Data Validation Summary Report
Parcel "C", "D", "F", "G" and "H" Soil Confirmation
Tronox LLC
Henderson, Nevada

June 15, 2010

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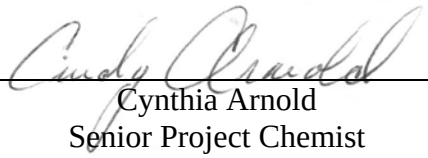

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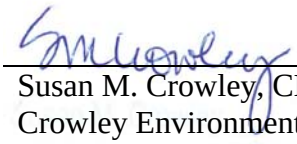
Tronox LLC
Henderson, Nevada

Responsible Certified Environmental Manager (CEM) for this project

I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein.

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and, to the best of my knowledge, comply with all applicable federal, state and local statutes, regulations and ordinances.



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ACRONYMS AND ABBREVIATIONS

Acronym	Meaning
%D	Percent Difference
BEC	Basic Environmental Company
BRC	Basic Remediation Company
CEM	Certified Environmental Manager
CLP	Contract Laboratory Program
DOE	Department of Energy
DQI	Data Quality Indicator
DUP	Duplicate
EDD	Electronic Data Deliverable
EDXA	Energy Dispersive X-ray Analysis
EPA	U.S. Environmental Protection Agency
GC/MS	Gas Chromatograph/Mass Spectrometer
ICP	Inductively Coupled Plasma
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LDC	Laboratory Data Consultants
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NDEP	Nevada Division of Environmental Protection
PAH	Polynuclear Aromatic Hydrocarbons
PARCCS	Precision, Accuracy, Representativeness, Comparability, Completeness, and Sensitivity
PCB	Polychlorinated Biphenyl
PQL	Practical Quantitation Limit
QAPP	Quality Assurance Project Plan
QC	Quality Control
R	Rejected
RPD	Relative Percent Difference
SAED	Selected Area Electron Diffraction
SAP	Sampling and Analysis Plan
SDG	Sample Delivery Group
SOP	Standard Operating Procedure
SQL	Sample Quantitation Limit
SVOC	Semivolatile Organic Compound
TEM	Transmission Electron Microscope
Tronox	Tronox LLC

1.0 INTRODUCTION

On behalf of Tronox LLC (Tronox), Northgate Environmental Management, Inc. (Northgate) has prepared this Data Validation Summary Report to assess the validity (based on data validation) and usability (based on project objectives) of the Parcel "C", "D", "F", "G" and "H" Soil Confirmation data. The Parcel Soil Confirmation sampling was initiated by Northgate in April 2010.

Parcel Soil Confirmation samples were collected and analyzed in accordance with the *Removal Action Work Plan for Soil, Tronox Parcels "C", "D", "F", "G" and "H" Sites, Henderson, Nevada, July 2008* (Removal Action Work Plan; BEC 2008). Soils collected from the five parcels resulted in the analysis of 21 environmental and 16 field quality control (QC) samples (field blank, equipment blank, field duplicate, and matrix spike [MS]/MS duplicate [MSD] analysis). The sampling and analysis summary of the 21 soil and associated field QC samples is presented in Table 1-1. Analysis as proposed in the Removal Action Work Plan, was completed for each Parcel as presented below.

Location	Asbestos	Dioxin	SVOC	PCB	Arsenic
Parcels C and D	4	1			
Parcel F	8		1	1	1
Parcel G	2		1		
Parcel H	2				

Field samples and the associated field QC samples were logged into the laboratories in Sample Delivery Groups (SDGs). The Parcel Soil Confirmation data are contained in nine SDGs. A complete listing of the Parcel Soil Confirmation samples and SDGs is presented in Table 1-2. Analytical services were provided by three laboratories, for the analytical groups summarized below.

Laboratory	Location	Analytical Group(s)
EMSL Analytical	Westmont, NJ	Asbestos
Test America	Denver, CO	SVOC (PAHs) and Metals (As)
Test America	West Sacramento, CA	Dioxin/Furans and PCB

The analytical data were validated by Laboratory Data Consultants, Inc. (LDC) in accordance with procedures described in the Nevada Division of Environmental Protection (NDEP) *Data Verification and Validation Requirements – Supplement, Henderson, Nevada, April 13, 2009*, established for the BMI Plant Sites and Common Areas Projects. The association between the laboratory SDGs and LDC validation reports is presented in Table 1-3.

2.0 DATA VALIDATION PROCESS

A formal validation of the Parcel Soil Confirmation analytical results was performed to assess remediation performed at each of the five Parcels under the Removal Action Work Plan. Consistent with the Removal Action Work Plan, the *Tronox Quality Assurance Project Plan* (QAPP; AECOM/Northgate 2009), and *NDEP Supplemental Guidance on Data Validation for the BMI Plant Sites and Common Areas Projects* (NDEP Supplemental Guidance; NDEP 2009d), all of the Parcel Soil Confirmation data were validated. The Parcel Soil Confirmation data are contained in nine SDGs. Approximately 90% of the analytical data were validated as Stage 2B and approximately 10% were validated by Stage 4 data validation procedures. EPA Stage 2B (EPA 2009) validation evaluates the following QC criteria:

- Completeness of deliverable;
- Technical holding times and sample preservation;
- Sample integrity and cooler/sample temperature at the time of laboratory receipt;
- Laboratory and field blank contamination;
- Surrogate spike recoveries;
- Tracer recoveries (radiochemical data only);
- MS/MSD recoveries and relative percent differences (RPDs);
- Laboratory duplicate RPDs;
- Laboratory control sample (LCS) recoveries; and
- Initial and continuing calibrations.

The comprehensive validation, consistent with EPA designation of Stage 4 (EPA 2009), involves in-depth review of compound identification and quantification, spot-checks of calculations, and verification of summary data against the raw data. Table 1-3 is a cross-reference of laboratory SDG and associated validation reports. Field samples presented with shading were validated as Stage 4 (EPA 2009).

2.1 Data Deliverables

Analytical data deliverables were provided as an electronic data deliverable (EDD) version of the full data package, equivalent to a Contract Laboratory Program (CLP) deliverable (i.e., consisting of all the information required in a CLP package, including CLP-like summary forms). The electronic data packages were presented in PDF format with embedded text

wherever possible and include complete bookmarking for all forms, tables, and sections. Each data package was also delivered as an EDD.

Asbestos deliverables included sample results, a case narrative, chain-of-custody, QC summary data, sample prep data, transmission electron microscope (TEM) calibration data (chrysotile beam dose sensitivity, camera constant calibrations, crocidolite spectrum Na sensitivity, Mg-Si K-alpha peak resolvability, K factors, and detector resolution of the Mn K-alpha peak), one energy dispersive x-ray analysis (EDXA) and one selected area electron diffraction (SAED) image per asbestos type per sample, filter blank lot data (4%), lab blanks, method blanks, equipment blanks, and all analyst worksheets. The analytical reports for Parcel Soil Confirmation data are presented in Appendix A.

In addition to the laboratory deliverables, field information was provided to the validation staff in order to associate the field QC samples (field blanks, equipment blanks, and field duplicates) with the primary field samples prior to validation.

2.2 Validation of Analytical Deliverables

Validation of the Parcel Soil Confirmation data was performed by LDC using the appropriate EPA guidelines (EPA 1999, 2004, 2008, 2009) or equivalent regional EPA validation guidelines such as Region 9 Superfund Data Evaluation/Validation Guidance, R9QA/006.1 (EPA 2001), the *NDEP Supplemental Guidance* (NDEP 2009b, 2009c, 2009d, 2009e) and the *Basic Remediation Company* (BRC) *SOP 40, Data Review/Validation* (BRC SOP; BRC 2009). These federal EPA guidelines, prepared for CLP data, were adapted to reflect the analytical methods and measurement quality objectives established for the Parcel soil methods and the guidance provided by NDEP. LDC validation reports for Parcel Soil Confirmation data are presented in Appendix B.

Analytical data deficiencies were qualified using the data validation qualifiers in Table 2-1 and project-specific reason codes shown in Table 2-2. The finalized NDEP EDD (NDEP 2009f) for the Parcel Soil Confirmation data is presented in Appendix C.

3.0 DATA VALIDATION RESULTS

The data validation qualifiers and reason codes were used to indicate all the data in the database where results were qualified as a result of validation. This information was sorted by the QC review elements listed below:

- Holding times and sample preservation;
- Initial and continuing calibrations;
- Serial dilution;
- Laboratory blanks/equipment blanks/field blanks;
- LCS/Laboratory Control Sample Duplicate (LCSD) results;
- MS/MSD results;
- Surrogate recoveries;
- Internal standard performance;
- Laboratory duplicate results;
- Field duplicate results; and
- Quantitation problems.

Table 3-1 presents the qualified results based on QC deficiencies identified during the validation process. Reason codes for each qualifier assignment have been provided in each table. Where available, a numerical data quality indicator (DQI) result value and acceptance criteria for that value have been added to the tables in columns to the right of the reason codes per NDEP's request. No QC problems were identified that resulted in qualification of results based on mass spectrometer tuning, gas chromatograph/mass spectrometer (GC/MS) performance checks, compound identification, or peak integration. The data validation memorandum presented in Appendix B discusses the application of qualifiers in detail. Table 3-1 is provided to NDEP on CD as an Excel spreadsheet that can be re-sorted to assist the data user in locating validation information for any particular sample, SDG, method, or analyte.

3.1 Holding Times and Sample Preservation

Sample preservation and analytical holding times are evaluated to assure that the sample integrity is intact for accurate sample preparation and analysis. Sample preservation and analytical hold time are presented for each method of analysis in Table B-1 of the QAPP. Holding time exceedances can cause loss of sample constituents due to biodegradation,

precipitation, volatization, and chemical degradation. In accordance with EPA guidance (USEPA 2004, 2008), sample results for organic and non-metal analyses that were performed after the method holding time but less than two times the method holding time are qualified as estimated (J- or UJ) and results for analyses performed after two times the method holding time are qualified as rejected (R). Inorganic hold time exceedances are qualified as estimated J- or R. No data were qualified based on hold time or preservation exceedances.

3.2 Initial and Continuing Calibration

Instrument performance was evaluated during the review of initial and continuing calibration for each method analyzed. No data were qualified based on calibration exceedances.

3.3 Serial Dilution

Serial dilutions were performed on results greater than 50X the instrument detection limit (IDL) to confirm matrix interference. All percent differences were acceptable. No data were qualified based on serial dilutions.

3.4 Laboratory Blanks/Equipment Blanks/Field Blanks

The Parcel Soil data were assessed using the following blanks: field blanks, equipment blanks, and laboratory method blanks. Data were evaluated and qualified in accordance with EPA guidance (EPA 2004, 2008), NDEP Supplemental Guidance (NDEP 2009c,d,e), and the BRC SOP. Dioxin results for two congeners (HpCDD and TCDF) in sample I6-PC-1-0.0 and congener TCDF in the field duplicate I6-PC-1-0.0_FD were qualified as non-detect due to blank contamination.

3.5 LCS/LCSD Results

Laboratory control samples and laboratory control sample duplicates were used to assess laboratory accuracy. The Parcel Soil samples were evaluated in accordance with the BRC SOP. No data were qualified based on LCS/LCSD precision and accuracy.

3.6 MS/MSD Results

Matrix spike and matrix spike duplicate samples consist of aliquots of environmental samples spiked with a subset of target compounds. MS/MSD samples monitor potential interference from the site-specific sample matrix and its effect on target compounds. Additional field sample aliquots were collected for arsenic and SVOCs. Samples were evaluated using the EPA

guidance (EPA 2004, 2008), *NDEP Supplemental Guidance* (NDEP 2009c,d,e), the *BRC SOP*, and professional judgment.

SVOC/Method 8270 field sample Q3-PF-3-1-0.0 yielded several MS/MSD recoveries outside the upper control limit, demonstrating matrix interference. The associated LCS/LCSD recoveries were acceptable and the non-detect sample results did not require qualification. No data were qualified based on MS/MSD precision and accuracy.

3.7 Surrogate Recoveries

Surrogate recoveries were reviewed for organic methods and evaluated using the EPA guidance (EPA 2004, 2008), NDEP Supplemental Guidance (NDEP 2009c,d,e), and the *BRC SOP*.

Semivolatile organic compound (SVOC)/Method 8270 field duplicate Q3-PF-3-1-0.0FD resulted in nitrobenzene-d5 (42%) surrogate recovery outside of the control limit (50-1120). No qualification is necessary based on one surrogate recovery deficiency. No data were qualified based on surrogate recoveries.

3.8 Internal Standard Performance

Internal standards were prepared for certain organic and inductively coupled plasma (ICP)/MS analyses by adding compounds similar to target compounds of interest to sample aliquots. Internal standards are used in the quantitation of target compounds in the sample or sample extract. Internal standards were reviewed using the EPA guidance (EPA 2008), NDEP Supplemental Guidance (NDEP 2009c,d,e), and the *BRC SOP*.

SVOC/Method 8270 internal standard perylene-d12 area counts were outside of the QC criteria (-50% or + 100%) for Parcel F samples Q3-PF-3-1-0.0 and the field duplicate Q3-PF-3-1-0.0FD. One detected result associated with this internal standard was qualified as estimated (J) and 11 non-detect results were qualified as rejected (R). No other qualification was necessary based on internal standard performance.

3.9 Laboratory Duplicate Results

Laboratory duplicate analysis involves the preparation and analysis of an additional aliquot of a field sample. Results from duplicate sample analyses measure laboratory precision as well as homogeneity of contaminants in the field matrix. The relative percent difference (RPD) of the duplicate results were evaluated in accordance with EPA guidance (EPA 2004, 2005), NDEP

Supplemental Guidance (NDEP 2009c,d,e), and the *BRC SOP*. No data were qualified based on laboratory duplicate results.

3.10 Field Duplicate Results

Field duplicates are used to evaluate sampling technique precision and homogeneity of the sample matrix. Field duplicates were collected at a frequency of 10% during the Phase B Investigation. In accordance with the QAPP, NDEP Supplemental Guidance (NDEP 2009c,d,e), and the BRC SOP, the precision goal for field duplicate analyses was $\pm$ 50 percent RPD. If the field duplicate RPD exceeds the 50 percent limit, non-detected sample results shall be qualified as estimated (UJ) at the sample quantitation limit (SQL) and detected results shall be qualified as estimated (J). The RPD will be calculated using the reporting limit for non-detected sample results. Similar to analytical duplicates, this limit does not apply when the result for either the sample or its duplicate is less than five times the practical quantitation limit (PQL). For this situation, the absolute value of the PQL is to be used as the control limit. Field duplicate exceedances for Parcel C soil samples I6-PC-1-0.0 and I6-PC-1-0.0 FD were qualified as estimated (J) for dioxin congener OCDD. No other qualification was necessary based on laboratory duplicate results.

3.11 Quantitation Problems

During Stage 4 evaluation, all raw data was reviewed to confirm target analyte identification and quantitation. SVOC/Method 8270 sample S3-PG-2-0.0 and field duplicate Q3-PF-3-1-0.0FD demonstrated matrix interference, resulting in unresolved benzo(b) fluoranthene and benzo(k) fluoranthene. The laboratory reported the detected values as benzo(b) fluoranthene and the results were qualified as estimated (J). No other qualification was necessary based on quantitation problems.

4.0 EVALUATION OF QUALITY INDICATORS

Data quality indicators of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) were used to verify that sampling and analytical systems used in support of project activities are effective and that the quality of the data generated for the project is appropriate for making decisions affecting future activities. This section discusses the DQIs for the Parcel "C", "D", "F", "G" and "H" Soil Confirmation dataset. DQIs address the field and analytical data quality aspects as they affect uncertainties in the data collected for site characterization and risk assessment. The PARCCS parameters definition and assessment are presented in the *Tronox Revised Phase B QAPP* (Revised QAPP; AECOM/Northgate 2009), and the *Project Plan* (BRC/ERM 2008). All data not meeting the established PARCCS criteria were qualified during the validation process using the guidelines presented in the QAPP, *National Functional Guidelines* (EPA 2004, 2005, 2008), BRC SOP, each analytical method employed, and professional judgment.

4.1 Precision

Precision is the measure of agreement among repeated measurements of the same property under identical or substantially similar conditions. Field precision was assessed through the collection and measurement of field duplicates and expressed as the RPD of the sample and field duplicate pair results. The assessment of field duplicate precision is discussed in Section 3.10 of this report, and is listed on Table 3-1. In general, field duplicate precision was acceptable for all analytes. No data were rejected.

Laboratory precision evaluates DQIs such as calibration, surrogates, MS/MSD, duplicate (DUP), LCS/LCSD and interference check samples previously discussed in Section 3 of this report. All laboratory precision was acceptable.

4.2 Accuracy

Accuracy is the degree of agreement between an observed value and an accepted reference or true value. Laboratory accuracy was assessed during the validation using the recoveries of following QC parameters:

- Holding times and sample temperatures;
- Calibration;
- LCS percent recovery;
- MS/MSD percent recovery (organics);

- Serial dilution recovery (inorganics);
- Surrogate spike recovery; and
- Blank sample results.

Accuracy was evaluated for each of the DQIs in Sections 3.1 through 3.7. Evaluation of the Stage 4 QC elements that contribute to accuracy – such as mass spectrometer tuning, compound or element identification, peak integration and mass spectral matches, and calculation/ transcription verifications did not result in the qualification or rejection of any data during validation.

4.3 Representativeness

Representativeness is a qualitative parameter defined by the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or a process or environmental condition. There is no formula for evaluating representativeness. Aspects of representativeness addressed during validation include the review of sample collection information in the chain-of-custody documentation, conformity of laboratory analyses to Work Plan intentions, adherence of the documented laboratory procedures to method requirements, and completeness of the laboratory data packages. All representativeness deficiencies were resolved during the actual field sampling event and/or data validation process. No qualification was necessary based on representativeness.

4.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system, compared to the amount expected under normal conditions. "Normal conditions" are defined as the conditions expected if the program specific work plan was implemented as proposed.

Field completeness is defined as the percentage of samples actually collected versus those intended to be collected per the Work Plan. The field completeness goal established in the QAPP is 90%. A comparison of the Removal Action Work Plan with the database sample IDs indicates that actual field completeness was 100%, exceeding the goal established for the project. Field completeness was assessed using the total sample locations scheduled in the Removal Action Work Plan compared to actual number submitted for analysis.

Laboratory completeness is defined as percentage of valid data points versus the total expected from the laboratory analyses. Valid data are defined as all the data points judged to be usable (i.e., not rejected as a result of the validation process). The laboratory completeness goal

established in the QAPP is 95%. Actual laboratory completeness was 100% on the basis of sample analysis (i.e., all requested analyses were performed and reported by the laboratories), and 91.41% completeness based on valid data, with 8.59% of the data qualified as rejected (R) as described in Section 3.8.

4.5 Comparability

Comparability is a qualitative expression of the measure of confidence that two or more data sets may contribute to a common analysis. Comparability of data within the Parcel Soil Confirmation was maximized by using standard methods for sampling and analysis, reporting data, and data validation.

4.6 Sensitivity

Sensitivity is the capability of a method to discriminate an actual deflection or response above instrument noise. For the EPA methods employed in this project, sensitivity is measured by the Method Detection Limit (MDL) and PQL. Both nominal MDLs and PQLs were provided by the laboratories in the laboratory data packages and were verified during validation. MDLs in general were adjusted for each Parcel soil sample to include the necessary dilution factors, preparation factors, and dry-weight factors of an individual sample as the SQL. The sensitivity requirements were based on the laboratory's ability to detect and report consistent and reliable limits.

5.0 CONCLUSIONS

One hundred percent of the laboratory data for the Parcel Soil Confirmation samples were validated using standardized guidelines and procedures recommended by EPA and NDEP. Based on the validated data, 91.94% of the results for Parcel Soil Confirmation data were determined usable and considered valid for all decision-making purposes.

Laboratory results qualified during validation are summarized in Table 3-1. Data qualifiers and qualifier reason codes are presented as Table 2-1 and 2-2, respectively.

All the qualified results were evaluated with respect to the data quality indicators and compared to the QAPP and Removal Action Work Plan. Details of this evaluation are discussed in Section 4 of this report. Based on the results of data validation, actual laboratory completeness was 100% on the basis of sample analysis, and 91.4% completeness based on valid data. The overall goals for data quality were not achieved due to rejected SVOC data for sample Q3-PF-3-1-0.0 which demonstrated matrix interference during the analysis of a field duplicate and sample specific MS/MSD. Matrix interference resulted in sample specific QC deficiencies for MS/MSD recoveries, surrogate recoveries, internal standard performance, and quantitation problems, as discussed in Sections; 3.6, 3.7, 3.8 and 3.11, respectively.

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TABLES

TABLE 1-1
Sample Analysis Summary

Parameter	Method	Soil				
		Primary	FB	EB	FD	MS/MSD
Asbestos	EPA 540-R-97-028 modified per Berman & Kolk (2000)	**16**	NA	NA	2	NA
Dioxins/Furans	EPA 8290	**1**	1	1	1	0
Metals (arsenic only)	EPA 6020	**1**	1	1	1	1
PCBs	EPA 8082	**1**	0	1	0	0
SVOCs (PAH only)	EPA 8270C	**2**	2	2	1	1
TOTALS		**21**	4	5	5	2

Notes:
EB: Equipment blank
FB: Field blank
FD: Field duplicate
MS/MSD: Matrix spike/matrix spike duplicate
NA: Not applicable

Table 1-2
Sample IDs and Laboratory SDGs

Sample ID	SDG	Matrix	Collection Date	Sample Type
E1-PC-1-1-0.0	91003471	SO	4/13/2010	N
EB-04082010-PARCELG	280-2306-1	WQ	4/8/2010	EB
EB-0427200-PF	G0D280454	WQ	4/27/2010	EB
EB-PARCELC_033110	G0D140559	WQ	4/13/2010	EB
EB-PARCELS-032910	280-2143-1	WQ	4/6/2010	EB
F4-PD-1-1-0.0	91003471	SO	4/13/2010	N
FB-PARCELC_033110	G0D140559	WQ	4/13/2010	FB
FB-PARCELS_032910	280-2306-1	WQ	4/8/2010	FB
FB-PARCELS-032910	280-2143-1	WQ	4/6/2010	FB
G1-PC-1-1-0.0	91003471	SO	4/13/2010	N
H2-PC-1-1-0.0	91003471	SO	4/14/2010	N
I6-PC-1-0.0	G0D140560	SO	4/13/2010	N
I6-PC-1-0.0FD	G0D140560	SO	4/13/2010	FD
P2-P2-1-1-0.0	91003269	SO	4/6/2010	N
P3-PF-1-1-0.0	91003269	SO	4/6/2010	N
P3-PF-2-1-0.0	91003269	SO	4/6/2010	N
P3-PF-2-1-0.0	280-2143-1	SO	4/6/2010	N
P3-PF-2-1-0.0FD	280-2143-1	SO	4/6/2010	FD
P4-PF-1-1-0.0	91003269	SO	4/6/2010	N
Q2-PF-1-1-0.0	91003269	SO	4/6/2010	N
Q3-PF-1-1-0.0	91003269	SO	4/6/2010	N
Q3-PF-1-1-0.0-FD	91003269	SO	4/6/2010	FD
Q3-PF-2-1-0.0	91003269	SO	4/6/2010	N
Q3-PF-3-1-0.0	91003269	SO	4/6/2010	N
Q3-PF-3-1-0.0	280-2143-1	SO	4/6/2010	N
Q3-PF-3-1-0.0	G0D280454	SO	4/27/2010	N
Q3-PF-3-1-0.0FD	280-2143-1	SO	4/6/2010	FD
S2-PG-1-1-0.0	91003272	SO	4/8/2010	N
S2-PG-1-1-0.0-FD	91003272	SO	4/8/2010	FD
S3-PB-2-0.0	280-2306-1	SO	4/8/2010	N
S3-PG-1-1-0.0	91003471	SO	4/14/2010	N
V5-PH-1-1-0.0	91003274	SO	4/9/2010	N
W4-PH-1-1-0.0	91003274	SO	4/9/2010	N

Notes:
N = Normal
EB = Equipment Blank
FD = Field Duplicate
FB = Field Blank
SO = Soil
WQ = Blank Water

Table 1-3
Sample Delivery Groups and LDC Validation Reports
(Blank Columns Indicate No Other Test Methods Were Requested For A Given LDC Report)

SDG#: 091003269 **LDC#:** 23103A

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	Date Collected	Asb. (540-R-97-028)											
Q2-PF-1-1-0.0	091003269-0001	soil	04/06/10	X											
Q3-PF-1-1-0.0	091003269-0002	soil	04/06/10	X											
Q3-PF-1-1-0.0-FD	091003269-0003	soil	04/06/10	X											
Q3-PF-2-1-0.0	091003269-0004	soil	04/06/10	X											
P2-P2-1-1-0.0	091003269-0005	soil	04/06/10	X											
Q3-PF-3-1-0.0	091003269-0006	soil	04/06/10	X											
P3-PF-2-1-0.0	091003269-0007	soil	04/06/10	X											
P3-PF-1-1-0.0	091003269-0008	soil	04/06/10	X											
P4-PF-1-1-0.0	091003269-0009	soil	04/06/10	X											

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed, FD = Field Duplicate, FB = Field Blank, EB = Equipment Blank

Table 1-3
Sample Delivery Groups and LDC Validation Reports
(Blank Columns Indicate No Other Test Methods Were Requested For A Given LDC Report)

SDG#: 091003272 **LDC#:** 23103B

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	Date Collected	Asb. (540-R-97-028)											
S2-PG-1-1-0.0	091003272-0001	soil	04/08/10	X											
S2-PG-1-1-0.0-FD	091003272-0002	soil	04/08/10	X											

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed, FD = Field Duplicate, FB = Field Blank, EB = Equipment Blank

Table 1-3
Sample Delivery Groups and LDC Validation Reports
(Blank Columns Indicate No Other Test Methods Were Requested For A Given LDC Report)

SDG#: 091003274 **LDC#:** 23103C

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	Date Collected	Asb. (540-R-97-028)											
V5-PH-1-1-0.0	091003274-0001	soil	04/09/10	X											
W4-PH-1-1-0.0	091003274-0002	soil	04/09/10	X											

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed, FD = Field Duplicate, FB = Field Blank, EB = Equipment Blank

Table 1-3
Sample Delivery Groups and LDC Validation Reports
(Blank Columns Indicate No Other Test Methods Were Requested For A Given LDC Report)

SDG#: 091003471 **LDC#:** 23103D

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	Date Collected	Asb. (540-R-97-028)											
G1-PC-1-1-0.0	091003471-0001	soil	04/13/10	X											
E1-PC-1-1-0.0	091003471-0002	soil	04/13/10	X											
F4-PD-1-1-0.0	091003471-0003	soil	04/13/10	X											
H2-PC-1-1-0.0	091003471-0004	soil	04/14/10	X											
S3-PG-1-1-0.0	091003471-0005	soil	04/14/10	X											

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed, FD = Field Duplicate, FB = Field Blank, EB = Equipment Blank

Table 1-3
Sample Delivery Groups and LDC Validation Reports
(Blank Columns Indicate No Other Test Methods Were Requested For A Given LDC Report)

SDG#: 280-2143-1 **LDC#:** 23104A

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	Date Collected	SVOA (8270C)	As (6020)										
Q3-PF-3-1-0.0	280-2143-1	soil	04/06/10	X											
Q3-PF-3-1-0.0FD	280-2143-2	soil	04/06/10	X											
P3-PF-2-1-0.0*	280-2143-3	soil	04/06/10		X										
P3-PF-2-1-0.0FD	280-2143-4	soil	04/06/10		X										
FB-PARCELS-032910	280-2143-5	water	04/06/10	X	X										
EB-PARCELS-032910	280-2143-6	water	04/06/10	X	X										

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed, FD = Field Duplicate, FB = Field Blank, EB = Equipment Blank

Table 1-3
Sample Delivery Groups and LDC Validation Reports
(Blank Columns Indicate No Other Test Methods Were Requested For A Given LDC Report)

SDG#: 280-2306-1 **LDC#:** 23104B

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	Date Collected	SVOA (8270C)	As (6020)										
S3-PB-2-0.0	280-2306-1	soil	04/08/10	X											
FB-PARCELS_032910	280-2306-2	water	04/08/10	X											
EB-04082010-PARCELG	280-2306-3	water	04/08/10	X											

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed, FD = Field Duplicate, FB = Field Blank, EB = Equipment Blank

Table 1-3
Sample Delivery Groups and LDC Validation Reports
(Blank Columns Indicate No Other Test Methods Were Requested For A Given LDC Report)

SDG#: G0D140559 **LDC#:** 23105A

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	Date Collected	SVOA (8270C)	As (6020)	Dioxins (8290)									
EB-PARCELC_033110	G0D140559-001	water	04/13/10			X									
FB-PARCELC_033110	G0D140559-002	water	04/13/10			X									

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed, FD = Field Duplicate, FB = Field Blank, EB = Equipment Blank

Table 1-3
Sample Delivery Groups and LDC Validation Reports
(Blank Columns Indicate No Other Test Methods Were Requested For A Given LDC Report)

SDG#: G0D140560 **LDC#:** 23105B

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	Date Collected	SVOA (8270C)	As (6020)	Dioxins (8290)									
I6-PC-1-0.0	G0D140560-001	soil	04/13/10			X									
I6-PC-1-0.0FD	G0D140560-002	soil	04/13/10			X									

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed, FD = Field Duplicate, FB = Field Blank, EB = Equipment Blank

Table 1-3
Sample Delivery Groups and LDC Validation Reports
(Blank Columns Indicate No Other Test Methods Were Requested For A Given LDC Report)

SDG#: G0D280454 **LDC#:** 23105C

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	Date Collected	SVOA (8270C)	PCBs (8082)	As (6020)	Dioxins (8290)								
EB-0427200-PF	G0D280454-001	water	04/27/10		X										
Q3-PF-3-1-0.0	G0D280454-002	soil	04/27/10		X										

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed, FD = Field Duplicate, FB = Field Blank, EB = Equipment Blank

TABLE 2-1
Data Validation Qualifiers

Validation Qualifier	Definition
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, and the result may be biased high.
J-	The result is an estimated quantity, and the result may be biased low.
UJ	The analyte was not detected above the sample reporting limit, and the reporting limit is approximate.
U	The analyte was analyzed for, but was not detected above the sample reporting limit.
R	The result is rejected and unusable due to serious data deficiencies. The presence or absence of the analyte cannot be verified.
B	The result may be a false positive totally attributable to blank contamination. This qualifier is applied only to radiochemical results.
JB	The result may be biased high and partially attributable to blank contamination. This qualifier is applied only to radiochemical results.
JK	The result is an estimated maximum possible concentration.
X	The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
J-TDS	The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
J-CAB	The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with the Standard Method 1030E.
J-TDS & CAB	The analytical result is unreliable based on failure of the cation-anion balance and TDS correctness check performed in accordance with the Standard Method 1030E.

TABLE 2-2
Data Validation Qualifier Reason Codes

Reason Code	Explanation
a	qualified due to low abundance (radiochemical activity)
be	qualified due to equipment blank contamination
bf	qualified due to field blank contamination
bl	qualified due to lab blank contamination
bt	qualified due to trip blank contamination
bp	qualified due to pump blank contamination (wells w/o dedicated pumps, when contamination is detected in the Pump Blk)
br	qualified due to filter blank contamination (aqueous Hexavalent Chromium and Dissolved sample fractions)
c	qualified due to calibration problems
cp	qualified due to insufficient ingrowth (radiochemical only)
dc	duel column confirmation %D exceeded
e	concentration exceeded the calibration range
fd	qualified due to field duplicate imprecision
h	qualified due to holding time exceedance
i	qualified due to internal standard areas
k	qualified as Estimated Maximum Possible Concentrations (dioxins and PCB congeners)
l	qualified due to LCS recoveries
ld	qualified due to lab duplicate imprecision (matrix duplicate, MSD, LCSD)
m	qualified due to matrix spike recoveries
nb	qualified due to negative lab blank contamination (nondetect results only)
o	other
p	qualified as a false positive due to contamination during shipping
pH	sample preservation not within acceptance range
q	qualified due to quantitation problem
s	qualified due to surrogate recoveries
sd	serial dilution did not meet control criteria
sp	detected value reported >SQL <PQL
st	sample receipt temperature exceeded
t	qualified due to elevated helium tracer concentrations
vh	volatile headspace detected in aqueous sample containers submitted for VOC analysis
x	qualified due to low % solids
z	qualified due to ICS results

Table 3-1
Qualification Summary

SDG	Client Sample ID	Sample Date	Method	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Reason Code	Reason Code Definition	DQI Result	DQI Limits
280-2143-1	Q3-PF-3-1-0.0	4/6/2010	SW 846 8270C	Benzo[a]pyrene	23	U	ug/kg	R	i	Internal Standards	374011	820545-3282178
280-2143-1	Q3-PF-3-1-0.0	4/6/2010	SW 846 8270C	Benzo[b]fluoranthene	29	U	ug/kg	R	i	Internal Standards	374011	820545-3282178
280-2143-1	Q3-PF-3-1-0.0	4/6/2010	SW 846 8270C	Benzo[g,h,i]perylene	18	U	ug/kg	R	i	Internal Standards	374011	820545-3282178
280-2143-1	Q3-PF-3-1-0.0	4/6/2010	SW 846 8270C	Benzo[k]fluoranthene	45	U	ug/kg	R	i	Internal Standards	374011	820545-3282178
280-2143-1	Q3-PF-3-1-0.0	4/6/2010	SW 846 8270C	Dibenz(a,h)anthracene	21	U	ug/kg	R	i	Internal Standards	374011	820545-3282178
280-2143-1	Q3-PF-3-1-0.0	4/6/2010	SW 846 8270C	Indeno[1,2,3-cd]pyrene	25	U	ug/kg	R	i	Internal Standards	374011	820545-3282178
280-2143-1	Q3-PF-3-1-0.0	4/6/2010	SW 846 8270C	Pyrene	15	J	ug/kg	J	sp	>SQL, <PQL		
280-2143-1	Q3-PF-3-1-0.0FD	4/6/2010	SW 846 8270C	Benzo[a]pyrene	21	U	ug/kg	R	i	Internal Standards	357940	820545-3282178
280-2143-1	Q3-PF-3-1-0.0FD	4/6/2010	SW 846 8270C	Benzo[b]fluoranthene	110	JK	ug/kg	J	i,sp	Internal Standards	357940	820545-3282178
										>SQL, <PQL		
280-2143-1	Q3-PF-3-1-0.0FD	4/6/2010	SW 846 8270C	Benzo[g,h,i]perylene	17	U	ug/kg	R	i	Internal Standards	357940	820545-3282178
280-2143-1	Q3-PF-3-1-0.0FD	4/6/2010	SW 846 8270C	Benzo[k]fluoranthene	43	UK	ug/kg	R	i	Internal Standards	357940	820545-3282178
280-2143-1	Q3-PF-3-1-0.0FD	4/6/2010	SW 846 8270C	Chrysene	29	J	ug/kg	J	sp	>SQL, <PQL		
280-2143-1	Q3-PF-3-1-0.0FD	4/6/2010	SW 846 8270C	Dibenz(a,h)anthracene	20	U	ug/kg	R	i	Internal Standards	357940	820545-3282178
280-2143-1	Q3-PF-3-1-0.0FD	4/6/2010	SW 846 8270C	Fluoranthene	49	J	ug/kg	J	sp	>SQL, <PQL		
280-2143-1	Q3-PF-3-1-0.0FD	4/6/2010	SW 846 8270C	Indeno[1,2,3-cd]pyrene	23	U	ug/kg	R	i	Internal Standards	357940	820545-3282178
280-2143-1	Q3-PF-3-1-0.0FD	4/6/2010	SW 846 8270C	Phenanthrene	18	J	ug/kg	J	sp	>SQL, <PQL		
280-2143-1	Q3-PF-3-1-0.0FD	4/6/2010	SW 846 8270C	Pyrene	34	J	ug/kg	J	sp	>SQL, <PQL		
280-2306-1	S3-PG-2-0.0	4/8/2010	SW 846 8270C	Benzo[b]fluoranthene	43	JK	ug/kg	J	sp	>SQL, <PQL		
280-2306-1	S3-PG-2-0.0	4/8/2010	SW 846 8270C	Benzo[g,h,i]perylene	42	J	ug/kg	J	sp	>SQL, <PQL		
280-2306-1	S3-PG-2-0.0	4/8/2010	SW 846 8270C	Phenanthrene	21	J	ug/kg	J	sp	>SQL, <PQL		
280-2306-1	S3-PG-2-0.0	4/8/2010	SW 846 8270C	Pyrene	25	J	ug/kg	J	sp	>SQL, <PQL		
G0D140560	I6-PC-1-0.0	4/13/2010	SW 846 8290	1,2,3,4,6,7,8-HpCDD	0.40	J B	pg/g	U	bl,be,bf	MB Contamination	0.40	0.14 pg/g
										EB Contamination	0.40	100 pg/l
										FB Contamination	0.40	91 pg/l
G0D140560	I6-PC-1-0.0	4/13/2010	SW 846 8290	2,3,7,8-TCDF	0.12	J Q B	pg/g	UJK	bl,k	MB Contamination	0.12	0.088 pg/g
										EMPC		
G0D140560	I6-PC-1-0.0	4/13/2010	SW 846 8290	OCDD	2.6	J B	pg/g	J	fd,sp	Field Duplicate	10.4	Diff (≤10)
										>SQL, <PQL		
G0D140560	I6-PC-1-0.0_FD	4/13/2010	SW 846 8290	1,2,3,4,6,7,8-HpCDD	0.91	J B	pg/g	J	sp	>SQL, <PQL		
G0D140560	I6-PC-1-0.0_FD	4/13/2010	SW 846 8290	2,3,7,8-TCDF	0.14	J Q B	pg/g	UJK	bl,k	MB Contamination	0.14	0.088 pg/g
										EMPC		
G0D140560	I6-PC-1-0.0_FD	4/13/2010	SW 846 8290	OCDD	13	B	pg/g	J	fd	Field Duplicate	10.4	Diff (≤10)

Notes:

Data Qualifiers are defined in Table 2-1

Data Qualifier Reason Codes are defined in Tabel 2-2

Laboratory Qualifiers:

B - Analyte found in the associated method blank

K - Estimated maximum possible concentration (EMPC)

Q - Elevated reporting limits due to target analyte concentrations

APPENDIX A
LABORATORY REPORTS

Provided on DVD

APPENDIX B
VALIDATION REPORTS

Provided on DVD

APPENDIX C
ELECTRONIC DATABASE

Provided on DVD