas within limits (within -50/+100% of last calib check)?	x			for samples
100	RTs within limits (<10/30(8270) s diff from last calib check)?	x			for samples
10	Analyte qualitative ID criteria met?	x			
10	Analyte quantitation/RLs correct?	x			
10	All target analytes included in ICAL at min 5 levels w low≤ RL?	x			
10	IS Areas within limits (within -50/+100% of ICAL midlevel)?	x			for CCVs
10	IS RTs within limits (<10/30(8270) s diff from ICAL midlevel)?	x			for CCVs
10	QC parameters calculated correctly?				
	Surrogate / **Control Limits**				
VOC	1,2-Dichloroethane-d4 / 70-130 (Sep15 78-135)				
	Toluene-d8 / 70-130 (Sep15 73-121)				
	Bromofluorobenzene / 70-130 (Sep15 67-126)				
	Dibromofluoromethane / 70-130 (Sep15 61-149)				
SVOC	2,4,6-Tribromopheno / **19-114 (Oct14 10-120, Sep15 10-95)**				Bold updated from P2B 2013 (10-120 TALNASH)
	Terphenyl-d14 / **41-145 (Oct14 16-151, Sep15 16-114)**				(13-120 TALNASH)
	2-Fluorobipheny / **49-112 (Oct14 40-109, Sep15 27-84)**				(29-120 TALNASH)
	Nitrobenzene-d5 / **40-106 (Oct14 38-105, Sep15 28-92)**				(27-120 TALNASH)
	2-Fluoropheno / **39-103 (Oct14 37-125, Sep15 21-84)**				(10-120 TALNASH)
	Phenol-d5 / **44-104 (Oct14 41-118, Sep15 22-88)**				(10-120 TALNASH)

COMMENTS

DATA USABILITY SUMMARY REPORT

REVERE SMELTING & REFINING SITE
OPERABLE UNIT 1
MIDDLETOWN, NEW YORK

Phase III Remedial Design/ Remedial Action
Backfill and Cover Material Samples

May 2016 to June 2016

Prepared by:

Quality Assurance Associates (*QAALLC*)
1007 Francis Drive
College Station, TX 77840
www.qaallc.com
979-694-7199

October 21, 2016

TABLE OF CONTENTS

1.0 PROJECT OVERVIEW AND SUMMARY 1

2.0 PROCEDURES 4

3.0 DATA VALIDATION RESULTS 6

3.1 PRECISION 6
3.1.1 Laboratory Control Spike Duplicate (LCSD) Precision 6
3.1.2 Matrix Duplicate (MD) and Matrix Spike Duplicate (MSD) Precision 6
3.1.3 Field Duplicate (FD) Precision 6
3.2 ACCURACY 6
3.2.1 Laboratory Control Spike (LCS) Accuracy 7
3.2.2 Matrix Spike (MS) Accuracy 7
3.2.3 Serial Dilution (SD) %Difference 7
3.2.4 Surrogate (SU) Recovery 7
3.3 REPRESENTATIVENESS 7
3.3.1 Chain-of-Custody and Analysis Requests 8
3.3.2 Sample Preservation and Holding Time 8
3.3.3 Laboratory and Method Selection 8
3.3.4 Blanks (Laboratory and Field) 9
3.3.5 Theoretical Result Values 9
3.3.6 Analytical Procedures 9
3.4 COMPLETENESS 10
3.4.1 Laboratory Deliverables Completeness 10
3.4.2 EDD Correctness 11
3.4.3 Analytical Completeness 12
3.5 COMPARABILITY 12

LIST OF TABLES

Table 1 – Sample Summary
Table 2 – Data Validation Qualifiers (DVQs)
Table 3 – QC Deficiencies and Data Qualification Actions
Table 4 – Qualified Results for Field Samples

ATTACHMENTS

Attachment A – Validator's Checklists

1.0 PROJECT OVERVIEW AND SUMMARY

Quality Assurance Associates (QAA) completed a third party QA/QC data validation of chemical analysis data from the Revere Smelting & Refining Site Operable Unit 1 in Middletown, New York. The independent data review was completed in accord with the *Phase III Remedial Design/ Remedial Action Workplan* (March 2016), hereinafter called the Workplan, using New York State Department of Environmental Conservation (NYSDEC) Category B laboratory data deliverables. The data include 43 investigative soil samples plus the associated field QC samples, which were collected by ENTACT in May 2016 through June 2016 with the intended use of confirming that backfill and cover materials are suitable for use on-site. A complete listing of the samples collected and tests performed is shown in Table 1. QAA performed a full validation of the data and prepared this Data Usability Summary Report (DUSR) per the requirements of Appendix 2B of NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) as specified in Section 5.9 of the Workplan. The validation procedures are derived from the U.S. EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (August 2014) and *National Functional Guidelines for Superfund Organic Methods Data Review* (August 2014), hereinafter called the NFG, with adaptations to reflect requirements for the analytical methodology used by the laboratory (SW-846) and the objectives of the Workplan.

PARCC EVALUATION

Section 5.3 of the Workplan presents data quality usability objectives in terms of precision, accuracy, representativeness, completeness, and comparability.

1. Precision (P) is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, without assumption of any prior information as to the true result. Precision is measured through the analysis of replicate or duplicate samples and calculation of the relative percent difference (RPD) between the results. The Workplan stipulates that the precision control limits will be dictated by the analytical method. The validator assessed precision using the laboratory duplicates, and the limits are 30-35 RPD depending upon the test. The laboratory prepared a laboratory control spike duplicate (LCSD) using reagent water or sand for each VOC analytical batch plus at least one matrix spike duplicate (MSD) using a sample from the site for each test except Metals, Chromium VI, VOC and SVOC. All LCSD RPDs are within the limits, which indicates good precision for the analytical technique on a sample free of matrix effects. The MSD RPDs are also within the limits, which indicates good precision for the analytical technique on the given sample matrix.

2. Accuracy (A) is the degree of agreement of a measurement with an accepted reference or true value. Accuracy is measured through the analysis of reference samples or the introduction of reference materials (spikes) to field samples and calculation of the percent recovery of the known value. The Workplan stipulates that the accuracy control limits will be dictated by the analytical method. The validator assessed accuracy using the laboratory spikes and matrix spikes, and the limits are the laboratory/manufacturer's established control limit for soils/solid reference materials (which range from 3.5%-150% for this data set). In order to better assess data usability, limits of 50-200% were employed where the method limits for a spiked analyte falls outside these values. The laboratory prepared a laboratory control spike (LCS) using reagent water or sand with each analytical batch and reported the recovery for all spiked compounds, which included every target compound except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result). The laboratory also prepared a laboratory control spike duplicate (LCSD) with each VOC analytical batch. The LCS/LCSD recoveries are within the limits, which indicates good accuracy for the analytical technique on a sample free of matrix effects, with three exceptions for Cyanide. (In each case the recoveries are within the laboratory limits, and thus laboratory corrective action was not required.) As a result, 13 Cyanide results (of the 1,757 total results for field samples for this data set) are qualified as estimated with an unknown or low bias due to laboratory spike recovery. Additionally, the laboratory prepared two matrix spike/matrix

spike duplicate samples (MS/MSD) for PEST and PCB, three MS/MSD for HERB, and one MS/MSD for Cyanide using a sample from the site. All MS/MSD recoveries are within the laboratory limits, which indicates good accuracy for the analytical technique on the given sample matrix. Additionally, the laboratory utilized one or more surrogate spikes for each organic analysis. The surrogate recoveries are within the laboratory limits for all field samples, which indicates good accuracy for the analytical technique for each individual sample analysis.

3. Representativeness (R) expresses the degree to which sample data accurately and precisely represent environmental conditions and parameter variations at a sampling location. Representativeness is a qualitative parameter most concerned with the proper design of the sampling program. The Workplan states that the representativeness criterion is best satisfied by assuring that sampling locations are properly selected and a sufficient number of investigative samples are collected. Per ENTACT, investigative samples were collected as required in the approved sampling and analysis plans. (Note that sampling has been an on-going process at the site and all samples may not be reflected in this data set.) Representativeness is also ensured by using the proper analytical procedures. Appropriate analytical methods were employed and the laboratory is properly certified. The validator further assessed representativeness by examining sample preservation and holding times, the laboratory and field QC blanks, and analytical instrument setup (i.e., tuning, calibration, interference correction, etc.) For all samples, preservation and holding times met the method requirements, which indicates the results are not affected by sample degradation. The laboratory prepared and analyzed a method blank with each analytical batch and the sampler collected trip blanks with the VOC samples. The laboratory and field QC blanks show no contamination, which indicates the samples were not affected by laboratory or field procedures. Proper analytical procedures were used and calibration results met the method requirements or the validator qualified the affected samples. Twenty-nine (29) results for Silvex (2,4,5-TP), Carbon Tetrachloride, Benzo(g,h,i)perylene, Dibenz(a,h) anthracene, or Indeno(1,2,3-c,d)pyrene are qualified as estimated with an unknown or high bias due to calibration drift. (Since the %difference was outside the limits for only a small percentage of the total number of target analytes for the given test, laboratory corrective action was not required.) Additionally, one nondetect result for Pentachlorophenol is qualified as estimated due to low instrument sensitivity, as indicated by the relative response factor, near the lower end of the calibration range.

4. Completeness (C) is the amount of valid data obtained from a measurement system compared to the amount that was expected and required to meet the project data goals. Completeness is calculated as the ratio of the number of valid sample results to the total number of samples analyzed within a specific matrix. The Workplan states that the intent of this sampling program is to attempt to achieve a goal of 100% completeness. All analyses produced valid analytical measurements for this data set, and thus the completeness is 100%. (Completeness to-date for all backfill, cover material, and post-excavation confirmation samples for all project phases (i.e., Phase I, Phase II-A, Phase II-B, and Phase III) is 99.8%.) Additionally, the validator verified the completeness and correctness of the laboratory data packages and EDD. All necessary analytical documentation is present in the original submissions or revisions were provided by the laboratory upon request.

5. Comparability (C) is an expression of the confidence with which one data set can be compared to another. The samples were analyzed using standard EPA protocols from SW-846 as required in the Workplan. The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated. Note that results for all field samples are reported in mg/kg with dry-weight correction for total metals and inorganics, and in µg/kg with dry-weight correction for organics.

DATA USABILITY

No results are rejected for this data set. All results for the samples are acceptable for use with the qualifications shown in Table 4, as follows:

- Fifteen (15) nondetected results for Carbon Tetrachloride, Pentachlorophenol, or Silvex (2,4,5-TP) are qualified as estimated (UJ) due to negative calibration drift or low instrument sensitivity near the lower end of the calibration range. These results can be used for determining the absence of the analyte; however, the reporting limit (RL) given for these non-detects is likely biased low. In each case, the RL is well below (more than ten times) the DER-10 Appendix 5 Allowable Constituent Level for Imported Fill or Soil (ACL), and thus there is negligible effect on data quality, except as follows:

Lab ID	Field ID	Test	Analyte	Result	MDL	ACL	Units	DVQ	QC Issue
460-114069-1	BF-ORI-WT-2C-01-R3	SVOC	Pentachlorophenol	360 U	54	800	µg/kg	UJ	ICAL RRF <0.05 advisory level (at 0.0324) for the 4 µg/ml standard (270 µg/kg in dry soil)

  For this sample, the ICAL RRF is below the 0.05 advisory level (at 0.0324) for the 4 µg/ml standard but greater than the 0.05 advisory level (at 0.0593 to 0.1426) for the 10 µg/ml and higher standards. (No standards were analyzed at a concentration between 4 µg/ml and 10 µg/ml.) Thus, instrument sensitivity is demonstrated to be sufficient at and above 10 µg/ml. Taking into account sample weight and %solids, the 10 µg/ml standard concentration corresponds to 880 µg/kg in sample BF-ORI-WT-2C-01-R3, which is above the ACL and thus the low bias may produce inconclusiveness. Other considerations such as sample source and evaluation of results for other samples/analytes may produce conclusive results.

- Thirteen (13) results for Cyanide are qualified as biased low (L) or estimated (J or UJ) due to extremely low (less than 40%) laboratory control spike recovery for the vendor-supplied standard reference material (SRM) LCS, with acceptable recovery for the low level and high level LCS. These results can be used for determining the absence or presence of the analyte; however, the concentration reported for these detects or the reporting limit (RL) given for these non-detects is likely biased low. In each case, the laboratory control spike recovery is greater than 15% and the result (which range from 0.020 mg/kg to 0.17 mg/kg) is well below (more than ten times) the ACL (27 mg/kg) and thus the potential low bias has negligible effect on data quality.

- Fifteen (15) detected results for Benzo(g,h,i)perylene, Dibenz(a,h)anthracene, and Indeno(1,2,3-c,d)pyrene are qualified as biased high (H) or estimated (J) due to positive calibration drift. These results can be used for determining the presence of the analyte; however, the concentration reported for these detects is likely biased high. In each case, the concentration is below the ACL (100,000 µg/kg, 330 µg/kg, and 500 µg/kg, respectively), and thus there is no effect on data quality

- The remaining 65 qualified results are considered estimated (J) solely because the concentration is between the method detection limit (MDL) and reporting limit (RL). In each case, the actual value is not expected to exceed the sample RL.

2.0 PROCEDURES

QAA completed the validation by examining the Category B laboratory data deliverables (which include pdf data packages containing analysis results, QC reports, and raw data such as instrument printouts, extraction logs, and chromatograms) and the EQuIS format electronic data deliverable (EDD). The laboratory data were subjected to a comprehensive, technically oriented review and evaluation by a QAA data validation specialist. QAA examined the data for 100% of the samples to determine if the analyses meet the requirements for:

- Laboratory Deliverables Completeness,
- EDD Correctness,
- Chain-of-Custody and Analysis Requests,
- Sample Preservation and Holding Time,
- Laboratory and Method Selection,
- Instrument Tuning and Initial Calibration,
- Calibration Verification,
- Interference Check Standards (ICS),
- Blanks (Laboratory and Field),
- Laboratory Control Spikes (LCS/LCSD),
- Matrix Spikes (MS/MSD),
- Serial Dilutions (SD),
- Matrix Duplicates (MD),
- Field Duplicates (FD),
- Dual Column Confirmation,
- Surrogates (SU), and
- Internal Standards (IS).

Additionally, the validator examined the raw data for 10% of the sample batches (randomly selected by the validator across the various analysis dates and tests) to verify the raw data confirms the results reported for investigative samples and QC samples.

The validator performed the validation using data validation checklists (Attachment A), which include details of the validation procedures, quality control (QC) check outcomes, and a list of the laboratory narrative comments with details on how each narrative issue affects data quality. The following QC criteria were used for the validation:

- Laboratory Accuracy – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not less than 50% lower limit or greater than 200% upper limit)
- Laboratory Precision – the control limits as specified in the analytical methodology and reported on the laboratory QC forms and in the EDD, which are either specific numerical values or the laboratory-derived recovery control limits based on historical performance (but not greater than 40%)

After completing the examination, the validator applied qualifying flags to any data with a QC deficiency. The qualifiers were applied in accord with the NFG and include the expected direction of bias if apparent from the QC outcome. The validator considered each QC deficiency separately and then, for multiple deficiencies, applied the most severe flag. Data rejection limits of 40% and 30% for inorganics laboratory and matrix spikes, and 30%, 20% and 10% for organics laboratory, matrix

and surrogate spikes were used. The data validation qualifiers (DVQs) are defined in Table 2. Note that the DVQ replaces all qualifiers applied by the laboratory except the U flag for non-detects.

3.0 DATA VALIDATION RESULTS

3.1 PRECISION

QAA evaluated the sampling and analytical precision of the sample results using the relative percent difference (RPD) for the laboratory control spike duplicates (LCSD), unspiked matrix duplicates (MD), matrix spike duplicates (MSD), and field duplicates (FD). LCSD are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the precision of the preparation and analysis technique on a sample free of matrix effects. MD and MSD are prepared by the laboratory using a field sample. They provide an indication of the precision of the preparation and analysis technique on the given sample matrix. FD are prepared by the sampler in the field and provide an indication of the precision of the sampling technique plus the preparation and analysis technique on the given sample matrix.

3.1.1 LABORATORY CONTROL SPIKE DUPLICATE (LCSD) PRECISION

The laboratory analyzed an LCSD and reported RPDs for all target compounds for each VOC batch (maximum 20 samples). All LCSD RPDs are at or below the criteria.

3.1.2 MATRIX DUPLICATE (MD) AND MATRIX SPIKE DUPLICATE (MSD) PRECISION

The laboratory analyzed an MD for every inorganics analytical batch (maximum 20 samples) and an MSD for every organics analytical batch (maximum 20 samples) except VOC batches and reported RPDs for MD and MSD prepared using a sample from the site or another site. MD/MSD prepared with a sample from another site were not evaluated, since they do not reflect data quality for the site. No soil samples were designated by the sampler for MD/MSD for the 43 backfill/cover material samples (29 for VOC and 13-14 for the remaining tests); however, the laboratory selected one or more backfill/cover material samples for batch QC for PEST, PCB, HERB, and Cyanide. The Workplan requirement is one per 20 or fewer samples per sample matrix.

All RPDs for MSD prepared using a sample from the site are at or below the criteria.

3.1.3 FIELD DUPLICATE (FD) PRECISION

No field duplicates were collected for this event. The Workplan requirement is one per 20 or fewer samples per sample matrix. The following shows the breakdown by sample type of the field duplicates for all project phases (i.e., Phase I, Phase II-A, Phase II-B, and Phase III):

TOTAL NUMBER OF SAMPLES

Sample Type	Investigative Samples	Field Duplicate Samples
Confirmation Samples (TCLP Metals)	656	36
Confirmation Samples (Total Metals)	803	41
Backfill/Cover Material Composite Samples (Metals, Cr III/VI, PEST, PCB, HERB, SVOC, Cyanide)	140	9
Backfill/Cover Material Grab Samples (VOC)	314	12

3.2 ACCURACY

QAA evaluated the analytical accuracy of the sample results using the results for the laboratory control spikes (LCS/LCSD), matrix spikes including post digestion spikes (MS/MSD/PDS), serial dilutions (SD), and surrogate (SU) spikes. LCS/LCSD

are prepared using a clean sample matrix (reagent water or sand) and provide an indication of the accuracy of the preparation and analysis technique on a sample free of matrix effects. MS/MSD/PDS are prepared using a field sample and provide an indication of the accuracy of the preparation and analysis technique on the given sample matrix. SD are prepared using a field sample and indicate whether matrix interferences are affecting the accuracy of the preparation and analysis technique for metals results that are substantially above the reporting limit. Surrogates are added to each sample before preparation and analysis and provide an indication of accuracy for each individual sample analysis.

3.2.1 LABORATORY CONTROL SPIKE (LCS) ACCURACY

The laboratory analyzed a LCS and/or LCSD for every analytical batch (maximum 20 samples) as required and reported recoveries for all target compounds except the multi-component pesticides technical Chlordane and Toxaphene, five of the seven multi-component PCB Aroclors, and Chromium III (which is a calculated rather than measured result).

Three LCS recoveries for Cyanide are within the laboratory limits but outside the data qualification criteria and the validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data from the EDD as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

3.2.2 MATRIX SPIKE (MS) ACCURACY

The laboratory analyzed an MS/PDS for every inorganics analytical batch (maximum 20 samples) and an MS/MSD for every organics analytical batch (maximum 20 samples) and reported recoveries for MS/PDS/MSD prepared using a sample from the site or another site. MS/PDS/MSD prepared with a sample from another site were not evaluated, since they do not reflect data quality for the site. No soil samples were designated by the sampler for MS/PDS/MSD for the 43 backfill/cover material samples (29 for VOC and 13-14 for the remaining tests); however, the laboratory selected one or more backfill/cover material samples for batch QC for PEST, PCB, HERB, and Cyanide. The Workplan requirement is one per 20 or fewer samples per sample matrix.

All recoveries for MS/MSD prepared using a sample from the site are within the criteria.

3.2.3 SERIAL DILUTION (SD) %DIFFERENCE

For each metals MS, the laboratory analyzed a SD and reported the %difference for all target compounds detected above 50x the method detection limit (MDL). None of the SD were prepared using a sample from the site, and thus the %differences were not evaluated.

3.2.4 SURROGATE (SU) RECOVERY

The laboratory spiked each organic sample with one or more surrogates before preparation and analysis. All surrogate recoveries for field samples are within the criteria. Additionally, all surrogate recoveries for QC samples are above the data rejection limit and thus no qualification of field samples is deemed necessary.

3.3 REPRESENTATIVENESS

QAA evaluated representativeness of the sample results by examining the custody procedures, calculating holding times, verifying that the laboratory and method selection meet project objectives, examining blanks for evidence of contamination,

comparing sample results to theoretical values, and comparing the actual analytical procedures to those described in the analysis methods.

3.3.1 CHAIN-OF-CUSTODY AND ANALYSIS REQUESTS

The samples were delivered to the laboratory by an overnight, commercial carrier with properly executed chain-of-custody records, which confirms that sample integrity was maintained, except as follows:

- For work order 460-114318-1, the sampler did not enter a date or time upon sample relinquishment. The sampler signed the custody record, and the samples were relinquished to a commercial carrier with custody seals intact and then received at the laboratory with no evidence of tampering on the day after sample collection. No further action was taken.

Additionally, the information on the custody record is complete and correct, and agrees with that reported in the analytical results; and all samples were analyzed for the tests requested on the chain-of-custody and one result was reported for each target analyte, except as follows:

- For the seven composite samples in laboratory work orders 460-113178-1 and 460-113180-1, the laboratory reported an original result (preparation batch 366530 05/04/2016 18:00:00) and re-extracted/re-analyzed result (preparation batch 366555 05/05/2016 19:00:00) for Chromium (VI). The samples were re-extracted/ re-analyzed due to deficiencies for the MS/MSD, which was prepared using a sample from another site and thus does not reflect on data quality for the site samples. The sample results for both sets are all non-detect and the validator did not find any QC deficiencies for either set. In the EDD, the laboratory reported the original set with a reportable_result of Yes and the second set with a reportable_result of No. The validator confirmed this selection and made no changes.

3.3.2 SAMPLE PRESERVATION AND HOLDING TIME

All samples were properly preserved and analyzed within the holding times listed in Table 3 of the Workplan, and/or SW-846, which confirms that sample results are not affected by sample degradation. Note that the holding time was calculated using dates only without regard to the time of day since all holding times are greater than 24-hours. Also, note that Chromium III is a calculated result and the holding time check does not apply for this analyte.

3.3.3 LABORATORY AND METHOD SELECTION

As required per Section 5.4 of the Workplan, the laboratory is accredited under the National Environmental Laboratory Accreditation Program (NELAP) and pursuant to the NYSDOH Environmental Laboratory Accreditation Program (ELAP) (no. 11452).

As required per Section 5.7.1 of the Workplan, analytical methods presented in NYSDEC's Analytical Services Protocol (ASP) and Table 3 of the Workplan were used for the sample analyses. (In some cases, the method update number used by the laboratory may differ from that in the Workplan. For example, method 8260C was used rather than 8260B for the VOCs.)

The target analyte list includes all DER-10 analytes, except as follows:

- DER-10 Appendix 5 lists m-Cresol(s), o-Cresol(s), and p-Cresol(s). The laboratory reported m & p-Cresols and o-Cresol as it is not possible to separate m-Cresol and p-Cresol using method 8270D.

- DER-10 Appendix 5 lists Chlordane (alpha). The laboratory reported technical Chlordane, which is a commercial mixture that contains alpha-Chlordane and gamma-Chlordane along with other related compounds.
- The laboratory reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of the DER-10 analytes as requested on the custody record.

Additionally, the nominal reporting limits (i.e., without dry-weight correction or sample dilution and based on the standard sample weight and final volume) are at or below the levels of concern (i.e., the Allowable Constituent Levels for Imported Fill or Soil (ACLs) from Appendix 5 of the DER-10), except as follows:

Analyte	Commercial or Industrial Use ACL (mg/kg)	Unrestricted Use ACL (mg/kg)	Nominal RL (mg/kg)	MDL (mg/kg)
Selenium	4	3.9	4	1.4
Chromium VI	19	1	2	0.81
Aldrin	0.19	0.005	0.0067	0.00081
4,4'-DDD	14	0.0033	0.0067	0.00088
4,4'-DDE	17	0.0033	0.0067	0.00097
4,4'-DDT	47	0.0033	0.0067	0.00069

For these six analytes, the nominal RL is at or below the Commercial or Industrial Use ACL but above the Unrestricted Use ACL. In each case, the method detection limit (MDL) is below both the Commercial or Industrial Use ACL and the Unrestricted Use ACL. Though non-detects are reported at the sample reporting limit (RL) as requested, the samples were evaluated to the method detection limit (MDL).

None of the backfill/cover material samples required dilution, and thus none have elevated reporting limits except based on actual sample weight and dry-weight correction.

(Note: The laboratory dilutes all total metals samples 2-4x before analysis as standard practice. All Revere samples were diluted 4x and thus nominal reporting limits were determined at this dilution rate.)

3.3.4 BLANKS (LABORATORY AND FIELD)

The laboratory analyzed a preparation/method blank for every analytical batch (maximum 20 samples) and a calibration blank for every 10 metals analyses as required per the analytical methodology. Additionally, a trip blank was included with each shipment of VOC samples, which meets the Workplan requirement of one for every cooler of VOC samples. (Note that the trip blank for work order 460-113180-1 is reported in work order 460-113179-1 since these two sets were shipped together.) Field rinsate blanks were not collected as only dedicated and/or disposable sampling equipment was used. No detects are reported in the laboratory or trip blanks.

3.3.5 THEORETICAL RESULT VALUES

None of the samples were analyzed for two related values (e.g., TCLP and total metals), and thus no theoretical comparisons were made.

3.3.6 ANALYTICAL PROCEDURES

The analytical procedures (instrument tuning and initial calibration, calibration verification, interference check standards, dual column confirmation, and internal standards), met the requirements in the analytical method with a few exceptions for initial

calibration and calibration verification. The validator qualified the associated data per the NFG as detailed in Table 3, which shows the QC data as reported by the laboratory on the QC summary sheets in the data package. Table 4 lists all qualified results for the field samples.

The data set includes 32 analytical batches and the validator randomly selected three batches (HERB batch 370404, SVOC batch 369453, and Cyanide batch 366670) for a detailed raw data review including re-calculation of sample results and QC check parameters. No issues were found with analyte identification or quantitation of sample results or calculation of QC parameters.

The validator made the following observations from the review of the raw data:

- The laboratory used dual column confirmation for all GC analyses (including PEST, PCB, and HERB). For surrogates and spiked analytes, the laboratory reports the results from both columns in the CLP forms section of the pdf report. For target analytes in blanks and field samples (and as the reportable result in the EDD for surrogates and spiked analytes), the laboratory reports the result from the column with the higher concentration (unless chromatographic performance is better on one column and it is therefore used for all analyses), provided that the RPD between the two columns is less than 40%. If the RPD is greater than 40%, the column with the lower concentration is reported with a note in the narrative and the result is reported with a P flag. The RPD did not exceed 40% for any field or QC samples in this data set. (All field samples are non-detect.)
- For all HERB analyses, the lowest ICAL level used by the laboratory corresponds to 33 µg/kg of Silvex (2,4,5-TP) in dry soil while the reporting limit (RL) is 17 µg/kg. Thus, detects between the MDL and 33 µg/kg should be considered estimates. All field samples are non-detect to the MDL so no further action is required.

3.4 COMPLETENESS

QAA evaluated completeness by examining the laboratory data packages and EDD and determining the amount of valid analytical data obtained for the field samples.

3.4.1 LABORATORY DELIVERABLES COMPLETENESS

The Level 4 data packages and EDD contain all necessary information or the laboratory submitted a revision upon request as detailed in the validator's checklists, except as follows:

- For all work orders, the QC Sample Results section in the pdf report does not include the RPDs for the laboratory duplicates for the %solids determination. The validator calculated the RPD using the raw data for each laboratory duplicate prepared using a sample from the site. (RPDs for duplicates prepared using a sample from another site were not evaluated since they do not reflect data quality for the Revere site.) As shown below, the calculated RPDs are within the laboratory criteria (maximum 20 RPD) and thus no further action was taken.

Work Order	Batch	Sample ID	Sample %Solids	Duplicate %Solids	RPD
460-113180-1	366275	CC-PSL-8c-001	99.3	99.3	0
460-114779-1	372396	BF-5L-GF-9c-01	88.6	88.6	0

- For work orders 460-113178-1 and 460-113180-1, Form 2A (Calibration Verifications) in the pdf report for Mercury batch 367324 does not include the results for CCV 460-367324/91 analyzed 5/10/16 19:27. The instrument QC printout in the raw data section shows the %R for this CCV was 100.2%, which is within the 80-120% criteria and thus no further action was taken.
- For work order 460-114069-1, the QC Sample Results section and Form 3 (GC/MS Semi VOA Lab Control Sample Recovery) in the pdf report for SVOC batch 369452 do not include results for LCS 460-369453/2-A analyzed

5/24/16 05:01. The LCS results and recoveries are included in the EDD, and Form 1 (Analysis Data Sheet) and the quantitation report/chromatogram are included in the raw data section of the pdf report. Thus no further action was taken.

- For work order 460-114318-1, there is no secondary column data (DB-608, 2C) or results in the pdf report or EDD for the method blank (MB 460-370404/1-A analyzed 5/29/16 14:29) for HERB batch 370404. The primary column data (DB-5, 1C) and results are reported and show Silvex is non-detect with passing SU recovery, and thus no further action was taken.

3.4.2 EDD CORRECTNESS

The validator examined the EDD to confirm that the cell entries are correct based on the information on the custody records and in the laboratory data packages. (Note that the validator did not verify that the EDD entries conform to the valid values and field formats specified by the NYSDEC, since this is done by the laboratory using the EQuIS software.) The following corrections were made:

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
All	All laboratory QC samples	sampling_technique	The validator changed the entry from null to the default entry (UN) to meet NYSDEC requirements.
All	All composite field samples and MS/MSD samples (*c-0*)	composite_yn	The validator changed the entry from N to Y based on the custody record.
All	All 6010C total metals field samples and laboratory QC samples	prep_method	The validator changed the method reference from SW3020B to SW3050B based on the pdf analytical results and as confirmed by the laboratory.
All	All laboratory QC samples	validation_level	For the target analyte (TRG), surrogate (SUR), and spike compound (SC) records (which have validated_yn set to N), the validator changed the entry from UNKNOWN to blank to meet NYSDEC requirements.
All	All field QC samples	validation_level	For the surrogate (SUR) records (which have validated_yn set to N), the validator changed the entry from UNKNOWN to blank to meet NYSDEC requirements.
460-113178-1	BF-5L-TS-1c-01 BF-5L-TS-1c-02 BF-5L-TS-1g-01 BF-5L-TS-1g-02 BF-5L-TS-1g-03 BF-5L-TS-1g-04 BF-5L-TS-1g-05 BF-5L-TS-1g-06 BF-5L-TS-1g-07	lab_matrix_code	The validator updated the entry from U (Unknown) to SO (Soil Matrix).
460-113178-1 460-114779-1	TB-5/3/16 TB-6/2/16	lab_matrix_code	The validator updated the entry from U (Unknown) to WQ (Water Quality Control Matrix).

Laboratory Work Order(s)	Sample(s)	EDD Field(s)	Action
460-114779-1	BF-5L-GF-9c-01-20160602MS BF-5L-GF-9c-01-20160602SD	reportable_result	For these two QC samples, both results (i.e. from the primary and secondary column) for the 8151 HERB surrogate (2,4-Dichlorophenylacetic Acid) had an entry of No. The validator changed the entry to Yes for the higher result as per laboratory standard procedure.

3.4.3 ANALYTICAL COMPLETENESS

The validator did not reject any of the 1,757 total results for field samples for this event, and thus the completeness is 100%.

3.5 COMPARABILITY

Samples were analyzed using standard EPA protocols as shown in Table 1. The SW-846 methodologies employed by the laboratory are specified for use in the Workplan and/or presented in the NYSDEC's Analytical Services Protocol (ASP) and provide definitive, quantitative data. The sample results are reported with a method detection limit (MDL) and reporting limit (RL), which is a quantitation limit. A detection limit corresponds to the lowest concentration at which a target analyte can be positively identified but not necessarily accurately measured and is statistically determined by the laboratory. A quantitation limit reflects the lowest concentration at which a target analyte can be both positively identified and accurately measured.

The MDLs and RLs reported by the laboratory are adjusted for sample-specific actions such as dilution or use of a smaller aliquot size and include dry-weight correction for all soil samples as required per Section 5.7.1 of the Workplan. Non-detects are reported as less than the RL on the analysis reports and detects between the MDL and RL are reported with a laboratory J flag. Since these detects are below the calibration range, the validator qualified each as estimated with an unknown bias (J).

Results for the investigative samples are reported in mg/kg with dry-weight correction for total metals and inorganics, and in µg/kg with dry-weight correction for organics. (For the 7196A analyses, Chromium III is shown as not dry-weight corrected. Chromium III is calculated from the results for Chromium VI and total Chromium, which are dry-weight corrected, and thus the Chromium III is not directly dry-weight corrected but is on a dry-weight basis.)

The analytical results were fully reviewed and validated and are classified as Level 4 data. The analytical results are considered comparable to other results similarly generated.

TABLE 1
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase III Remedial Design/ Remedial Action
Backfill and Cover Material Samples
May 2016 to June 2016

SAMPLE SUMMARY

Lab ID	Field ID	Date	Type	Media	Matrix	Total DER10 Metals	Hg	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-113178-1	BF-5L-TS-1g-01-20160503	5/3/2016	INV	BF	Soil							X		
460-113178-2	BF-5L-TS-1g-02-20160503	5/3/2016	INV	BF	Soil							X		
460-113178-3	BF-5L-TS-1g-03-20160503	5/3/2016	INV	BF	Soil							X		
460-113178-4	BF-5L-TS-1g-04-20160503	5/3/2016	INV	BF	Soil							X		
460-113178-5	BF-5L-TS-1g-05-20160503	5/3/2016	INV	BF	Soil							X		
460-113178-6	BF-5L-TS-1g-06-20160503	5/3/2016	INV	BF	Soil							X		
460-113178-7	BF-5L-TS-1g-07-20160503	5/3/2016	INV	BF	Soil							X		
460-113178-8	BF-5L-TS-1c-01-20160503	5/3/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-113178-8MS	BF-5L-TS-1c-01-20160503MS	5/3/2016	MS	BF	Soil				X	X	X			
460-113178-8SD	BF-5L-TS-1c-01-20160503SD	5/3/2016	MSD	BF	Soil				X	X	X			
460-113178-9	BF-5L-TS-1c-02-20160503	5/3/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-113178-10	TB-5/3/16-20160503	5/3/2016	TB	TB	Water							X		
460-113180-1	CC-PSL-6g-001-20160503	5/3/2016	INV	BF	Soil							X		
460-113180-2	CC-PSL-6g-002-20160503	5/3/2016	INV	BF	Soil							X		
460-113180-3	CC-PSL-6c-001-20160503	5/3/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-113180-4	CC-PSL-7g-001-20160503	5/3/2016	INV	BF	Soil							X		
460-113180-5	CC-PSL-7g-002-20160503	5/3/2016	INV	BF	Soil							X		
460-113180-6	CC-PSL-7c-001-20160503	5/3/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-113180-6MS	CC-PSL-7c-001-20160503MS	5/3/2016	MS	BF	Soil									X
460-113180-6SD	CC-PSL-7c-001-20160503SD	5/3/2016	MSD	BF	Soil									X
460-113180-7	CC-PSL-8g-001-20160503	5/3/2016	INV	BF	Soil							X		
460-113180-8	CC-PSL-8g-002-20160503	5/3/2016	INV	BF	Soil							X		
460-113180-9	CC-PSL-8c-001-20160503	5/3/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-113180-10	CC-PSL-9g-001-20160503	5/3/2016	INV	BF	Soil							X		
460-113180-11	CC-PSL-9g-002-20160503	5/3/2016	INV	BF	Soil							X		

Lab ID	Field ID	Date	Type	Media	Matrix	Total DER10 Metals	Hg	Cr III/ VI	PEST	PCB	HERB	VOC	SVOC	CN
460-113180-12	CC-PSL-9c-001-20160503	5/3/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-113180-13	CC-PSL-10g-001-20160503	5/3/2016	INV	BF	Soil							X		
460-113180-14	CC-PSL-10g-002-20160503	5/3/2016	INV	BF	Soil							X		
460-113180-15	CC-PSL-10c-001-20160503	5/3/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-114069-1	BF-ORI-WT-2C-01-R3-20160519	5/19/2016	INV	BF	Soil								X	
460-114318-1	BF-5L-TS-2g-01-20160524	5/24/2016	INV	BF	Soil							X		
460-114318-2	BF-5L-TS-2g-02-20160524	5/24/2016	INV	BF	Soil							X		
460-114318-3	BF-5L-TS-2c-01-20160524	5/24/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-114318-3MS	BF-5L-TS-2c-01-20160524MS	5/24/2016	MS	BF	Soil				X	X	X			
460-114318-3SD	BF-5L-TS-2c-01-20160524SD	5/24/2016	MSD	BF	Soil				X	X	X			
460-114318-4	BF-5L-TS-3g-01-20160524	5/24/2016	INV	BF	Soil							X		
460-114318-5	BF-5L-TS-3g-02-20160524	5/24/2016	INV	BF	Soil							X		
460-114318-6	BF-5L-TS-3c-01-20160524	5/24/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-114318-7	BF-5L-TS-4g-01-20160524	5/24/2016	INV	BF	Soil							X		
460-114318-8	BF-5L-TS-4g-02-20160524	5/24/2016	INV	BF	Soil							X		
460-114318-9	BF-5L-TS-4c-01-20160524	5/24/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-114318-10	BF-5L-TS-5g-01-20160524	5/24/2016	INV	BF	Soil							X		
460-114318-11	BF-5L-TS-5g-02-20160524	5/24/2016	INV	BF	Soil							X		
460-114318-12	BF-5L-TS-5c-01-20160524	5/24/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-114318-13	TB-5/24/16-20160524	5/24/2016	TB	TB	Water							X		
460-114779-1	BF-5L-GF-9g-01-20160602	6/2/2016	INV	BF	Soil							X		
460-114779-2	BF-5L-GF-9g-02-20160602	6/2/2016	INV	BF	Soil							X		
460-114779-3	BF-5L-GF-9c-01-20160602	6/2/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-114779-3MS	BF-5L-GF-9c-01-20160602MS	6/2/2016	MS	BF	Soil						X			
460-114779-3SD	BF-5L-GF-9c-01-20160602SD	6/2/2016	MSD	BF	Soil						X			
460-114779-4	BF-5L-GF-10g-01-20160602	6/2/2016	INV	BF	Soil							X		
460-114779-5	BF-5L-GF-10g-02-20160602	6/2/2016	INV	BF	Soil							X		
460-114779-6	BF-5L-GF-10c-01-20160602	6/2/2016	INV	BF	Soil	X	X	X	X	X	X		X	X
460-114779-7	TB-6/2/16-20160602	6/2/2016	TB	TB	Water							X		

BF - Backfill or Cover Material Sample
INV - Investigative Sample
MS - Matrix Spike Sample
MSD - Matrix Spike Duplicate Sample
TB - Trip Blank

The following analytical methods from EPA SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* were used:

- Total DER10 Metals: 3050B/ 6010C for 12 ICP-AES NYSDEC DER-10 Appendix 5 Metals (Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Nickel, Selenium, Silver, and Zinc) in soil samples
- Hg: 7471B for total Mercury in soil samples
- Cr III/VI: 3060A/7196A for Trivalent Chromium and Hexavalent Chromium in soil samples
- PEST: 3546/ 3620C/ 8081B for 15 NYSDEC DER-10 Appendix 5 pesticides plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene in soil samples
- PCB: 3546/ 3665A/ 8082A for 7 Aroclors in soil samples
- HERB: 8151A for Silvex (2,4,5-TP) in soil samples
- VOC: 5035/8260C for 30 NYSDEC DER-10 Appendix 5 volatile organic compounds (VOCs) in soil samples and 5030B/ 8260C for 30 VOCs in aqueous trip blanks
- SVOC: 3546/ 8270D for 20 NYSDEC DER-10 Appendix 5 semivolatile organic compounds (SVOCs) plus Dibenzofuran and Hexachlorobenzene in soil samples
- CN: 9012B for Cyanide in soil samples

TABLE 2
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase III Remedial Design/ Remedial Action

DATA VALIDATION QUALIFIERS (DVQs)

The DVQ replaces all flags applied by the laboratory except the U-flag for non-detects.

U = Potentially contaminated. The analyte was not detected substantially above the level reported in an associated laboratory blank and/or field QC blank and should be considered not detected at the reporting limit.

UJ = Estimated. The analyte was not detected above the reporting limit; however, the reporting limit is approximate due to exceedance of one or more QC requirements.

J = Estimated. The reported sample concentration is approximate due to exceedance of one or more QC requirements or because the concentration is below the reporting limit. Directional bias cannot be determined

L = Estimated low. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased low.

H = Estimated high. The reported sample concentration is approximate due to exceedance of one or more QC requirements and the result may be biased high.

R = Rejected. The sample result is rejected due to serious QC deficiencies that make it impossible to verify the presence or absence of the analyte.

NOTE: For multiple deficiencies, the reviewer applied the most severe flag. (R>U>J>L/H and R>UJ)

TABLE 3
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase III Remedial Design/ Remedial Action
Backfill and Cover Material Samples
May 2016 to June 2016

QC DEFICIENCIES AND DATA QUALIFICATION ACTIONS

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
			Leach	Prep	Analy	Leach	Prep	Analy									
LABORATORY CONTROL SPIKE (LCS) ACCURACY																	
4603666704A10	4603666704A10	BS		Method	9012		5/6/16 8:00:00 AM	5/6/16 12:27:00 PM	NA	10	Cyanide		3.5	121.4		Extremely low LCS-SRM recovery (18.6%) - within vendor limits but <50%	L/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 98% and 104%. Additionally, the MS and MSD (prepared with sample CC-PSL-7c-001 from the site) pass at 105% and 100%.)
4603711904A10	4603711904A10	BS		Method	9012		6/2/16 9:00:00 AM	6/2/16 2:49:00 PM	NA	10	Cyanide		3.5	121.4		Extremely low LCS-SRM recovery (22.9%) - within vendor limits but <50%	L/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 106% and 100%.)
4603723534A10	4603723534A10	BS		Method	9012		6/8/16 9:00:00 AM	6/8/16 12:37:00 PM	NA	10	Cyanide		3.5	121.4		Extremely low LCS-SRM recovery (22.5%) - within vendor limits but <50%	L/UJ to detects/NDs for samples digested in the same batch (Note: The low and high level LCS pass at 104% and 102%.)
INITIAL CALIBRATION																	
IC 460-369723/3-10	IC 460-369723/3-10	ICAL			8270D			5/24/16 4:42:00 PM	NA	1	Pentachlorophenol					RRF <0.05 advisory level (at 0.0324) for the 4 ug/ml standard (270 µg/kg in dry soil)	J to detects/UJ to NDs for samples quantitated with this ICAL (data not rejected since RRF >0.05 advisory level at 0.0593 for the 10 ug/ml standard (660 µg/kg in dry soil)

Lab ID	Sample Code	Type	Method			Date and Time			GC Col	DF	Analyte	Lab Qual	Spk LCL	Spk UCL	RPD CL	QC Issue	DVQs Applied
CALIBRATION VERIFICATION																	
CCV 460-370610/1	CCV 460-370610/1	CCV			8151A			5/29/16 2:15:00 PM	1C	1	Silvex (2,4,5-TP)	*	-20	+20		Calibration drift secondary column (%D= -22.8%)	L to detects quantitated on this column, UJ to NDs for samples analyzed after and before this CCV (all NDs)
CCVIS 460-366734/2	CCVIS 460-366734/2	CCV			8260C			5/6/16 7:29:00 PM	NA	1	Carbon Tetrachloride	*	-20	+20		Calibration drift (%D= -39.1%)	L to detects, UJ to NDs samples analyzed this shift (all ND)
CCVIS 460-366734/2	CCVIS 460-366734/2	CCV			8260C			5/6/16 7:29:00 PM	NA	1	Vinyl Chloride	*	-20	+20		Calibration drift (%D= +20.3%)	H to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-372544/2	CCVIS 460-372544/2	CCV			8260C			6/9/16 6:50:00 AM	NA	1	Carbon Tetrachloride	*	-20	+20		Calibration drift (%D= +25.1%)	H to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-366775/2	CCVIS 460-366775/2	CCV			8270D			5/7/16 4:52:00 AM	NA	1	Benzo(g,h,i) perylene	*	-20	+20		Calibration drift (%D= +23%)	H to detects only since < +40% for samples analyzed this shift
CCVIS 460-366775/2	CCVIS 4 60-366775/2	CCV			8270D			5/7/16 4:52:00 AM	NA	1	Indeno(1,2,3-c,d)pyrene	*	-20	+20		Calibration drift (%D= +27.7%)	H to detects only since < +40% for samples analyzed this shift
CCVIS 460-369533/2	CCVIS 460-369533/2	CCV			8270D			5/24/16 1:49:00 AM	NA	1	Benzo(g,h,i) perylene	*	-20	+20		Calibration drift (%D= -23.1%)	none (applies for QC samples only)
CCVIS 460-370565/2	CCVIS 460-370565/2	CCV			8270D			5/29/16 3:20:00 AM	NA	1	Benzo(g,h,i) perylene	*	-20	+20		Calibration drift (%D= +31.8%)	H to detects only since < +40% for samples analyzed this shift
CCVIS 460-370565/2	CCVIS 460-370565/2	CCV			8270D			5/29/16 3:20:00 AM	NA	1	Dibenz(a,h) anthracene	*	-20	+20		Calibration drift (%D= +28.7%)	H to detects only since < +40% for samples analyzed this shift
CCVIS 460-370565/2	CCVIS 460-370565/2	CCV			8270D			5/29/16 3:20:00 AM	NA	1	Hexachloro benzene	*	-20	+20		Calibration drift (%D= +33.8%)	H to detects only since < +40% for samples analyzed this shift (none)
CCVIS 460-370565/2	CCVIS 460-370565/2	CCV			8270D			5/29/16 3:20:00 AM	NA	1	Indeno(1,2,3-c,d)pyrene	*	-20	+20		Calibration drift (%D= +36.4%)	H to detects only since < +40% for samples analyzed this shift

CL – Control Limit
DF – Dilution Factor
LCL – Lower Control Limit
UCL – Upper Control Limit

TABLE 4
REVERE SMELTING & REFINING SITE OPERABLE UNIT 1
Phase III Remedial Design/ Remedial Action
Backfill and Cover Material Samples
May 2016 to June 2016

QUALIFIED RESULTS FOR FIELD SAMPLES

Lab ID	Field ID-Date	Analyte	Lab Result			DVQ	QC Issue
TOTAL METALS							
460-113180-6	CC-PSL-7c-001-20160503	Barium	36.6	J	mg/kg	J	Result between MDL and RL
460-114318-3	BF-5L-TS-2c-01-20160524	Selenium	1.2	J	mg/kg	J	Result between MDL and RL
460-114318-6	BF-5L-TS-3c-01-20160524	Selenium	1.5	J	mg/kg	J	Result between MDL and RL
460-114318-9	BF-5L-TS-4c-01-20160524	Selenium	1.7	J	mg/kg	J	Result between MDL and RL
460-114318-9	BF-5L-TS-4c-01-20160524	Silver	0.34	J	mg/kg	J	Result between MDL and RL
460-114318-12	BF-5L-TS-5c-01-20160524	Selenium	1.8	J	mg/kg	J	Result between MDL and RL
HERBICIDES (HERB)							
460-114318-3	BF-5L-TS-2c-01-20160524	Silvex (2,4,5-TP)	21	U	ug/kg	UJ	Calibration drift secondary column (%D= -22.8%)
460-114318-6	BF-5L-TS-3c-01-20160524	Silvex (2,4,5-TP)	21	U	ug/kg	UJ	Calibration drift secondary column (%D= -22.8%)
460-114318-9	BF-5L-TS-4c-01-20160524	Silvex (2,4,5-TP)	21	U	ug/kg	UJ	Calibration drift secondary column (%D= -22.8%)
460-114318-12	BF-5L-TS-5c-01-20160524	Silvex (2,4,5-TP)	21	U	ug/kg	UJ	Calibration drift secondary column (%D= -22.8%)
VOLATILE ORGANIC COMPOUNDS (VOC)							
460-113178-5	BF-5L-TS-1g-05-20160503	Methylene Chloride	0.84	J	ug/kg	J	Result between MDL and RL
460-113180-1	CC-PSL-6g-001-20160503	Carbon Tetrachloride	0.86	U	ug/kg	UJ	Calibration drift (%D= -39.1%)
460-113180-2	CC-PSL-6g-002-20160503	Carbon Tetrachloride	0.87	U	ug/kg	UJ	Calibration drift (%D= -39.1%)
460-113180-4	CC-PSL-7g-001-20160503	Carbon Tetrachloride	0.89	U	ug/kg	UJ	Calibration drift (%D= -39.1%)
460-113180-5	CC-PSL-7g-002-20160503	Carbon Tetrachloride	0.86	U	ug/kg	UJ	Calibration drift (%D= -39.1%)
460-113180-7	CC-PSL-8g-001-20160503	Carbon Tetrachloride	0.86	U	ug/kg	UJ	Calibration drift (%D= -39.1%)
460-113180-7	CC-PSL-8g-001-20160503	Methylene Chloride	0.78	J	ug/kg	J	Result between MDL and RL
460-113180-8	CC-PSL-8g-002-20160503	Carbon Tetrachloride	0.86	U	ug/kg	UJ	Calibration drift (%D= -39.1%)
460-113180-10	CC-PSL-9g-001-20160503	Carbon Tetrachloride	0.82	U	ug/kg	UJ	Calibration drift (%D= -39.1%)
460-113180-11	CC-PSL-9g-002-20160503	Carbon Tetrachloride	0.81	U	ug/kg	UJ	Calibration drift (%D= -39.1%)
460-113180-13	CC-PSL-10g-001-20160503	Carbon Tetrachloride	0.84	U	ug/kg	UJ	Calibration drift (%D= -39.1%)
460-113180-14	CC-PSL-10g-002-20160503	Carbon Tetrachloride	0.87	U	ug/kg	UJ	Calibration drift (%D= -39.1%)
460-113180-14	CC-PSL-10g-002-20160503	Methylene Chloride	0.79	J	ug/kg	J	Result between MDL and RL
460-114318-5	BF-5L-TS-3g-02-20160524	Methylene Chloride	0.60	J	ug/kg	J	Result between MDL and RL
460-114318-8	BF-5L-TS-4g-02-20160524	Methylene Chloride	0.55	J	ug/kg	J	Result between MDL and RL
460-114318-11	BF-5L-TS-5g-02-20160524	Methylene Chloride	0.90	J	ug/kg	J	Result between MDL and RL
460-114779-5	BF-5L-GF-10g-02-20160602	Methylene Chloride	0.52	J	ug/kg	J	Result between MDL and RL
SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)							
460-113178-8	BF-5L-TS-1c-01-20160503	Benzo(g,h,i)perylene	110	J	ug/kg	J	Calibration drift (%D= +23%); Result between MDL and RL
460-113178-8	BF-5L-TS-1c-01-20160503	Chrysene	120	J	ug/kg	J	Result between MDL and RL
460-113178-8	BF-5L-TS-1c-01-20160503	Fluoranthene	150	J	ug/kg	J	Result between MDL and RL
460-113178-8	BF-5L-TS-1c-01-20160503	Indeno(1,2,3-c,d)pyrene	110		ug/kg	H	Calibration drift (%D= +27.7%)

Lab ID	Field ID-Date	Analyte	Lab Result			DVQ	QC Issue
460-113178-8	BF-5L-TS-1c-01-20160503	Naphthalene	13	J	ug/kg	J	Result between MDL and RL
460-113178-8	BF-5L-TS-1c-01-20160503	Phenanthrene	76	J	ug/kg	J	Result between MDL and RL
460-113178-8	BF-5L-TS-1c-01-20160503	Pyrene	190	J	ug/kg	J	Result between MDL and RL
460-113178-9	BF-5L-TS-1c-02-20160503	Acenaphthylene	16	J	ug/kg	J	Result between MDL and RL
460-113178-9	BF-5L-TS-1c-02-20160503	Benzo(g,h,i)perylene	100	J	ug/kg	J	Calibration drift (%D= +23%); Result between MDL and RL
460-113178-9	BF-5L-TS-1c-02-20160503	Chrysene	120	J	ug/kg	J	Result between MDL and RL
460-113178-9	BF-5L-TS-1c-02-20160503	Cresols, M & P	12	J	ug/kg	J	Result between MDL and RL
460-113178-9	BF-5L-TS-1c-02-20160503	Fluoranthene	140	J	ug/kg	J	Result between MDL and RL
460-113178-9	BF-5L-TS-1c-02-20160503	Fluorene	12	J	ug/kg	J	Result between MDL and RL
460-113178-9	BF-5L-TS-1c-02-20160503	Indeno(1,2,3-c,d)pyrene	99		ug/kg	H	Calibration drift (%D= +27.7%)
460-113178-9	BF-5L-TS-1c-02-20160503	Naphthalene	14	J	ug/kg	J	Result between MDL and RL
460-113178-9	BF-5L-TS-1c-02-20160503	Phenanthrene	97	J	ug/kg	J	Result between MDL and RL
460-113178-9	BF-5L-TS-1c-02-20160503	Pyrene	210	J	ug/kg	J	Result between MDL and RL
460-114069-1	BF-ORI-WT-2C-01-R3-20160519	Benzo(g,h,i)perylene	99	J	ug/kg	J	Result between MDL and RL
460-114069-1	BF-ORI-WT-2C-01-R3-20160519	Chrysene	130	J	ug/kg	J	Result between MDL and RL
460-114069-1	BF-ORI-WT-2C-01-R3-20160519	Cresols, M & P	13	J	ug/kg	J	Result between MDL and RL
460-114069-1	BF-ORI-WT-2C-01-R3-20160519	Dibenz(a,h)anthracene	31	J	ug/kg	J	Result between MDL and RL
460-114069-1	BF-ORI-WT-2C-01-R3-20160519	Fluoranthene	97	J	ug/kg	J	Result between MDL and RL
460-114069-1	BF-ORI-WT-2C-01-R3-20160519	Pentachlorophenol	360	U	ug/kg	UJ	ICAL RRF <0.05 advisory level (at 0.0324) for the 4 ug/ml standard (270 µg/kg in soil)
460-114069-1	BF-ORI-WT-2C-01-R3-20160519	Phenanthrene	33	J	ug/kg	J	Result between MDL and RL
460-114069-1	BF-ORI-WT-2C-01-R3-20160519	Pyrene	95	J	ug/kg	J	Result between MDL and RL
460-114318-3	BF-5L-TS-2c-01-20160524	Acenaphthene	25	J	ug/kg	J	Result between MDL and RL
460-114318-3	BF-5L-TS-2c-01-20160524	Acenaphthylene	11	J	ug/kg	J	Result between MDL and RL
460-114318-3	BF-5L-TS-2c-01-20160524	Anthracene	73	J	ug/kg	J	Result between MDL and RL
460-114318-3	BF-5L-TS-2c-01-20160524	Benzo(g,h,i)perylene	290	J	ug/kg	J	Calibration drift (%D= +31.8%); Result between MDL and RL
460-114318-3	BF-5L-TS-2c-01-20160524	Chrysene	280	J	ug/kg	J	Result between MDL and RL
460-114318-3	BF-5L-TS-2c-01-20160524	Dibenz(a,h)anthracene	55		ug/kg	H	Calibration drift (%D= +28.7%)
460-114318-3	BF-5L-TS-2c-01-20160524	Dibenzofuran	21	J	ug/kg	J	Result between MDL and RL
460-114318-3	BF-5L-TS-2c-01-20160524	Fluorene	33	J	ug/kg	J	Result between MDL and RL
460-114318-3	BF-5L-TS-2c-01-20160524	Indeno(1,2,3-c,d)pyrene	300		ug/kg	H	Calibration drift (%D= +36.4%)
460-114318-3	BF-5L-TS-2c-01-20160524	Naphthalene	18	J	ug/kg	J	Result between MDL and RL
460-114318-6	BF-5L-TS-3c-01-20160524	Benzo(g,h,i)perylene	110	J	ug/kg	J	Calibration drift (%D= +31.8%); Result between MDL and RL
460-114318-6	BF-5L-TS-3c-01-20160524	Chrysene	130	J	ug/kg	J	Result between MDL and RL
460-114318-6	BF-5L-TS-3c-01-20160524	Fluoranthene	190	J	ug/kg	J	Result between MDL and RL
460-114318-6	BF-5L-TS-3c-01-20160524	Fluorene	11	J	ug/kg	J	Result between MDL and RL
460-114318-6	BF-5L-TS-3c-01-20160524	Indeno(1,2,3-c,d)pyrene	120		ug/kg	H	Calibration drift (%D= +36.4%)
460-114318-6	BF-5L-TS-3c-01-20160524	Phenanthrene	120	J	ug/kg	J	Result between MDL and RL
460-114318-6	BF-5L-TS-3c-01-20160524	Pyrene	190	J	ug/kg	J	Result between MDL and RL
460-114318-9	BF-5L-TS-4c-01-20160524	Acenaphthylene	11	J	ug/kg	J	Result between MDL and RL
460-114318-9	BF-5L-TS-4c-01-20160524	Benzo(g,h,i)perylene	140	J	ug/kg	J	Calibration drift (%D= +31.8%); Result between MDL and RL
460-114318-9	BF-5L-TS-4c-01-20160524	Chrysene	130	J	ug/kg	J	Result between MDL and RL
460-114318-9	BF-5L-TS-4c-01-20160524	Dibenz(a,h)anthracene	27	J	ug/kg	J	Calibration drift (%D= +28.7%); Result between MDL and RL

Lab ID	Field ID-Date	Analyte	Lab Result			DVQ	QC Issue
460-114318-9	BF-5L-TS-4c-01-20160524	Fluoranthene	160	J	ug/kg	J	Result between MDL and RL
460-114318-9	BF-5L-TS-4c-01-20160524	Indeno(1,2,3-c,d)pyrene	140		ug/kg	H	Calibration drift (%D= +36.4%)
460-114318-9	BF-5L-TS-4c-01-20160524	Phenanthrene	81	J	ug/kg	J	Result between MDL and RL
460-114318-9	BF-5L-TS-4c-01-20160524	Pyrene	200	J	ug/kg	J	Result between MDL and RL
460-114318-12	BF-5L-TS-5c-01-20160524	Benzo(g,h,i)perylene	120	J	ug/kg	J	Calibration drift (%D= +31.8%); Result between MDL and RL
460-114318-12	BF-5L-TS-5c-01-20160524	Chrysene	110	J	ug/kg	J	Result between MDL and RL
460-114318-12	BF-5L-TS-5c-01-20160524	Dibenz(a,h)anthracene	27	J	ug/kg	J	Calibration drift (%D= +28.7%); Result between MDL and RL
460-114318-12	BF-5L-TS-5c-01-20160524	Fluoranthene	150	J	ug/kg	J	Result between MDL and RL
460-114318-12	BF-5L-TS-5c-01-20160524	Indeno(1,2,3-c,d)pyrene	110		ug/kg	H	Calibration drift (%D= +36.4%)
460-114318-12	BF-5L-TS-5c-01-20160524	Phenanthrene	62	J	ug/kg	J	Result between MDL and RL
460-114318-12	BF-5L-TS-5c-01-20160524	Pyrene	160	J	ug/kg	J	Result between MDL and RL
460-114779-3	BF-5L-GF-9c-01-20160602	Naphthalene	13	J	ug/kg	J	Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Acenaphthene	9.6	J	ug/kg	J	Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Benzo(a)pyrene	12	J	ug/kg	J	Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Benzo(b)fluoranthene	14	J	ug/kg	J	Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Chrysene	17	J	ug/kg	J	Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Dibenzofuran	18	J	ug/kg	J	Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Fluoranthene	47	J	ug/kg	J	Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Fluorene	18	J	ug/kg	J	Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Naphthalene	110	J	ug/kg	J	Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Phenanthrene	87	J	ug/kg	J	Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Pyrene	38	J	ug/kg	J	Result between MDL and RL
CYANIDE							
460-113178-8	BF-5L-TS-1c-01-20160503	Cyanide	0.11	J	mg/kg	J	Extremely low LCS-SRM recovery (18.6%) - within vendor limits but <50%; Result between MDL and RL
460-113178-9	BF-5L-TS-1c-02-20160503	Cyanide	0.12		mg/kg	L	Extremely low LCS-SRM recovery (18.6%) - within vendor limits but <50%
460-113180-12	CC-PSL-9c-001-20160503	Cyanide	0.022	J	mg/kg	J	Extremely low LCS-SRM recovery (18.6%) - within vendor limits but <50%; Result between MDL and RL
460-113180-15	CC-PSL-10c-001-20160503	Cyanide	0.10	U	mg/kg	UJ	Extremely low LCS-SRM recovery (18.6%) - within vendor limits but <50%
460-113180-3	CC-PSL-6c-001-20160503	Cyanide	0.10	U	mg/kg	UJ	Extremely low LCS-SRM recovery (18.6%) - within vendor limits but <50%
460-113180-6	CC-PSL-7c-001-20160503	Cyanide	0.020	J	mg/kg	J	Extremely low LCS-SRM recovery (18.6%) - within vendor limits but <50%; Result between MDL and RL
460-113180-9	CC-PSL-8c-001-20160503	Cyanide	0.028	J	mg/kg	J	Extremely low LCS-SRM recovery (18.6%) - within vendor limits but <50%; Result between MDL and RL
460-114318-12	BF-5L-TS-5c-01-20160524	Cyanide	0.13		mg/kg	L	Extremely low LCS-SRM recovery (22.9%) - within vendor limits but <50%

Lab ID	Field ID-Date	Analyte	Lab Result	DVQ	QC Issue
460-114318-3	BF-5L-TS-2c-01-20160524	Cyanide	0.17 mg/kg	L	Extremely low LCS-SRM recovery (22.9%) - within vendor limits but <50%
460-114318-6	BF-5L-TS-3c-01-20160524	Cyanide	0.14 mg/kg	L	Extremely low LCS-SRM recovery (22.9%) - within vendor limits but <50%
460-114318-9	BF-5L-TS-4c-01-20160524	Cyanide	0.12 mg/kg	L	Extremely low LCS-SRM recovery (22.9%) - within vendor limits but <50%
460-114779-3	BF-5L-GF-9c-01-20160602	Cyanide	0.023 J mg/kg	J	Extremely low LCS-SRM recovery (22.5%) - within vendor limits but <50%; Result between MDL and RL
460-114779-6	BF-5L-GF-10c-01-20160602	Cyanide	0.020 J mg/kg	J	Extremely low LCS-SRM recovery (22.5%) - within vendor limits but <50%; Result between MDL and RL

ATTACHMENT A
VALIDATOR'S CHECKLISTS

Data Validation Checklist - General

Client Name: Entact	Project Number/ Manager: E7976M/ Jenny Self
Site Name: Revere Smelting & Refining (P3 BF May-Jun16)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see below
Reviewer: Taryn Scholz	Date Checked: 9/21/16
Parameters: TCLP Pb, Metals, CrIII/VI, Pesticide, PCB, Herbicide, VOC, SVOC, CN	Methods: 1311/6010C, 6010C/7471B, 7196A, 8081B, 8082A, 8151A, 5035/8260C, 8270D, 9012B

ITEM	YES	NO	N/A	(CRITERIA) COMMENT
Laboratory NELAP/ELAP accredited?	x			#11452 for Edison
Signed Narrative included?	x			certification signature on cover page
No narrative issues noted by lab?		x		See Narrative Comments
Chain of Custody (COC)/ Sample Receipt				
Date/time of sample collection included?	x			
Sample temp upon receipt 2-6 C?	x			
Proper containers/preservation?	x			(P1 WP Table 2, P2A/B WP Table 1/2 - all soils, no preserv required)
COCs properly executed and seals used?		x		see Comment no. 1
Samples received within 2 days?	x			(DER10 - recommended)
Analytical Results				
All requested analyses reported?	x			
Field, Laboratory, and Batch ID included?	x			on QA Association Summary
Date of sample collection/receipt included?	x			
Date of sample preparation/analysis included?	x			
NDs at DL or QL and J-values as needed?	x			Hardcopy - NDs at SQL with 'MDL' (SDL) and 'RL' (SQL), J-values reported; EDD - NDs blank with 'method_detection_limit' = 'minimum_detectable_conc' (SDL), 'reporting_detection_limit' = 'quantitation_limit' (SQL), J-values reported. Note: 108300 in slightly different format than other work orders
Target analyte list complete?	x			(P1 WP Table 3, P2A/B WP Table 2/4 and/or DER-10 App 5 plus CLP TAL) see Comment no. 2
RLs acceptable?		x		(ASP Exh C Part III and/or DER-10 App 5) see Comment no. 3
No elevated RLs for NDs?	x			Note: 4x std dilution for total metals in soil, 5x std dilution for TCLP
Prep/Analysis method references included and approved?	x			(P1 WP Table 2, P2A/B WP Table 1/2, and/or ASP Exh D); (5035 used for VOC soils this phase) on QA Assoc, see Comment no. 4
If analytical cleanup used, method ref included and approved?	x			(ASP Exh D) see Comment no. 5
Sample matrix included?	x			
Soils on dry weight basis?	x*			
Correct and consistent units?	x			Organics in ug/L (TBs) and ug/kg for rest; Inorganics in mg/kg
Holding time to analysis not expired?	x**			(P1 WP Table 2, P2A/B WP Table 1/2 or SW846 for those not in table per ASP Exh I, which gives only aq HTs) Hg 28-d, Extr 14/40-d, Cr VI 30/7-d, CN 14-d, VOC 14-d (freeze within 2-d)
Holding time to preparation not expired?	x**			see above
QC Samples (Phase 2B Workplan Section 5.4.7)				
Rinsate Blank - 1 per day of sampling using non-dedicated, non-disposable sampling equipment			NA	only disposable equipment used
Trip Blank - 1 for every cooler of VOC samples submitted to the laboratory	x			Note that the Trip Blank for 113180 is reported in 113179 since these two sets were shipped together
Filter blank - 1 per week of time-integrated air monitoring			NA	
Field duplicate samples - 1 for every 20 or fewer samples per sample matrix (excluding air samples)		x		Low for BF grab for to-date P2B (see right), all others approx 1 per 20
Field MS/MSD - 1 for every 20 or fewer samples per sample matrix from the same batch as the project samples to the extent possible		x		MS/LR used for metals (ICP, Hg, Cr VI - %R not reported for calc Cr III); no field MS/MSD this event - with lab MS/MSD one short for DER Metals, Cr6, VOC, and SVOC each with no MS/MSD
Completeness criteria met?	x			(P2B WP Section 5.3.3 - 100%) 1757/1757 = 100%
Field Notes				
Agree with custody records?			x	not included
Field instruments calibrated daily?			x	
Well conditions constant before sampling?			x	
Samples filtered? If so, give turbid/size			x	

Definitions: AA - Atomic Absorption; CCV - Continuing Calibration Verification; COI - Compound of Interest; %D - Percent Difference, DL - Detection Limit; DUP Duplicate; FDUP - Field Duplicate; ICP - Inductively Coupled Plasma; ICV - Initial Calibration Verification; IDL - Instrument Detection Limit; LCS - Laboratory Control Sample; MDL - Method Detection Limit; MS/MSD - Matrix Spike/Matrix Spike Duplicate; QL - Quantitation Limit; %R - Percent Recovery; RL - Reporting Limit; RPD - Relative Percent Difference; RRF - Relative Response Factor; RT - Retention Time; RSD - Relative Standard Deviation; TA - Target Analyte

COMMENTS

Laboratory Job No: 460-113178-1, 460-113180-1, 460-114069-1, 460-114318-1, 460-114779-1

*For the 7196A analyses, Cr III is shown as not dry-weight corrected. However, Cr III is calculated from the results for Cr VI and Total Cr, which are dry-weight corrected, and thus the Cr III is not directly dry-weight corrected but is on a dry-weight basis.

** The holding time was calculated using dates only without regard to the time of day since all holding times are greater than 24 hours. Also, note that Cr III is a calculated result and the holding time check does not apply for this analyte.

1. Custody Record
For work order 460-114318-1, the sampler did not enter a date or time upon sample relinquishment. The sampler signed the custody record, and the samples were relinquished to a commercial carrier with custody seals intact and then received at the laboratory with no evidence of tampering on the day after sample collection. No further action was taken.
Batch Numbers - Batch numbers are given along with batch date/times on the analytical data sheets (except for 108300) and QA Association Summary in the pdf report, but only the batch date/times are given in the EDD. The prep dates/times are consistent across all samples and can be used to assign batches for most batches but some have varying times for one batch. All samples with unexpected batch time were checked against the prep batch worksheets to verify correct batch assignment. (doesn't apply this event)
2. Analyte List:
P1 WP Table 3, P2A/B WP Table 2/4, and DER10 App5 list m-cresol, o-cresol, and p-cresol separately. The laboratory reported m,p-cresol and o-cresol as it is not possible to separate m-cresol and p-cresol using method 8270D. (P1 WP Table 3, which only lists RLs for the DER-10 metals and not the 23 TAL metals, also mistakenly lists Antimony. This metal does not appear in DER10 Appendix 5 and was not reported by the laboratory for the backfill samples.)
For all BF samples (and the associated QC), the laboratory reported technical Chlordane rather than Chlordane (alpha) as listed in the workplan and DER10 Appendix 5.
For all BF samples (and the associated QC), the laboratory reported TAL Pesticides (DER-10 list plus Endrin aldehyde, Endrin ketone, Heptachlor epoxide, Methoxychlor, and Toxaphene) instead of just the DER-10 analytes as requested. Note: These extra analytes are all ND in the samples.
For the LB/BS/BD - the lab reported m,p-Xylene and o-Xylene. For the LB, Xylenes (total) is also reported.
Note: The analyte names in the hardcopy report differ from those in the EDD for some analytes.
3. The MQL (Unadj) for several DER-10 analytes (metals) is above the CRQL, but in each case, it is below the Allowable Constituent Level in DER10 App 5 for Indus/Commercial. ~~Additionally, the MQL (Unadj) for the TAL metal Iron is above the CRQL. There are no action levels for this analyte~~.
4. Update IV methods (6010C, 7471B, 8260C, 8270D) used instead of Update III as in WP. Prep method for 6010C total metals in soils shown as SW3020B in EDD, validator changed all to SW3050B per the pdf report and as confirmed correct by the laboratory.
5. Per laboratory, Florisil cleanup (SW3620C) used for Pesticide analyses and sulfuric acid cleanup (SW3665A) used for PCB analyses (not indicated in package exc on prep log nor in EDD). No cleanup used for SVOC or Herbicides.
NOTES:
New reporting format used for this event. Second column results for LCS/MS are reported in EDD and CLP forms section of pdf but no longer in front of pdf report.
For all work orders, the QC Sample Results sections in the pdf report do not include the RPDs for the laboratory duplicates for the %Solids determination. The validator calculated the RPD using the raw data for each laboratory duplicate prepared using a sample from the site. (RPDs for duplicates prepared using a sample from another site were not evaluated since they do not reflect data quality for the Revere site.) As shown below, the calculated RPDs are within the laboratory criteria (maximum 20 RPD) and thus no further action was taken.
For work orders 460-113178-1 and 460-113180-1, Form 2A Calibration Verifications in the pdf report for Mercury batch 367324 does not include the results for CCV 460-367324/91 analyzed 5/10/16 19:27. The instrument QC printout in the raw data section shows the %R for this CCV was 100.2%, which is within the 80-120% criteria and thus no further action was taken.
For work order 460-114069-1, the QC Sample Results section and Form 3 GC/MS SEMI VOA LAB CONTROL SAMPLE RECOVERY in the pdf report for SVOC batch 369452 do not include results for LCS 460-369453/2-A analyzed 5/24/16 05:01. The LCS results and recoveries are included in the EDD, and Form 1 and the quantitation report/chromatogram are included in the raw data section of the pdf report. Thus no further action was taken.
For work order 460-114318-1, there is no secondary column data (DB-608, 2C) or results in the pdf report or EDD for the method blank (MB 460-370404/1-A analyzed 5/29/16 14:29) for HERB batch 370404. The primary column data (DB-5, 1C) and results are reported and show Silvex is non-detect with passing SU recovery, and thus no further action was taken.

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
All	All	Total Metals	All samples	Required 4x dilution prior to analysis; RLs adjusted accordingly	noted in QA report narrative
EN631	460-113178-1	VOC	NA	nothing noted	NA
		SVOC	366775	CCV %R out for Indeno(1,2,3-cd)pyrene and Benzo(g,h,i)perylene; samples analyzed per method, detects should be considered estimated	see QC Deficiencies
		SVOC	366682/LCS	2-FBP SU %R high; SOP allows one acid and one BN out so no RE, data flagged and reported	none required (SU >10% (hi), sample results not significantly affected)
		SVOC	366863/112963-10	MS/D %R low for several TAs	none required (MS is non-project)
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		Mercury	367324/113299-16	MS %R high for Hg (with 4 qualifier)	none required (MS is non-project)
		Mercury	367324/113299-16	LR RPD out for Hg	none required (LR is non-project)
		Cr3/6	366530/113155-1	MSS/MSI %R low due to sample matrix; LCSS/LCSI within control	none required (MS is non-project)
		Cr3/6	366569/113155-1	MSS %R out due to sample matrix; LCSS/LCSI within control; Reprep of 366530, both data sets reported	noted in QA report narrative
		CN	NA	nothing noted	NA
EN632	460-113180-1	VOC	366734	CCV %R high for Vinyl chloride and low for Carbon tetrachloride; CCVLL in control; samples analyzed per metho detects should be considered estimated	see QC Deficiencies (CCVLL not reported)
		SVOC	366775	CCV %R out for Indeno(1,2,3-cd)pyrene and Benzo(g,h,i)perylene; samples analyzed per method, detects should be considered estimated	see QC Deficiencies
		SVOC	366682/LCS	2-FBP SU %R high; SOP allows one acid and one BN out so no RE, data flagged and reported	none required (SU >10% (hi), sample results not significantly affected)
		SVOC	366863/112963-10	MS/D %R low for several TAs	none required (MS is non-project)
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		Mercury	367324/113299-16	MS %R high for Hg (with 4 qualifier)	none required (MS is non-project)
		Mercury	367324/113299-16	LR RPD out for Hg	none required (LR is non-project)
		Cr3/6	366530/113155-1	MSS/MSI %R low due to sample matrix; LCSS/LCSI within control	none required (MS is non-project)
		Cr3/6	366569/113155-1	MSS %R out due to sample matrix; LCSS/LCSI within control; Reprep of 366530, both data sets reported	noted in QA report narrative
		CN	NA	nothing noted	NA
EN633	460-114069-1	SVOC	369533	CCV %R out for Benzo(g,h,i)perylene; CCVLL in control; samples analyzed per method, detects should be considered estimated	see QC Deficiencies (CCVLL not reported)

QAA No.	Lab Job No.	Test	Batch/Sample	Issue	Resolution
		SVOC	369533	CCV %R out for 2,4,6-TBP (SU); CCVLL in control; samples analyzed per method, detects should be considered estimated	none required (SU recovery evaluated and passes)
EN634	460-114318-1	VOC	NA	nothing noted	NA
		SVOC	370565	CCV %R out for Indeno(1,2,3-cd)pyrene, Hexachlorobenzene, Benzo(g,h,i)perylene and Dibenz(a,h)anthracene; samples analyzed per method, detects should be considered estimated	see QC Deficiencies
		SVOC	370565	CCV %R out for 2,4,6-TBP (SU); samples analyzed per method, detects should be considered estimated	none required (SU recovery evaluated and passes for all samples)
		SVOC	370391/LCS	2,4,6-TBP SU %R high; SOP allows one acid and one BN out so no RE, data flagged and reported	none required (SU >10% (hi), sample results not significantly affected)
		SVOC	370565/114219-2	MS/D %R low for several TAs	none required (MS is non-project)
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	370610/11	CCV %R low for 2,4-DCPA (SU) on secondary column; samples ND, data reported	none required (SU recovery evaluated and passes)
		Total Metals	113724-25	LR RPD out for Mn	none required (LR is non-project)
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	NA	nothing noted	NA
EN635	460-114779-1	VOC	372544	CCV %R high for Carbon tetrachloride; samples ND, data reported	see QC Deficiencies
		SVOC	372654/LCS	2-FBP SU %R high; SOP allows one acid and one BN out so no RE, data flagged and reported	none required (SU >10% (hi), sample results not significantly affected)
		SVOC	372769/114590-2	MSD RPD out for PCP	none required (MSD is non-project)
		Pest	NA	nothing noted	NA
		PCB	NA	nothing noted	NA
		Herb	NA	nothing noted	NA
		Total Metals	NA	nothing noted	NA
		Mercury	NA	nothing noted	NA
		Cr3/6	NA	nothing noted	NA
		CN	NA	nothing noted	NA

Data Validation Checklist: Metals (Update IV)/Wet Chem

Client Name: Entact		Project Number/ Manager: E7976M/ Jenny Self			
Site Name: Revere Smelting & Refining (P3 BF May-Jun16)		QC Level: IV			
Laboratory: TestAmerica (Edison)		Laboratory Job No: see DURC			
Reviewer: Taryn Scholz		Date Checked: 9/21/16			
Parameters: Metals, CrIII/VI, CN		Methods: 3050B/6010C, 7471B, 3060A/7196A, 9012B			
%PERFORMED/ ITEM		**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package? *	x			
100	Criteria met? (< MDL, ≥ -RL)	x			
100	Criteria met for field blanks? (< MDL)			x	
	QC check samples/LCS data included in lab package? *	x			
	All project COCs or TAs included? *	x			
100	%R criteria met?		x		method (lab** but within 50-200%) see QC Def
	Matrix spike data included in lab package? *	x			eval for CN only, rest on non-project
100	%R criteria met?	x			method (lab*** but within 50-200%)
	Sample duplicate data included in lab package? *	x			as LR for metals, eval for CN only, rest on non-project
100	RPD criteria met?	x			ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
100	Field dup RPD criteria met? (individual, mean, and overall)			x	ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Instrument Tune for ICP-MS included in lab package?			x	
NA	Instrument Tune method criteria met? (±5 RSD, ±0.1 amu)			x	
	Initial calibration documentation included in lab package?	x			
	blank/1 std (ICP), blank/ 5 stds (Hg)	x			
100	correl coeff criteria met? (r > 0.998 ICP, r > 0.995 AA/Hg)	x			
	Calibration verification data included in lab package?	x			
	ICB/CCB criteria met? (<RL, ≥-RL)	x			
	ICV %R criteria met? (ICP/Cr 90-110,Hg 80-120,CN 85-115)	x			
	CCV %R criteria met? (ICP/Cr 90-110,Hg 80-120,CN 85-115)	x			
100	LLCCV %R criteria met? (50-150% Sb/Pb/Tl,70-130%)	x			CL per ASP Exh E
100	Dilution test data included?	x			
100	Results within criteria if >50xMDL? (max 10%, qualify 15%)			x	only non-project
100	Post digestion spike included?	x			
100	%R criteria met?			x	method (80-120%)****, only non-project
100	Interference check sample data included (ICP/MS only)?	x			
100	%R criteria met? (80-120%, unspk <2RL,≥2-RL)	x			2RL per ASP Exh E
NA	Internal standard data included in lab package?			x	
NA	*Intensities within limits (within ≥ 70% of calib std)?*			x	
10	Analyte quantitation/RLs correct?	x			
10	All target analytes included in ICAL?	x			
10	QC parameters calculated correctly?	x			

COMMENTS

* No QC reported for Chromium III, which is calculated from the Total Chromium and Chromium VI result.

**For SRMs (solid LCS), the manufacturer's established limits as reported by the lab are used. For aqueous LCS, method limit is 80-120% for metals and 90-110% for CN.

***For MS, the method limits are used for metals (75-125%) and Hg (80-120%) and the laboratory's established limits are used for CN

****PDS deficiencies not delineated if waived (sample result > 4x spike added)

TOTAL METALS VS LEACHED - NA

Data Validation Checklist: GC (Update IV)

Client Name: Entact	Project Number/ Manager: E7976M/ Jenny Self
Site Name: Revere Smelting & Refining (P3 BF May-Jun16)	QC Level: IV
Laboratory: TestAmerica (Edison)	Laboratory Job No: see DURC
Reviewer: Taryn Scholz	Date Checked: 9/21/16
Parameters: Pesticide, PCB, Herbicide	Methods: 3546/8081B, 3546/8082A, 8151A

%PERFORMED/	ITEM	YES	NO	N/A	(CRITERIA) COMMENT
	Method blank data included in Lab Package?	x			
100	Criteria met? (<MDL)	x			
100	Criteria met for field blanks? (<MDL)			x	
	QC check samples/LCS data included in lab package?	x			
	All project COIs or TAs included?	x			With the exception of multi-component pesticides Chlordane (technical) and Toxaphene; only two multi-component Aroclors (1016 and 1260) spiked per method recommendations
	%R criteria met?	x			method (lab but within 50-200%)
100	RPD criteria met?			x	
	Matrix spike data included in lab package?	x			
	%R criteria met?	x			method (lab but within 50-200%)
100	RPD criteria met?	x			method (lab but within 40%)
	Surrogate data included in lab package?	x			
	Required surrogates included?	x			
100	%R criteria met?	x			method (lab but within 10-200%)
100	Field dup RPD criteria met? (individual, mean, and overall)			x	ASP for lab dup - 20% aq, 35% solid (+/-RL aq, +/-2RL sol if either ≤5RL)
	Initial calibration documentation included in lab package?	x			5 peaks used for all multi-comp Pest/PCB
100	%RSD criteria met? (≤20%RSD or r ≥ 0.995 or COD ≥ 0.990)	x			
100	DDT/Endrin %breakdown max 15%?	x			
	Calibration verification data included in lab package?	x			only beg CCV (no end) for 8082/8081 (104045) since IS used
100	%D criteria met? (<20%,<15% for 8151)		x		see QC Deficiencies
100	Internal standard data included in lab package?	x			used for 8082A and 8081B for all work orders
100	Areas within limits (within -50/+100% of last calib check)?	x			for samples
100	RTs within limits (+/-0.07 min from last calib check)?	x			for samples
100	Dual column/detector confirmation data incl in lab package?	x			
100	%Difference criteria met? (<40%)	x			
10	Analyte qualitative ID criteria met?	x			see Comment no. 1
10	Analyte quantitation/RLs correct?	x			
10	All target analytes included in ICAL at min 5 levels w low≤ RL?		x		completed for 100%, see Comment no. 2
10	IS Areas within limits (within -50/+100% of ICAL midlevel)?			x	for CCVs, not used for Herb
10	IS RTs within limits (+/-0.05(Pest)-0.07(PCB) min from ICAL midlevel)?			x	for CCVs, not used for Herb
10	QC parameters calculated correctly?	x			

	Surrogate	Control Limits				
PEST/	Decachlorobiphenyl	55-148/47-150				
PCB	Tetrachloro-m-xylene	55-139				
HERB	2,4-DCPA	83-150				

COMMENTS

The validator did not delineate cases where the surrogate has a %D outside the criteria since surrogate recoveries for each analysis are evaluated separately

1. Chromatograms show peaks in region of interest but none of the sample have Silvex peak on first column.

2. For all work orders, the lowest ICAL level for Silvex is 101 ug/L (on-column). This corresponds to 33 ug/kg in soil, which is above but near the RL of 17 ug/kg. All samples are ND to the MDL (11 ug/kg) so no further action.

For work order 460-114779-1, the 8081 Pesticide ICAL Summary in original report includes only 4 levels with no standard at 2.5 ug/L. The lowest ICAL level for the single-component target analytes is 50 ug/L (on-column). This corresponds to 33 ug/kg in soil, which is well below the RLs of 2-6.7 ug/kg and the MDLs of 0.6-1.4 ug/kg. Clarification requested 9/27/16. Revision dated 10/6/16 rec'd 10/13/16 with ICAL Summary showing all 5 levels (same %RSD so this was just reporting issue) and with L1 raw data. Note that the revised report does not include calib stds for Chlordane (Tech) or Toxaphene but these analytes were not detected and they are included in original report, so no further action.

Data Validation Checklist: GC/MS (Update IV)

Client Name: Entact			Project Number/ Manager: E7976M/ Jenny Self			
Site Name: Revere Smelting & Refining (P3 BF May-Jun16)			QC Level: IV			
Laboratory: TestAmerica (Edison)			Laboratory Job No: see DURC			
Reviewer: Taryn Scholz			Date Checked: 9/21/16			
Parameters: VOC, SVOC			Methods: 5035/8260C, 3546/8270D			
%PERFORMED/ ITEM			**YES**	**NO**	**N/A**	**(CRITERIA) COMMENT**
	Method blank data included in Lab Package?		x			
100	Criteria met? (<MDL)		x			
100	Criteria met for field blanks? (<MDL)		x			
	QC check samples/LCS data included in lab package?		x			
	All project COIs or TAs included?		x			
100	%R criteria met?		x			method (lab but within 50-200%)
100	RPD criteria met?		x			method (lab but within 40%)
	Matrix spike data included in lab package?		x			
100	%R criteria met?				x	method (lab but within 50-200%) only non-project
100	RPD criteria met?				x	method (lab but within 40%) only non-project
	Surrogate data included in lab package?		x			
	Required surrogates included?		x			
100	%R criteria met?		x			method (lab but within 10-200% extr, 20-200% purg)
100	Field dup RPD criteria met? (individual, mean, and overall)				x	20% aq, 35% solid (+/-2RL aq, +/-3RL sol if either ≤5RL)
	Instrument Tune (12-hr) for GC/MS included in lab package?		x			
100	Instrument Tune method criteria met?		x			
	Initial calibration documentation included in lab package?		x			
	RRF met (Table 4)? Reject for RRF<Table 4 or min (0.01) from NFG 2014			x		
100	%RSD criteria met? (≤20%RSD or r ≥ 0.995 or COD ≥ 0.990)		x			
	Calibration verification data included in lab package?		x			
	RRF met (Table 4)? Reject for RRF<Table 4 or min (0.01) from NFG 2014		x			
100	%D criteria met for CCC/TAs? (20% max)			x		see QC Deficiencies
100	Internal standard data included in lab package?		x			
100	Areas within limits (within -50/+100% of last calib check)?		x			for samples
100	RTs within limits (<10/30(8270) s diff from last calib check)?		x			for samples
10	Analyte qualitative ID criteria met?		x			Dibenz(a,h)anthracene potentially not present but conservative approach so no further action
10	Analyte quantitation/RLs correct?		x			
10	All target analytes included in ICAL at min 5 levels w low ≤ RL?		x			completed for 100%
10	IS Areas within limits (within -50/+100% of ICAL midlevel)?		x			for CCVs
10	IS RTs within limits (<10/30(8270) s diff from ICAL midlevel)?		x			for CCVs
10	QC parameters calculated correctly?		x			
	Surrogate	**Control Limits**				
VOC	1,2-Dichloroethane-d4	70-130 (Sep15 78-135)				
	Toluene-d8	70-130 (Sep15 73-121)				
	Bromofluorobenzene	70-130 (Sep15 67-126)				
	Dibromofluoromethane	70-130 (Sep15 61-149)				
SVOC	2,4,6-Tribromophenol	19-114 (Oct14 10-120, Sep15 10-95)				
	Terphenyl-d14	41-145 (Oct14 16-151, Sep15 16-114)				
	2-Fluorobiphenyl	49-112 (Oct14 40-109, Sep15 27-84)				
	Nitrobenzene-d5	40-106 (Oct14 38-105, Sep15 28-92)				
	2-Fluorophenol	39-103 (Oct14 37-125, Sep15 21-84)				
	Phenol-d5	44-104 (Oct14 41-118, Sep15 22-88)				

COMMENTS

The validator did not delineate cases where the surrogate has a %D outside the criteria since surrogate recoveries for each analysis are evaluated separately.