

Data Validation Summary Report  
January to June 2013  
Annual Remedial Performance Sampling  
Nevada Environmental Response Trust (NERT)  
Henderson, Nevada

Prepared for

**ENVIRON International Corporation**  
Emeryville, California

Prepared by

**Laboratory Data Consultants, Inc.**  
7750 El Camino Real, Suite 2C  
Carlsbad, California 92009

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## LIST OF ACRONYMS AND ABBREVIATIONS

DQO	Data Quality Objectives
DUP	Duplicate
DVSR	Data Validation Summary Report
ICV	Initial Calibration Verification
LCS/LCSD	Laboratory Control Sample / Laboratory Control Sample Duplicate
LDC	Laboratory Data Consultants, Inc.
MS/MSD	Matrix Spike / Matrix Spike Duplicate
PARCC	Precision, Accuracy, Representativeness, Comparability, Completeness
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance / Quality Control
QAPP	Quality Assurance Project Plan
RPD	Relative Percent Difference
SDG	Sample Delivery Group
SQL	Sample Quantitation Limit
ug/L	Micrograms per Liter
ug/Kg	Micrograms per Kilogram
mg/L	Milligram per Liter
mg/Kg	Milligram per Kilogram
USEPA	United States Environmental Protection Agency
%D	Percent Difference
%R	Percent Recovery

## 1.0 INTRODUCTION

This data validation summary report (DVSR) has been prepared by Laboratory Data Consultants, Inc. (LDC) to assess the validity and usability of laboratory analytical data from the Annual Remedial Performance Sampling conducted at the Nevada Environmental Response Trust (NERT) site in Henderson, Nevada. The assessment was performed by ENVIRON as a part of the *Revised Phase B Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada* dated May 2009 and included the collection and analyses of 576 environmental and quality control (QC) samples. The analyses were performed by the following methods:

Chromium by EPA SW 846 Method 6010 and EPA Method 200.7

Wet Chemistry:

Hexavalent Chromium by EPA SW 846 Method 7196 and EPA Method 218.6

Perchlorate by EPA Method 314.0

Total Dissolved Solids by Standard Method 2540C and EPA Method 160.1

Laboratory analytical services were provided by Eurofins and TestAmerica, Inc.. The samples were grouped into sample delivery groups (SDGs). The water samples are associated with QA/QC samples designed to document the data quality of the entire SDG or a sub-group of samples within an SDG. Table I is a cross-reference table listing each sample, analysis, SDG, collection date, laboratory sample number, and matrix. All shaded samples in Table I were reviewed under Stage 4 validation guidelines.

The laboratory analytical data were validated in accordance with procedures described in the Nevada Division of Environmental Protection (NDEP) *Data Verification and Validation Requirements - Supplement* established for the BMI Plant Sites and Common Areas Projects, Henderson, Nevada, April 13, 2009. Consistent with the NDEP requirements, approximately ninety percent of the analytical data were validated according to Stage 2A data validation procedures and ten percent of the analytical data were validated according to Stage 4 data validation procedures. The analytical data were evaluated for quality assurance and quality control (QA/QC) based on the following documents: *Basic Remediation Company (BRC) Standard Operating Procedures (SOP) 40 Data Review/Validation*, Revision 1, July 2007, *Revised Phase B Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (QAPP)*, Revision, May 2009, *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA SW 846 Third Edition, Test Methods for Evaluating Solid Waste*, update I, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IV, February 2007.

This report summarizes the QA/QC evaluation of the data according to precision, accuracy, representativeness, completeness, and comparability (PARCC) relative to the project data quality objectives (DQOs). This report provides a quantitative and qualitative assessment of the data and identifies potential sources of error, uncertainty, and bias that may affect the overall usability.

The PARCC summary report evaluates and summarizes the results of QA/QC data validation for the entire sampling program. Each analytical fraction has a separate section for each of the PARCC criteria. These sections interpret specific QC deviations and their effects on both individual data points and the analyses as a whole. Section 5.0 presents a summary of the PARCC criteria by comparing quantitative parameters with acceptability criteria defined in the project DQO's. Qualitative PARCC criteria are also summarized in this section.

## Precision and Accuracy of Environmental Data

Environmental data quality depends on sample collection procedures, analytical methods and instrumentation, documentation, and sample matrix properties. Both sampling procedures and laboratory analyses contain potential sources of uncertainty, error, and/or bias, which affect the overall quality of a measurement. Errors for sample data may result from incomplete equipment decontamination, inappropriate sampling techniques, sample heterogeneity, improper filtering, and improper preservation. The accuracy of analytical results is dependent on selecting appropriate analytical methods, maintaining equipment properly, and complying with QC requirements. The sample matrix also is an important factor in the ability to obtain precise and accurate results within a given media.

Environmental and laboratory QA/QC samples assess the effects of sampling procedures and evaluate laboratory contamination, laboratory performance, and matrix effects. QA/QC samples include: equipment blanks, field blanks, field duplicates, method blanks, laboratory control samples and laboratory control sample duplicates (LCS/LCSDs), laboratory duplicates (DUP), and matrix spike/matrix spike duplicates (MS/MSDs).

Before conducting the PARCC evaluation, the analytical data were validated according to the BRC SOP-40 (July 2007), QAPP (May 2009), Functional Guidelines (USEPA 2004), and EPA SW 846 Test Methods. Samples not meeting the acceptance criteria were qualified with a flag, an abbreviation indicating a deficiency with the data. The following are flags used in data validation.

- J- Estimated The associated numerical value is an estimated quantity with a negative bias. The analyte was detected but the reported value may not be accurate or precise.
- J+ Estimated The associated numerical value is an estimated quantity with a positive bias. The analyte was detected but the reported value may not be accurate or precise.
- J Estimated The associated numerical value is an estimated quantity. It is not possible to assess the direction of the potential bias. The analyte was detected but the reported value may not be accurate or precise. The "J" qualification indicates the data fell outside the QC limits, but the exceedance was not sufficient to cause rejection of the data.
- R Rejected The data is unusable (the compound or analyte may or may not be present). Use of the "R" qualifier indicates a significant variance from functional guideline acceptance criteria. Either resampling or reanalysis is necessary to determine the presence or absence of the rejected analyte. The "R" designation is also applied to yield only one complete set of data for a given sample and eliminate redundant data.
- U Nondetected Analyses were performed for the compound or analyte, but it was not detected. The "U" designation is also applied to suspected blank contamination. The "U" flag is used to qualify any result that is detected in an environmental sample and associated blank at less than the PQL.
- UJ Estimated/Nondetected Analyses were performed for the compound or analyte, but it was not detected and the sample quantitation or detection limit is an estimated quantity due to poor accuracy or precision. This qualification is also used to flag possible false negative results in the case where low bias in the analytical system is indicated by low calibration response, surrogate, or other spike recovery.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.
- A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The hierarchy of flags is listed below:

R > J	The R flag will always take precedence over the J qualifier.
J > J+ or J-	A non-biased (J) flag will always supersede biased (J+ or J-) flags since it is not possible to assess the direction of the potential bias.
J = J+ plus J-	Adding biased (J+, J-) flags with opposite signs will result in a non-biased flag (J).
UJ = U plus J or J+ or J-	The UJ flag is used when a non-detected (U) flag is added to a biased (J+ or J-) or non-biased flag (J).

Table II lists the reason codes used. Reason codes explain why flags have been applied and identify possible limitations of data use. Reason codes are cumulative except when one of the flags is R then only the reason code associated to the R flag will be used.

Table III presents the overall qualified results after all the flags or validation qualifiers and associated reason codes have been applied.

Once the data are reviewed and qualified according to the BRC SOP-40, QAPP, functional guidelines, and EPA Test Methods, the data set is then evaluated using PARCC criteria. PARCC criteria provide an evaluation of overall data usability. The following is a discussion of PARCC criteria as related to the project DQOs.

**Precision** is a measure of the agreement or reproducibility of analytical results under a given set of conditions. It is a quantity that cannot be measured directly but is calculated from percent recovery data. Precision is expressed as the relative percent difference (RPD):

$$RPD = (D1-D2)/\{1/2(D1+D2)\} \times 100$$

where:

D1 = reported concentration for the sample

D2 = reported concentration for the duplicate

Precision is primarily assessed by calculating an RPD from the percent recoveries of the spiked compounds for each sample in the MS/MSD pair. In the absence of an MS/MSD pair, a laboratory duplicate or LCS/LCSD pair can be analyzed as an alternative means of assessing precision. An additional measure of sampling precision was obtained by collecting and analyzing field duplicate samples, which were compared using the RPD result as the evaluation criteria.

MS and MSD samples are field samples spiked by the laboratory with target analytes prior to preparation and analysis. These samples measure the overall efficiency of the analytical method in recovering target analytes from an environmental matrix. A LCS is similar to an MS/MSD sample in that the LCS is spiked with the same target analytes prior to preparation and analysis. However, the LCS is prepared using a controlled interference-free matrix instead of a field sample aliquot. Laboratory reagent water is used to prepare aqueous LCS. The LCS measures laboratory efficiency in recovering target analytes from either an aqueous matrix in the absence of matrix interferences.

One primary sample is analyzed and accompanied by an unspiked laboratory duplicate. The data reviewer compares the reported results of the primary analysis and the laboratory duplicate, then calculates RPDs, which are used to assess laboratory precision.

Laboratory and field sampling precision are evaluated by calculating RPDs for aqueous field sample duplicate pairs. The sampler collects two field samples at the same location and under identically controlled conditions. The laboratory then analyzes the samples under identical conditions.

An RPD outside the numerical QC limit in either MS/MSD samples or LCS/LCSD indicates imprecision. Imprecision is the variance in the consistency with which the laboratory arrives at a particular reported result. Thus, the actual analyte concentration may be higher or lower than the reported result.

Possible causes of poor precision include sample matrix interference, improper sample collection or handling, inconsistent sample preparation, and poor instrument stability. In some duplicate pairs, results maybe reported in either the primary or duplicate samples at levels below the practical quantitation limit (PQL) or non-detected. Since these values are considered to be estimates, RPD exceedances from these duplicate pairs do not suggest a significant impact on the data quality.

**Accuracy** is a measure of the agreement of an experimental determination and the true value of the parameter being measured. It is used to identify bias in a given measurement system. Recoveries outside acceptable QC limits may be caused by factors such as instrumentation, analyst error, or matrix interference. Accuracy is assessed through the analysis of MS, MSD, LCS, and LCSD. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. Accuracy of inorganic analyses is determined using the percent recoveries of MS and LCS analyses.

Percent recovery (%R) is calculated using the following equation:

$$\%R = (A-B)/C \times 100$$

where:

A = measured concentration in the spiked sample

B = measured concentration of the spike compound in the unspiked sample

C = concentration of the spike

The percent recovery of each analyte spiked in MS/MSD samples and LCS/LCSD is evaluated with the acceptance criteria specified by the previously noted documents. Spike recoveries outside the acceptable QC accuracy limits provide an indication of bias, where the reported data may overestimate or underestimate the actual concentration of compounds detected or quantitation limits reported for environmental samples.

**Representativeness** is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population. It is evaluated by reviewing the QC results of blanks, samples and holding times. Positive detects of compounds in the blank samples identify compounds that may have been introduced into the samples during sample collection, transport, preparation, or analysis. The QA/QC blanks collected and analyzed are method blanks, equipment blanks and field blanks.

A method blank is a laboratory grade water or solid matrix that contains the method reagents and has undergone the same preparation and analysis as the environmental samples. The method blank provides a measure of the combined contamination derived from the laboratory source water, glassware, instruments, reagents, and sample preparation steps. Method blanks are prepared for each sample of a similar matrix extracted by the same method at a similar concentration level.

Initial and continuing calibration blanks consist of acidified laboratory grade water, which are injected at the beginning and at a regular frequency during each 12 - hour sample analysis run. These blanks estimate residual contaminants from the previous sample or standards analysis and measure baseline shifts that commonly occur in emission and absorption spectroscopy. Initial and continuing calibration blanks were only reviewed for samples on which Stage 4 review was performed.



Equipment blanks consist of analyte-free water poured over or through the sample collection equipment. The water is collected in a sample container for laboratory analysis. These blanks are collected after the sampling equipment is decontaminated and measure efficiency of the decontamination procedure. Equipment blanks were collected and analyzed for all target analytes.

Field blanks consist of analyte-free source water stored at the sample collection site. The water is collected from each source water used during each sampling event. Field blanks were collected and analyzed for all target analytes.

Contaminants found in both the environmental sample and the blank samples are assumed to be laboratory artifacts if both values are less than the PQL.

Holding times are evaluated to assure that the sample integrity is intact for accurate sample preparation and analysis. Holding times will be specific for each method and matrix analyzed. Holding time exceedance can cause loss of sample constituents due to biodegradation, precipitation, volatilization, and chemical degradation. In accordance with EPA guidance (USEPA 2004), sample results for analyses that were performed after the method holding time but less than two times the method holding time were qualified as estimated (J- or UJ) and sample results for analyses that were performed after two times the method holding time were qualified as rejected (R).

**Comparability** is a qualitative expression of the confidence with which one data set may be compared to another. It provides an assessment of the equivalence of the analytical results to data obtained from other analyses. It is important that data sets be comparable if they are used in conjunction with other data sets. The factors affecting comparability include the following: sample collection and handling techniques, matrix type, and analytical method. If these aspects of sampling and analysis are carried out according to standard analytical procedures, the data are considered comparable. Comparability is also dependent upon other PARCC criteria, because only when precision, accuracy, and representativeness are known can data sets be compared with confidence.

**Completeness** is defined as the percentage of acceptable sample results compared to the total number of sample results. Completeness is evaluated to determine if an acceptable amount of usable data were obtained so that a valid scientific site assessment can be completed. Completeness equals the total number of sample results for each fraction minus the total number of rejected sample results divided by the total number of sample results multiplied by 100. As specified in the project DQOs, the goal for completeness for target analytes in each analytical fraction is 90 percent.

Percent completeness is calculated using the following equation:

$$\%C = (T - R)/T \times 100$$

where:

%C = percent completeness

T = total number of sample results

R = total number of rejected sample results

Completeness is also determined by comparing the planned number of samples per method and matrix as specified in the QAPP, with the number determined above.

The following sections present a review of QC data for each analytical method.

## **2.0 CHROMIUM**

A total of 364 water samples were analyzed for chromium by EPA SW 846 Method 6010 and EPA Method 200.7. All metal data were assessed to be valid since none of the 364 total results were rejected based on holding time and QC exceedances. This section discusses the QA/QC supporting documentation as defined by the PARCC criteria and evaluated based on the DQOs.

### **2.1 Precision and Accuracy**

#### **2.1.1 Instrument Calibration**

Initial and continuing calibration verification results provide a means of evaluating accuracy within a particular SDG. Correlation coefficient (r) and percent recovery (%R) are the two major parameters used to measure the effectiveness of instrument calibration. The correlation coefficient indicates the linearity of the calibration curve. %R is used to verify the ongoing calibration acceptability of the analytical system.

The most critical of the two calibration parameters, r, has the potential to affect data accuracy across an SDG when it is outside the acceptable QC limits. %R exceedances suggest more routine instrumental anomalies, which typically impact all sample results for the affected analytes.

The correlation coefficients in the initial calibrations were within the acceptance criteria of  $\geq 0.995$  and the %Rs in the continuing calibration verifications met the acceptance criteria of 90-110%.

#### **2.1.2 MS/MSD Samples**

All MS/MSD %Rs and RPDs met acceptance criteria.

#### **2.1.3 LCS/LCSD Samples**

All LCS/LCSD %Rs and RPDs met acceptance criteria.

#### **2.1.4 Field Duplicate Samples**

The field duplicate samples were evaluated for acceptable precision with RPDs or difference in instances the results were less than five times the reporting limit for the compounds. The field duplicate RPDs or differences were within the acceptance criteria. The field duplicate RPDs or differences are presented in detail in Attachment A, Section XIV.

#### **2.1.5 ICP Interference Check Sample**

All ICP interference check %Rs met acceptance criteria for the Stage 4 samples.

#### **2.1.6 Analyte Quantitation and Target Identification**

Raw data were evaluated for the Stage 4 samples. All analyte quantitation and target identifications were acceptable.

## **2.2 Representativeness**

### **2.2.1 Sample Preservation and Holding Times**

The evaluation of holding times to verify compliance with the method was conducted. All samples met the 180-day analysis holding time criteria for chromium.

### **2.2.2 Blanks**

Method blanks, initial and continuing calibration blanks, equipment blanks, and field blanks were analyzed to evaluate representativeness. The concentration for an individual target compound in any of the types of QA/QC blanks was used for data qualification.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation. The corrective action consisted of amending the laboratory reported results based on the following criteria.

Results Below the PQL If a sample result and blank contaminant value were less than the PQL, the sample result was amended as estimated (J) at the concentration reported in the sample results.

Results Above the PQL If a sample result and blank contaminant value were greater than the PQL and less than 10 times the blank contaminant value, the sample result was qualified as detected estimated (J+) at the concentration reported in the sample results.

No Action If blank contaminant values were less than the PQL and associated sample results were greater than the PQL, or if blank contaminant values were greater than the PQL and associated sample results were greater than 10 times the blank contaminant value, the result was not amended.

#### **2.2.2.1 Method and Calibration Blanks**

No contaminants were detected in the method or calibration blanks for this analysis.

#### **2.2.2.2 Equipment and Field Blanks**

No data were qualified due to contaminants detected in the equipment blanks for this analysis.

## **2.3 Comparability**

The laboratory used standard analytical methods for all of the analyses. In all cases, the Sample Quantitation Limits (SQLs) attained were at or below the PQLs. Methods 6010 and 200.7 both utilize multielemental determinations by inductively coupled plasma-atomic emission spectrometry using simultaneous optical systems and axial or radial viewing of the plasma, the comparability of the metals data is regarded as acceptable.

## **2.4 Completeness**

The completeness level attained for chromium field samples was 100 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

### **3.0 WET CHEMISTRY**

A total of 26 water samples were analyzed for hexavalent chromium by EPA SW 846 Method 7196 and EPA Method 218.6; 574 water samples were analyzed for perchlorate by EPA Method 314.0; and 575 water samples were analyzed for total dissolved solids by Standard Method 2540C and EPA Method 160.1. All wet chemistry data were assessed to be valid with the exception of three of the 1,175 total results which were rejected based on holding time exceedances. This section discusses the QA/QC supporting documentation as defined by the PARCC criteria and evaluated based on the DQOs.

#### **3.1 Precision and Accuracy**

##### **3.1.1 Instrument Calibration**

As previously discussed in Section 2.1.1, initial and continuing calibration results provide a means of evaluating accuracy.

The correlation coefficients in the initial calibrations were within the acceptance criteria of  $\geq 0.995$  and the %Rs in the continuing calibration verifications met the acceptance criteria of 90-110%.

##### **3.1.2 MS/MSD Samples**

All MS/MSD %Rs and RPDs met the acceptance criteria

##### **3.1.3 Duplicate (DUP) Samples**

All DUP RPDs met the acceptance criteria.

##### **3.1.4 LCS/LCSD Samples**

All LCS/LCSD %Rs and RPDs met the acceptance criteria.

##### **3.1.5 Field Duplicate Samples**

The field duplicate samples were evaluated for acceptable precision with RPDs or difference in instances the results were less than five times the reporting limit for the compounds. Two perchlorate results were qualified as detected estimated (J) due to RPD outside of acceptance criteria in field duplicate pair M-23 and VD-6. The details regarding the qualification of results are presented in Attachment B, Section X.

##### **3.1.6 Analyte Quantitation and Target Identification**

Raw data were evaluated for the Stage 4 samples. All analyte quantitation and target identifications were acceptable.

#### **3.2 Representativeness**

##### **3.2.1 Sample Preservation and Holding Times**

The evaluation of holding times to verify compliance with the method was conducted. All water samples met the 28-day analysis holding time criteria for perchlorate.

Due to a severe holding time criteria exceedance, the hexavalent chromium results for samples EB-1 (sampled on 2/5/13), EB-2 (sampled on 2/6/13), and M-37 (sampled on 2/6/13) were qualified as rejected (R). Additionally, 13 results for hexavalent chromium and total dissolved solids were qualified as

detected estimated (J-) or non-detected estimated (UJ). The analysis holding time criteria for water samples is 24 hours for hexavalent chromium and 7 days for total dissolved solids. The details regarding the qualification of results are presented in Attachment B, Section I.

### **3.2.2 Blanks**

As previously discussed in Section 2.2.2, method blanks, initial and calibration blanks, equipment blanks, and field blanks were analyzed to evaluate representativeness.

#### **3.2.2.1 Method and Calibration Blanks**

No contaminants were detected in the method or calibration blanks for this analysis.

#### **3.2.2.2 Equipment and Field Blanks**

The perchlorate results in samples M-153 (sampled on 5/23/13), TR-8 (sampled on 5/23/13), and TR-9 (sampled on 5/23/13) were qualified as detected estimated (J+) due to contaminants detected in the equipment blanks. The details regarding the qualification of results are presented in Attachment B, Section IV.

### **3.3 Comparability**

The laboratory used standard analytical methods for all of the analyses. In all cases, the SQLs attained were at or below the PQLs. Methods 160.1 and 2540C both utilize a well-mixed sample filtered through a glass fiber filter and the residue retained on the filter is dried to constant weight at 103-105°C, the comparability of the total dissolved solids data is regarded as acceptable.

### **3.4 Completeness**

The completeness level attained for wet chemistry field samples was 99.7 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

## **4.0 VARIANCES IN ANALYTICAL PERFORMANCE**

The laboratory used standard analytical methods for all of the analyses throughout the project. No systematic variances in analytical performance were noted in the laboratory case narratives.

## **5.0 SUMMARY OF PARCC CRITERIA**

The validation reports present the PARCC results for all SDGs. Each PARCC criterion is discussed in detail in the following sections.

### **5.1 Precision and Accuracy**

Precision and accuracy were evaluated using data quality indicators such as calibration, surrogates, MS/MSD, DUP, LCS/LCSD, and field duplicates. The precision and accuracy of the data set were considered acceptable after integration of result qualification.

All calibrations were performed as required and met the acceptance criteria. All surrogate, MS/MSD, DUP, LCS/LCSD, and field duplicate percent recoveries, RPDs, and difference met acceptance criteria. All ICP interference check sample %Rs met acceptance criteria.

## 5.2 Representativeness

All samples for each method and matrix were evaluated for holding time compliance. All samples were associated with a method blank in each individual SDG. The representativeness of the project data is considered acceptable after integration of result qualification.

## 5.3 Comparability

Sampling frequency requirements were met in obtaining necessary equipment blanks, field blanks and field duplicates. The laboratory used standard analytical methods for the analyses. The analytical results were reported in correct standard units. Sample preservation, and sample integrity criteria were met. Holding times were within QC criteria with the exceptions noted in Section 3.2.1. The overall comparability is considered acceptable.

## 5.4 Completeness

Of the 1,531 total analytes reported, three of the sample results were rejected. The completeness for the SDGs is as follows:

<b>Parameter</b>	<b>Total Analytes</b>	<b>No. of Rejects</b>	<b>% Completeness</b>
Metals	362	0	100
Wet Chemistry	1,169	3	99.7
<b>Total</b>	<b>1,531</b>	<b>3</b>	<b>99.8</b>

The completeness percentage based on rejected data met the 90 percent DQO goal.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

The analytical data quality assessment for the water sample laboratory analytical results generated during the Annual Remedial Performance Sampling at the Nevada Environmental Response Trust (NERT) site in Henderson, Nevada established that the overall project requirements and completeness levels were met. The sample results that were found to be rejected (R) are unusable for all purposes. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the Stage 2A and Stage 4 data validation all other results are considered valid and usable for all purposes.

## 7.0 REFERENCES

NDEP, 2009. Data Verification and Validation Requirements - Supplement established for the BMI Plant Sites and Common Areas Projects, Henderson, Nevada. April 13.

Basic Remediation Company (BRC), 2009. Standard Operating Procedures, SOP-40 Data Review/Validation. Revision 4. May 2009.

Revised Phase B Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (QAPP), Revision. May 2009.

Region 9 Superfund Data Evaluation/Validation Guidance, R6QA/006.1, Draft. December 2001.

USEPA, 2004. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. October 2004.

\_\_\_\_\_.1983. EPA Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Cincinnati, Ohio. March 1983.

\_\_\_\_\_.1996. EPA SW 846 Third Edition, Test Methods for Evaluating Solid Waste, update I, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IV. February 2007.

(Eaton et al., 1998) *Standard Method for the Examination of Water and Wastewater* (20th ed.). Washington, DC: American Public Health Association.

TABLE I



SDG#: 420318

## VALIDATION SAMPLE TABLE

LDC#: 30023A

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)									
ART-1	201301050068	water		01/03/13	X	X	X									
ART-2	201301050069	water		01/03/13	X	X	X									
ART-3	201301050070	water		01/03/13	X	X	X									
ART-4	201301050071	water		01/03/13	X	X	X									
ART-6	201301050072	water		01/03/13	X	X	X									
ART-7	201301050073	water		01/03/13	X	X	X									
ART-8	201301050074	water		01/03/13	X	X	X									
PC-99R2/R3	201301050075	water		01/03/13	X	X	X									
PC-115R	201301050076	water		01/03/13	X	X	X									
PC-116R	201301050077	water		01/03/13	X	X	X									
PC-117	201301050079	water		01/03/13	X	X	X									
PC-118	201301050080	water		01/03/13	X	X	X									
PC-119	201301050081	water		01/03/13	X	X	X									
PC-120	201301050082	water		01/03/13	X	X	X									
PC-121	201301050083	water		01/03/13	X	X	X									
PC-133	201301050084	water		01/03/13	X	X	X									
ART-9	201301050085	water		01/03/13	X	X	X									
ART-1MS	201301050068MS	water	MS	01/03/13	X											
ART-1MSD	201301050068MSD	water	MSD	01/03/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 420318

## VALIDATION SAMPLE TABLE

LDC#: 30023A

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)									
PC-121MS	201301050083MS	water	MS	01/03/13	X											
PC-121MSD	201301050083MSD	water	MSD	01/03/13	X											
PC-118DUP	201301050080DUP	water	DUP	01/03/13			X									
PC-119DUP	201301050081DUP	water	DUP	01/03/13			X									

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 422515

## VALIDATION SAMPLE TABLE

LDC#: 30023B

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)											
MW-K4	201301190069	water		01/17/13	X	X											
ARP-1	201301190070	water		01/16/13	X	X											
ARP-2A	201301190071	water		01/17/13	X	X											
ARP-3A	201301190072	water		01/17/13	X	X											
ARP-4A	201301190073	water		01/17/13	X	X											
ARP-5A	201301190074	water		01/17/13	X	X											
ARP-6B	201301190075	water		01/17/13	X	X											
ARP-7	201301190076	water		01/17/13	X	X											
PC-53	201301190077	water		01/16/13	X	X											
PC-103	201301190078	water		01/17/13	X	X											
MW-K5	201301190079	water		01/16/13	X	X											
M-83	201301190080	water		01/17/13	X	X											
PC-98R	201301190081	water		01/17/13	X	X											
PC-86	201301190082	water		01/16/13	X	X											
PC-90	201301190083	water		01/16/13	X	X											
PC-68	201301190084	water		01/16/13	X	X											
PC-122	201301190085	water		01/16/13	X	X											
PC-91	201301190086	water		01/16/13	X	X											
PC-97	201301190087	water		01/16/13	X	X											
PC-18	201301190088	water		01/16/13	X	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 422515

## VALIDATION SAMPLE TABLE

LDC#: 30023B

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C/ 160.1)										
PC-55	201301190089	water		01/16/13	X	X										
PC-101R	201301190090	water		01/16/13	X	X										
PC-86DUP	201301190082DUP	water	DUP	01/16/13		X										
PC-90MS	201301190083MS	water	MS	01/16/13	X											
PC-90MSD	201301190083MSD	water	MSD	01/16/13	X											
PC-68DUP	201301190084DUP	water	DUP	01/16/13		X										

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 423999

## VALIDATION SAMPLE TABLE

LDC#: 30023C

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)	CrVI (7196)								
PC-123	201302050291	water		02/04/13	X	X	X									
PC-128	201302050292	water		02/04/13	X	X	X									
PC-129	201302050293	water		02/04/13	X	X	X									
PC-130	201302050294	water		02/04/13	X	X	X									
PC-131	201302050295	water		02/04/13	X	X	X									
PC-132	201302050296	water		02/04/13	X	X	X									
PC-124	201302050297	water		02/04/13	X	X	X									
PC-125	201302050298	water		02/04/13	X	X	X									
PC-126	201302050299	water		02/04/13	X	X	X									
PC-127	201302050300	water		02/04/13	X	X	X									
M-95	201302050302	water	FD1	02/04/13	X	X	X	X								
PC-54	201302050303	water		02/04/13	X	X	X									
M-48A	201302050306	water		02/04/13	X	X	X									
M-44	201302050307	water		02/04/13	X	X	X	X								
PC-71	201302050308	water		02/04/13	X	X	X									
PC-72	201302050309	water		02/04/13	X	X	X									
PC-73	201302050310	water		02/04/13	X	X	X									
PC-37	201302050311	water		02/04/13	X	X	X									
M-23	201302050312	water		02/04/13	X	X	X									
FB-1	201302050313	water	FB	02/04/13	X	X	X	X								

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 423999

## VALIDATION SAMPLE TABLE

LDC#: 30023C

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)	CrVI (7196)								
VD-3	201302050314	water	FD1	02/04/13	X	X	X	X								
PC-54DUP	201302050303DUP	water	DUP	02/04/13			X									
M-23MS	201302050312MS	water	MS	02/04/13	X											
M-23MSD	201302050312MSD	water	MSD	02/04/13	X											
M-23DUP	201302050312DUP	water	DUP	02/04/13			X									
VD-3MS	201302050314MS	water	MS	02/04/13				X								
VD-3MSD	201302050314MSD	water	MSD	02/04/13				X								
FB-1MS	201302050313MS	water	MS	02/04/13	X											
FB-1MSD	201302050313MSD	water	MSD	02/04/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 424008

## VALIDATION SAMPLE TABLE

LDC#: 30023D

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)										
ART-1	20130205325	water		02/04/13	X	X	X										
ART-2	20130205326	water		02/04/13	X	X	X										
ART-3	20130205327	water		02/04/13	X	X	X										
ART-4	20130205328	water		02/04/13	X	X	X										
ART-6	20130205329	water		02/04/13	X	X	X										
ART-7	20130205330	water		02/04/13	X	X	X										
ART-8	20130205331	water		02/04/13	X	X	X										
PC-99R2/R3	20130205332	water		02/04/13	X	X	X										
PC-115R	20130205333	water		02/04/13	X	X	X										
PC-116R	20130205334	water		02/04/13	X	X	X										
PC-117	20130205336	water		02/04/13	X	X	X										
PC-118	20130205337	water		02/04/13	X	X	X										
PC-119	20130205338	water		02/04/13	X	X	X										
PC-120	20130205339	water		02/04/13	X	X	X										
PC-121	20130205340	water		02/04/13	X	X	X										
PC-133	20130205341	water		02/04/13	X	X	X										
ART-9	20130205342	water		02/04/13	X	X	X										
PC-117MS	20130205336MS	water	MS	02/04/13	X												
PC-117MSD	20130205336MSD	water	MSD	02/04/13	X												
PC-118MS	20130205337MS	water	MS	02/04/13		X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 424008

## VALIDATION SAMPLE TABLE

LDC#: 30023D

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)									
PC-118MSD	20130205337MSD	water	MSD	02/04/13		X										
PC-118DUP	20130205337DUP	water	DUP	02/04/13			X									
PC-119DUP	20130205338DUP	water	DUP	02/04/13			X									

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate



SDG#: 424010

## VALIDATION SAMPLE TABLE

LDC#: 30023E

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)										
I-O	201302050345	water		02/04/13	X	X	X										
I-P	201302050346	water		02/04/13	X	X	X										
I-H	201302050347	water		02/04/13	X	X	X										
I-U	201302050348	water		02/04/13	X	X	X										
I-T	201302050349	water		02/04/13	X	X	X										
I-G	201302050350	water		02/04/13	X	X	X										
I-Q	201302050351	water		02/04/13	X	X	X										
I-F	201302050352	water		02/04/13	X	X	X										
I-N	201302050353	water		02/04/13	X	X	X										
I-E	201302050354	water		02/04/13	X	X	X										
I-M	201302050355	water		02/04/13	X	X	X										
I-D	201302050356	water		02/04/13	X	X	X										
I-C	201302050357	water		02/04/13	X	X	X										
I-S	201302050358	water		02/04/13	X	X	X										
I-L	201302050359	water		02/04/13	X	X	X										
I-R	201302050360	water		02/04/13	X	X	X										
I-B	201302050361	water		02/04/13	X	X	X										
I-AR	201302050362	water		02/04/13	X	X	X										
I-BMS	201302050361MS	water	MS	02/04/13	X												
I-BMSD	201302050361MSD	water	MSD	02/04/13	X												

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 424010

**VALIDATION SAMPLE TABLE**

LDC#: 30023E

**Project Name:** 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)									
I-BDUP	201302050361DUP	water	DUP	02/04/13			X									
I-ARMS	201302050362MS	water	MS	02/04/13	X											
I-ARMSD	201302050362MSD	water	MSD	02/04/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 424394

## VALIDATION SAMPLE TABLE

LDC#: 30023F

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)	CrVI (7196)								
M-97	201302070215	water		02/06/13	X	X	X									
I-V	201302070216	water		02/06/13	X	X	X									
I-K	201302070217	water		02/06/13	X	X	X									
I-J	201302070218	water		02/06/13	X	X	X									
I-Z	201302070219	water		02/06/13	X	X	X									
I-I	201302070220	water		02/06/13	X	X	X									
M-31A	201302070221	water		02/06/13	X	X	X									
M-52	201302070222	water		02/06/13	X	X	X									
M-35	201302070223	water		02/06/13	X	X	X									
M-19	201302070224	water		02/06/13	X	X	X									
M-68	201302070225	water		02/06/13	X	X	X									
M-67	201302070226	water		02/06/13	X	X	X									
M-74	201302070227	water		02/06/13	X	X	X									
M-73	201302070228	water		02/06/13	X	X	X									
M-12A	201302070229	water		02/06/13	X	X	X	X								
M-11	201302070230	water	FD2	02/06/13	X	X	X	X								
M-10	201302070231	water		02/06/13	X	X	X	X								
VD-4	201302070232	water	FD2	02/06/13	X	X	X	X								
EB-2	201302070233	water	EB	02/06/13	X	X	X	X								
M-37	201302070234	water		02/06/13				X								

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 424394

## VALIDATION SAMPLE TABLE

LDC#: 30023F

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)	CrVI (7196)									
M-31ADUP	201302070221DUP	water	DUP	02/06/13			X										
M-19MS	201302070224MS	water	MS	02/06/13	X												
M-19MSD	201302070224MSD	water	MSD	02/06/13	X												
M-11MS	201302070230MS	water	MS	02/06/13				X									
M-11MSD	201302070230MSD	water	MSD	02/06/13				X									
M-11DUP	201302070230DUP	water	DUP	02/06/13			X										
M-10MS	201302070231MS	water	MS	02/06/13	X												
M-10MSD	201302070231MSD	water	MSD	02/06/13	X												

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 424392

## VALIDATION SAMPLE TABLE

LDC#: 30051G

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)	CrVI (7196)								
PC-135A	201302070196	water		02/05/13	X	X	X									
PC-136	201302070197	water		02/05/13	X	X	X									
PC-144	201302070198	water		02/05/13	X	X	X									
PC-148	201302070199	water		02/05/13	X	X	X									
PC-149	201302070200	water		02/05/13	X	X	X									
PC-150	201302070201	water	FD3	02/05/13	X	X	X									
M-64	201302070202	water		02/05/13	X	X	X									
M-65	201302070203	water		02/05/13	X	X	X									
M-66	201302070204	water	FD4	02/05/13	X	X	X									
M-79	201302070205	water		02/05/13	X	X	X									
M-69	201302070206	water		02/05/13	X	X	X									
M-135	201302070207	water		02/05/13	X	X	X									
M-131	201302070208	water		02/05/13	X	X	X									
M-57A	201302070209	water		02/05/13	X	X	X									
M-37	201302070210	water		02/05/13	X	X	X									
M-25	201302070211	water		02/05/13	X	X	X									
EB-1	201302070212	water	EB	02/05/13	X	X	X	X								
VD-1	201302070213	water	FD3	02/05/13	X	X	X									
VD-2	201302070214	water	FD4	02/05/13	X	X	X									
PC-136DUP	201302070197DUP	water	DUP	02/05/13			X									

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 424392

## VALIDATION SAMPLE TABLE

LDC#: 30051G

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)	CrVI (7196)								
PC-149MS	201302070200MS	water	MS	02/05/13	X											
PC-149MSD	201302070200MSD	water	MSD	02/05/13	X											
PC-149DUP	201302070200DUP	water	DUP	02/05/13			X									
PC-150MS	201302070201MS	water	MS	02/05/13	X											
PC-150MSD	201302070201MSD	water	MSD	02/05/13	X											
M-57ADUP	201302070209DUP	water	DUP	02/05/13			X									

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 424439

**VALIDATION SAMPLE TABLE**

LDC#: 30023G

**Project Name:** 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	TDS (2540C/160.1)										
M-10	201302080030	water		02/06/13	X	X										

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 424556

## VALIDATION SAMPLE TABLE

LDC#: 30023H

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (6010)	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)	CrVI (7196)								
M-83	201302090028	water		02/07/13	X	X	X									
M-80	201302090029	water		02/07/13	X	X	X									
M-81A	201302090030	water		02/07/13	X	X	X									
M-70	201302090031	water		02/07/13	X	X	X									
M-71	201302090032	water		02/07/13	X	X	X									
M-72	201302090033	water		02/07/13	X	X	X									
M-22A	201302090034	water		02/07/13	X	X	X									
M-14A	201302090035	water		02/07/13	X	X	X									
M-36	201302090036	water		02/07/13	X	X	X	X								
M-38	201302090037	water		02/07/13	X	X	X									
M-14AMS	201302090035MS	water	MS	02/07/13	X											
M-14MSD	201302090035MSD	water	MSD	02/07/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate



SDG#: 425373

## VALIDATION SAMPLE TABLE

LDC#: 30023I

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)											
PC-98R	201302140731	water		02/13/13	X	X											
PC-86	201302140732	water		02/12/13	X	X											
PC-90	201302140733	water		02/12/13	X	X											
PC-56	201302140734	water		02/12/13	X	X											
PC-58	201302140735	water		02/12/13	X	X											
PC-59	201302140736	water		02/12/13	X	X											
PC-60	201302140737	water		02/12/13	X	X											
PC-62	201302140738	water		02/12/13	X	X											
PC-68	201302140739	water		02/12/13	X	X											
PC-122	201302140740	water		02/13/13	X	X											
MW-K4	201302140741	water		02/13/13	X	X											
ARP-1	201302140742	water		02/13/13	X	X											
ARP-2A	201302140743	water		02/13/13	X	X											
ARP-3A	201302140744	water		02/13/13	X	X											
ARP-4A	201302140745	water		02/13/13	X	X											
ARP-5A	201302140746	water		02/13/13	X	X											
ARP-6B	201302140747	water		02/13/13	X	X											
ARP-7	201302140748	water		02/13/13	X	X											
PC-53	201302140749	water		02/13/13	X	X											
PC-103	201302140750	water		02/13/13	X	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 425373

## VALIDATION SAMPLE TABLE

LDC#: 30023I

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)											
MW-K5	201302140751	water		02/13/13	X	X											
PC-91	201302140752	water		02/12/13	X	X											
PC-97	201302140753	water		02/12/13	X	X											
PC-18	201302140754	water		02/12/13	X	X											
PC-55	201302140755	water		02/12/13	X	X											
PC-101R	201302140756	water		02/13/13	X	X											
PC-94	201302140757	water		02/13/13	X	X											
ART-7B	201302140758	water		02/13/13	X	X											
PC-86DUP	201302140732DUP	water	DUP	02/12/13		X											
PC-90MS	201302140733MS	water	MS	02/12/13	X												
PC-90MSD	201302140733MSD	water	MSD	02/12/13	X												
PC-68DUP	201302140739DUP	water	DUP	02/12/13		X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 427572

## VALIDATION SAMPLE TABLE

LDC#: 30023J

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)										
ART-1	201303080226	water		03/05/13	X	X										
ART-2	201303080227	water		03/05/13	X	X										
ART-3	201303080228	water		03/05/13	X	X										
ART-4	201303080229	water		03/05/13	X	X										
ART-6	201303080230	water		03/05/13	X	X										
ART-7	201303080231	water		03/05/13	X	X										
ART-8	201303080232	water		03/05/13	X	X										
PC-99R2/R3	201303080233	water		03/05/13	X	X										
PC-115R	201303080234	water		03/05/13	X	X										
PC-116R	201303080235	water		03/05/13	X	X										
PC-117	201303080237	water		03/05/13	X	X										
PC-118	201303080238	water		03/05/13	X	X										
PC-119	201303080239	water		03/05/13	X	X										
PC-120	201303080240	water		03/05/13	X	X										
PC-121	201303080241	water		03/05/13	X	X										
PC-133	201303080242	water		03/05/13	X	X										
ART-9	201303080243	water		03/05/13	X	X										

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 428373

## VALIDATION SAMPLE TABLE

LDC#: 30023K

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)											
M-83	201303150323	water		03/13/13	X	X											
PC-98R	201303150324	water		03/13/13	X	X											
PC-86	201303150325	water		03/12/13	X	X											
PC-90	201303150326	water		03/12/13	X	X											
PC-56	201303150327	water		03/12/13	X	X											
PC-58	201303150328	water		03/12/13	X	X											
PC-59	201303150329	water		03/12/13	X	X											
PC-60	201303150330	water		03/12/13	X	X											
PC-62	201303150331	water		03/12/13	X	X											
PC-68	201303150332	water		03/12/13	X	X											
PC-122	201303150333	water		03/13/13	X	X											
MW-K4	201303150334	water		03/13/13	X	X											
ARP-1	201303150335	water		03/12/13	X	X											
ARP-2A	201303150336	water		03/13/13	X	X											
ARP-3A	201303150337	water		03/13/13	X	X											
ARP-4A	201303150338	water		03/13/13	X	X											
ARP-5A	201303150339	water		03/13/13	X	X											
ARP-6B	201303150340	water		03/13/13	X	X											
ARP-7	201303150341	water		03/13/13	X	X											
PC-53	201303150342	water		03/13/13	X	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 428373

## VALIDATION SAMPLE TABLE

LDC#: 30023K

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C/ 160.1)											
PC-103	201303150343	water		03/13/13	X	X											
MW-K5	201303150344	water		03/13/13	X	X											
ART-7B	201303150345	water		03/13/13	X	X											
PC-91	201303150346	water		03/12/13	X	X											
PC-97	201303150347	water		03/12/13	X	X											
PC-18	201303150348	water		03/12/13	X	X											
PC-55	201303150349	water		03/12/13	X	X											
PC-101R	201303150350	water		03/12/13	X	X											
M-83MS	201303150323MS	water	MS	03/13/13	X												
M-83MSD	201303150323MSD	water	MSD	03/13/13	X												
M-83DUP	201303150323DUP	water	DUP	03/13/13		X											
PC-68DUP	201303150332DUP	water	DUP	03/12/13		X											
PC-55MS	201303150349MS	water	MS	03/12/13	X												
PC-55MSD	201303150349MSD	water	MSD	03/12/13	X												

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-42678-1

## VALIDATION SAMPLE TABLE

LDC#: 30023L

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)											
ART-1	440-42678-1	water		04/02/13	X	X											
ART-2	440-42678-2	water		04/02/13	X	X											
ART-3	440-42678-3	water		04/02/13	X	X											
ART-4	440-42678-4	water		04/02/13	X	X											
ART-6	440-42678-5	water		04/02/13	X	X											
ART-7	440-42678-6	water		04/02/13	X	X											
ART-8	440-42678-7	water		04/02/13	X	X											
ART-9	440-42678-8	water		04/02/13	X	X											
PC-99R2/R3	440-42678-9	water		04/02/13	X	X											
PC-115R	440-42678-10	water		04/02/13	X	X											
PC-116R	440-42678-11	water		04/02/13	X	X											
PC-117	440-42678-12	water		04/02/13	X	X											
PC-118	440-42678-13	water		04/02/13	X	X											
PC-119	440-42678-14	water		04/02/13	X	X											
PC-120	440-42678-15	water		04/02/13	X	X											
PC-121	440-42678-16	water		04/02/13	X	X											
PC-133	440-42678-17	water		04/02/13	X	X											
ART-1DUP	440-42678-1DUP	water	DUP	04/02/13		X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

## Project Name: 2013 Annual Remedial Performance Sampling

## Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C/160.1)										
PC-86	440-43599-1	water		04/09/13	X	X										
PC-90	440-43599-2	water		04/09/13	X	X										
PC-91	440-43599-3	water		04/09/13	X	X										
PC-97	440-43599-4	water		04/09/13	X	X										
PC-18	440-43599-5	water		04/09/13	X	X										
PC-55	440-43599-6	water		04/09/13	X	X										
PC-101R	440-43599-7	water		04/10/13	X	X										
MW-K4	440-43599-8	water		04/10/13	X	X										
ARP-1	440-43599-9	water		04/09/13	X	X										
ARP-2A	440-43599-10	water		04/10/13	X	X										
ARP-3A	440-43599-11	water		04/10/13	X	X										
ARP-4A	440-43599-12	water		04/10/13	X	X										
ARP-5A	440-43599-13	water		04/10/13	X	X										
ARP-6B	440-43599-14	water		04/10/13	X	X										
ARP-7	440-43599-15	water		04/10/13	X	X										
PC-53	440-43599-16	water		04/11/13	X	X										
PC-103	440-43599-17	water		04/10/13	X	X										
MW-K5	440-43599-18	water		04/11/13	X	X										
M-83	440-43599-19	water		04/09/13	X	X										
PC-98R	440-43599-20	water		04/11/13	X	X										

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-43599-1

## VALIDATION SAMPLE TABLE

LDC#: 30023M

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C/ 160.1)										
PC-58	440-43599-21	water		04/10/13	X	X										
PC-56	440-43599-22	water		04/10/13	X	X										
PC-60	440-43599-23	water		04/10/13	X	X										
PC-59	440-43599-24	water		04/10/13	X	X										
PC-62	440-43599-25	water		04/10/13	X	X										
PC-68	440-43599-26	water		04/10/13	X	X										
PC-122	440-43599-27	water		04/11/13	X	X										
PC-86DUP	440-43599-1DUP	water	DUP	04/09/13		X										
PC-58DUP	440-43599-21DUP	water	DUP	04/10/13		X										

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate



SDG#: 440-45612-1

## VALIDATION SAMPLE TABLE

LDC#: 30023N

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
PC-123	440-45612-1	water		05/06/13	X	X	X									
PC-128	440-45612-2	water		05/06/13	X	X	X									
PC-129	440-45612-3	water		05/06/13	X	X	X									
PC-130	440-45612-4	water		05/06/13	X	X	X									
PC-50	440-45612-5	water		05/06/13	X	X	X									
PC-131	440-45612-6	water		05/06/13	X	X	X									
PC-132	440-45612-7	water		05/06/13	X	X	X									
PC-124	440-45612-8	water		05/06/13	X	X	X									
PC-125	440-45612-9	water		05/06/13	X	X	X									
PC-126	440-45612-10	water		05/06/13	X	X	X									
PC-24	440-45612-11	water		05/06/13	X	X	X									
PC-127	440-45612-12	water		05/06/13	X	X	X									
PC-123MS	440-45612-1MS	water	MS	05/06/13	X											
PC-123MSD	440-45612-1MSD	water	MSD	05/06/13	X											
PC-123DUP	440-45612-1DUP	water	DUP	05/06/13			X									
PC-125MS	440-45612-9MS	water	MS	05/06/13	X											
PC-125MSD	440-45612-9MSD	water	MSD	05/06/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-45619-1

## VALIDATION SAMPLE TABLE

LDC#: 300230

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)										
I-AR	440-45619-1	water		05/06/13	X	X	X										
I-B	440-45619-2	water		05/06/13	X	X	X										
I-R	440-45619-3	water		05/06/13	X	X	X										
I-L	440-45619-4	water		05/06/13	X	X	X										
I-S	440-45619-5	water		05/06/13	X	X	X										
I-C	440-45619-6	water		05/06/13	X	X	X										
I-D	440-45619-7	water		05/06/13	X	X	X										
I-M	440-45619-8	water		05/06/13	X	X	X										
I-E	440-45619-9	water		05/06/13	X	X	X										
I-N	440-45619-10	water		05/06/13	X	X	X										
I-F	440-45619-11	water		05/06/13	X	X	X										
I-Q	440-45619-12	water		05/06/13	X	X	X										
I-ARDUP	440-45619-1DUP	water	DUP	05/06/13			X										
I-DMS	440-45619-7MS	water	MS	05/06/13	X												
I-DMSD	440-45619-7MSD	water	MSD	05/06/13	X												

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-45623-1

## VALIDATION SAMPLE TABLE

LDC#: 30023P

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
I-G	440-45623-1	water		05/06/13	X	X	X									
I-T	440-45623-2	water		05/06/13	X	X	X									
I-U	440-45623-3	water		05/06/13	X	X	X									
I-H	440-45623-4	water		05/06/13	X	X	X									
I-P	440-45623-5	water		05/06/13	X	X	X									
I-O	440-45623-6	water		05/06/13	X	X	X									
I-PMS	440-45623-5MS	water	MS	05/06/13	X											
I-PMSD	440-45623-5MSD	water	MSD	05/06/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-45624-1

## VALIDATION SAMPLE TABLE

LDC#: 30051A

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
PC-28	440-45624-1	water		05/06/13	X	X	X									
PC-31	440-45624-2	water		05/06/13	X	X	X									
PC-64	440-45624-3	water		05/06/13	X	X	X									
PC-65	440-45624-4	water		05/06/13	X	X	X									
PC-66	440-45624-5	water		05/06/13	X	X	X									
PC-67	440-45624-6	water		05/06/13	X	X	X									

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-45716-1

## VALIDATION SAMPLE TABLE

LDC#: 30023Q

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)	CrVI (218.6)								
PC-144	440-45716-1	water		05/07/13	X	X	X									
PC-134A	440-45716-2	water		05/07/13	X	X	X									
PC-135A	440-45716-3	water		05/07/13	X	X	X									
HMW-16	440-45716-4	water		05/07/13		X	X									
HMW-13	440-45716-5	water		05/07/13		X	X									
FB-1	440-45716-6	water	FB	05/07/13	X	X	X	X								

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-45723-1

## VALIDATION SAMPLE TABLE

LDC#: 30023R

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
AA-01	440-45723-1	water		05/07/13		X	X									
PC-148	440-45723-2	water		05/07/13	X	X	X									
PC-149	440-45723-3	water		05/07/13	X	X	X									
PC-150	440-45723-4	water		05/07/13	X	X	X									
PC-143	440-45723-5	water		05/07/13	X	X	X									
PC-142	440-45723-6	water		05/07/13	X	X	X									
PC-145	440-45723-7	water		05/07/13	X	X	X									
PC-137	440-45723-8	water		05/07/13	X	X	X									
PC-136	440-45723-9	water		05/07/13	X	X	X									
PC-2	440-45723-10	water		05/07/13	X	X	X									
PC-4	440-45723-11	water		05/07/13	X	X	X									
PC-148MS	440-45723-2MS	water	MS	05/07/13	X											
PC-148MSD	440-45723-2MSD	water	MSD	05/07/13	X											
PC-4DUP	440-45723-11DUP	water	DUP	05/07/13			X									

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-45890-1

## VALIDATION SAMPLE TABLE

LDC#: 30023S

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)										
ART-1	440-45890-1	water		05/06/13	X	X	X										
ART-2	440-45890-2	water		05/06/13	X	X	X										
ART-3	440-45890-3	water		05/06/13	X	X	X										
ART-4	440-45890-4	water		05/06/13	X	X	X										
ART-6	440-45890-5	water		05/06/13	X	X	X										
ART-7	440-45890-6	water		05/06/13	X	X	X										
ART-8	440-45890-7	water		05/06/13	X	X	X										
ART-9	440-45890-8	water		05/06/13	X	X	X										
PC-99R2/R3	440-45890-9	water		05/06/13	X	X	X										
PC-115R	440-45890-10	water		05/06/13	X	X	X										
PC-116R	440-45890-11	water		05/06/13	X	X	X										
PC-117	440-45890-12	water		05/06/13	X	X	X										
PC-118	440-45890-13	water		05/06/13	X	X	X										
PC-119	440-45890-14	water		05/06/13	X	X	X										
PC-120	440-45890-15	water		05/06/13	X	X	X										
PC-121	440-45890-16	water		05/06/13	X	X	X										
PC-133	440-45890-17	water		05/06/13	X	X	X										
ART-1MS	440-45890-1MS	water	MS	05/06/13	X												
ART-1MSD	440-45890-1MSD	water	MSD	05/06/13	X												
ART-1DUP	440-45890-1DUP	water	DUP	05/06/13			X										

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-45890-1

**VALIDATION SAMPLE TABLE**

LDC#: 30023S

**Project Name:** 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
PC-116RMS	440-45890-11MS	water	MS	05/06/13	X											
PC-116RMSD	440-45890-11MSD	water	MSD	05/06/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate



SDG#: 440-45976-1

## VALIDATION SAMPLE TABLE

LDC#: 30023T

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)										
PC-71	440-45976-1	water		05/08/13	X	X	X										
PC-72	440-45976-2	water		05/08/13	X	X	X										
PC-73	440-45976-3	water		05/08/13	X	X	X										
PC-40	440-45976-4	water		05/08/13	X	X	X										
H-58A	440-45976-5	water		05/08/13	X	X	X										
H-48	440-45976-6	water		05/08/13	X	X	X										
MC-65	440-45976-7	water		05/08/13	X	X	X										
PC-37	440-45976-8	water	FD7*	05/08/13	X	X	X										
HM-2	440-45976-9	water		05/08/13		X	X										
PC-107	440-45976-10	water		05/08/13		X	X										
HMW-14	440-45976-11	water		05/08/13		X	X										
HMW-15	440-45976-12	water		05/08/13		X	X										
PC-71DUP	440-45976-1DUP	water	DUP	05/08/13			X										
PC-40MS	440-45976-4MS	water	MS	05/08/13	X												
PC-40MSD	440-45976-4MSD	water	MSD	05/08/13	X												

\*FD7 = Sample PC-37 is the parent sample of field duplicate VD-5 (from SDG 440-46009-1).

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46009-1

## VALIDATION SAMPLE TABLE

LDC#: 30051B

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)										
PC-54	440-46009-1	water		05/08/13	X	X	X										
M-95	440-46009-2	water		05/08/13	X	X	X										
PC-21A	440-46009-3	water	FD6	05/08/13	X	X	X										
M-48A	440-46009-4	water	FD5	05/08/13	X	X	X										
VD-3	440-46009-5	water	FD5	05/08/13	X	X	X										
VD-4	440-46009-6	water	FD6	05/08/13	X	X	X										
VD-5	440-46009-7	water	FD7*	05/08/13	X	X	X										
M-44	440-46009-8	water		05/08/13	X	X	X										
EB-1	440-46009-9	water	EB	05/08/13	X	X	X										
EB-1MS	440-46009-9MS	water	MS	05/08/13		X											
EB-1MSD	440-46009-9MSD	water	MSD	05/08/13		X											
M-48AMS	440-46009-4MS	water	MS	05/08/13	X												
M-48AMSD	440-46009-4MSD	water	MSD	05/08/13	X												

\*FD7 = Sample VD-5 is the field duplicate of parent sample PC-37 (from SDG 440-45976-1).

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46072-1

## VALIDATION SAMPLE TABLE

LDC#: 30051C

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)										
MC-53	440-46072-1	water		05/09/13	X	X	X										
MC-7	440-46072-2	water		05/09/13		X	X										
MC-6	440-46072-3	water		05/09/13		X	X										
MC-45	440-46072-4	water		05/09/13		X	X										
MC-50	440-46072-5	water		05/09/13		X	X										
MC-51	440-46072-6	water		05/09/13		X	X										
MC-93	440-46072-7	water		05/09/13		X	X										
MC-69	440-46072-8	water		05/09/13		X	X										
MC-3	440-46072-9	water		05/09/13		X	X										
MC-29	440-46072-10	water		05/09/13		X	X										
MC-97	440-46072-11	water		05/09/13		X	X										
M-23	440-46072-12	water	FD8*	05/09/13	X	X	X										
MC-53DUP	440-46072-1DUP	water	DUP	05/09/13			X										
M-23MS	440-46072-12MS	water	MS	05/09/13	X												
M-23MSD	440-46072-12MSD	water	MSD	05/09/13	X												

\*FD8 = Sample M-23 is the parent sample of field duplicate VD-6 (from SDG 440-46077-1).

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46077-1

## VALIDATION SAMPLE TABLE

LDC#: 30023U

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)	CrVI (218.6)								
M-92	440-46077-1	water		05/09/13	X	X	X									
M-97	440-46077-2	water		05/09/13	X	X	X									
M-64	440-46077-3	water		05/09/13	X	X	X									
M-65	440-46077-4	water	FD9	05/09/13	X	X	X									
M-66	440-46077-5	water		05/09/13	X	X	X									
EB-2	440-46077-6	water	EB	05/09/13	X	X	X	X								
M-79	440-46077-7	water		05/09/13	X	X	X									
M-69	440-46077-8	water		05/09/13	X	X	X									
I-V	440-46077-9	water		05/09/13	X	X	X									
VD-6	440-46077-10	water	FD8*	05/09/13	X	X	X									
VD-7	440-46077-11	water	FD9	05/09/13	X	X	X									
EB-2MS	440-46077-6MS	water	MS	05/09/13	X	X		X								
EB-2MSD	440-46077-6MSD	water	MSD	05/09/13	X	X		X								

\*FD8 = Sample VD-6 is the field duplicate of parent sample M-23(from SDG 440-46072-1).

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46367-1

## VALIDATION SAMPLE TABLE

LDC#: 30023V

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)	CrVI (218.6)								
M-76	440-46367-1	water		05/13/13	X	X	X									
M-25	440-46367-2	water		05/13/13	X	X	X									
M-37	440-46367-3	water		05/13/13	X	X	X	X								
M-14A	440-46367-4	water		05/13/13	X	X	X									
M-115	440-46367-5	water		05/13/13	X	X	X									
M-75	440-46367-6	water		05/13/13	X	X	X									
M-2A	440-46367-7	water		05/13/13	X	X	X									
M-35	440-46367-8	water	FD11*	05/13/13	X	X	X									
M-19	440-46367-9	water		05/13/13	X	X	X									
M-68	440-46367-10	water		05/13/13	X	X	X									
M-74	440-46367-11	water		05/13/13	X	X	X									
M-73	440-46367-12	water		05/13/13	X	X	X									
M-14AMS	440-46367-4MS	water	MS	05/13/13	X											
M-14MSD	440-46367-4MSD	water	MSD	05/13/13	X											

FD11\* = Sample M-35 is the parent sample of field duplicate VD-8 (from SDG 440-46598-1).

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46369-1

## VALIDATION SAMPLE TABLE

LDC#: 30023W

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)										
I-K	440-46369-1	water		05/13/13	X	X	X										
I-J	440-46369-2	water		05/13/13	X	X	X										
I-Z	440-46369-3	water		05/13/13	X	X	X										
I-I	440-46369-4	water		05/13/13	X	X	X										
M-136	440-46369-5	water		05/13/13	X	X	X										
M-135	440-46369-6	water		05/13/13	X	X	X										
M-134	440-46369-7	water		05/13/13	X	X	X										
M-131	440-46369-8	water		05/13/13	X	X	X										
M-57A	440-46369-9	water		05/13/13	X	X	X										
M-126	440-46369-10	water		05/13/13	X	X	X										
MW-16	440-46369-11	water		05/13/13	X	X	X										
M-99	440-46369-12	water		05/13/13	X	X	X										
I-KDUP	440-46369-1DUP	water	DUP	05/13/13			X										
M-134MS	440-46369-7MS	water	MS	05/13/13	X												
M-134MSD	440-46369-7MSD	water	MSD	05/13/13	X												

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46454-1

## VALIDATION SAMPLE TABLE

LDC#: 30023X

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)	CrVI (218.6)									
M-38	440-46454-1	water		05/14/13	X	X	X										
H-11	440-46454-2	water		05/14/13		X	X										
M-125	440-46454-3	water		05/14/13		X	X										
M-142	440-46454-4	water		05/14/13	X	X	X										
M-36	440-46454-5	water		05/14/13	X	X	X	X									
EB-3	440-46454-6	water	EB	05/14/13	X	X	X	X									
FB-2	440-46454-7	water	FB	05/14/13	X	X	X	X									
VD-10	440-46454-8	water	FD10*	05/14/13	X	X	X	X									
M-38MS	440-46454-1MS	water	MS	05/14/13	X												
M-38MSD	440-46454-1MSD	water	MSD	05/14/13	X												
M-38DUP	440-46454-1DUP	water	DUP	05/14/13			X										
EB-3MS	440-46454-6MS	water	MS	05/14/13				X									
EB-3MSD	440-46454-6MSD	water	MSD	05/14/13				X									

\*FD10 = Sample VD-10 is the field duplicate of parent sample M-10 (from SDG 440-46459-1).

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46457-1

## VALIDATION SAMPLE TABLE

LDC#: 30023Y

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
M-67	440-46457-1	water		05/14/13	X	X	X									
M-81A	440-46457-2	water		05/14/13	X	X	X									
M-80	440-46457-3	water		05/14/13	X	X	X									
M-83	440-46457-4	water		05/14/13	X	X	X									
M-70	440-46457-5	water		05/14/13	X	X	X									
M-71	440-46457-6	water		05/14/13	X	X	X									
M-72	440-46457-7	water		05/14/13	X	X	X									
M-22A	440-46457-8	water		05/14/13	X	X	X									
M-133	440-46457-9	water		05/14/13	X	X	X									
M-123	440-46457-10	water		05/14/13		X	X									
M-128	440-46457-11	water		05/14/13		X	X									
M-124	440-46457-12	water		05/14/13	X	X	X									
M-71MS	440-46457-6MS	water	MS	05/14/13	X											
M-71MSD	440-46457-6MSD	water	MSD	05/14/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate



SDG#: 440-46459-1

**VALIDATION SAMPLE TABLE**

LDC#: 30023Z

**Project Name:** 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)	CrVI (218.6)								
M-10	440-46459-1	water	FD10*	05/14/13	X	X	X	X								

FD10\* = Sample M-10 is the parent sample of field duplicate VD-10 (from SDG 440-46454-1).

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46598-1

**VALIDATION SAMPLE TABLE**

LDC#: 30041A

**Project Name:** 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
VD-8	440-46598-1	water	FD11*	05/13/13	X	X	X									

\*FD11 = Sample VD-8 is the field duplicate of parent sample M-35 (from SDG 440-46367-1).

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46736-1

**VALIDATION SAMPLE TABLE**

LDC#: 30041B

**Project Name:** 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
PC-96	440-46736-1	water		05/15/13		X	X									
VD-9	440-46736-2	water	FD12*	05/15/13	X	X	X									
M-21	440-46736-3	water		05/15/13	X	X	X									

\*FD12 = Sample VD-9 is the field duplicate of parent sample M-13 (from SDG 440-46744-1).

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46744-1

## VALIDATION SAMPLE TABLE

LDC#: 30094A

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)	CrVI (218.6)								
M-77	440-46744-1	water		05/15/13	X	X	X									
PC-77	440-46744-2	water		05/15/13		X	X									
PC-74	440-46744-3	water		05/15/13		X	X									
M-148A	440-46744-4	water		05/15/13	X	X	X									
M-31A	440-46744-5	water		05/15/13	X	X	X									
M-141	440-46744-6	water		05/15/13	X	X	X									
M-52	440-46744-7	water		05/15/13	X	X	X									
M-139	440-46744-8	water		05/15/13	X	X	X									
M-145	440-46744-9	water		05/15/13	X	X	X									
M-11	440-46744-10	water		05/15/13	X	X	X	X								
M-13	440-46744-11	water	FD12*	05/15/13	X	X	X									
EB-4	440-46744-12	water	EB	05/15/13	X	X	X	X								
M-77DUP	440-46744-1DUP	water	DUP	05/15/13			X									
M-52MS	440-46744-7MS	water	MS	05/15/13	X											
M-52MSD	440-46744-7MSD	water	MSD	05/15/13	X											
EB-4MS	440-46744-12MS	water	MS	05/15/13		X		X								
EB-4MSD	440-46744-12MSD	water	MSD	05/15/13		X		X								

FD12\* = Sample M-13 is the parent sample of field duplicate VD-9 (from SDG 440-46736-1).

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46832-1

## VALIDATION SAMPLE TABLE

LDC#: 30041C

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
H-28A	440-46832-1	water		05/16/13	X	X	X									
M-6A	440-46832-2	water		05/16/13	X	X	X									
M-5A	440-46832-3	water		05/16/13	X	X	X									
M-7B	440-46832-4	water		05/16/13	X	X	X									
H-28ADUP	440-46832-1DUP	water	DUP	05/16/13			X									
M-5AMS	440-46832-3MS	water	MS	05/16/13	X											
M-5AMSD	440-46832-3MSD	water	MSD	05/16/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-46840-1

## VALIDATION SAMPLE TABLE

LDC#: 30041D

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)	CrVI (218.6)								
M-144	440-46840-1	water	FD14	05/16/13	X	X	X									
M-146	440-46840-2	water	FD13	05/16/13	X	X	X									
M-147	440-46840-3	water		05/16/13	X	X	X									
M-137	440-46840-4	water		05/16/13	X	X	X									
M-138	440-46840-5	water		05/16/13	X	X	X									
M-95	440-46840-6	water		05/16/13				X								
M-44	440-46840-7	water		05/16/13				X								
M-12A	440-46840-8	water		05/16/13	X	X	X	X								
VD-1	440-46840-9	water	FD13	05/16/13	X	X	X									
VD-2	440-46840-10	water	FD14	05/16/13	X	X	X									
M-38	440-46840-11	water		05/16/13				X								

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-47272-1

## VALIDATION SAMPLE TABLE

LDC#: 30041E

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
PC-79	440-47272-1	water		05/21/13	X	X	X									
PC-86	440-47272-2	water		05/21/13	X	X	X									
PC-82	440-47272-3	water		05/21/13		X	X									
PC-58	440-47272-4	water		05/21/13	X	X	X									
PC-56	440-47272-5	water		05/21/13	X	X	X									
PC-60	440-47272-6	water		05/21/13	X	X	X									
PC-62	440-47272-7	water		05/21/13	X	X	X									
PC-59	440-47272-8	water		05/21/13	X	X	X									
PC-68	440-47272-9	water		05/21/13	X	X	X									
PC-79DUP	440-47272-1DUP	water	DUP	05/21/13			X									
PC-86MS	440-47272-2MS	water	MS	05/21/13	X											
PC-86MSD	440-47272-2MSD	water	MSD	05/21/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-47313-1

## VALIDATION SAMPLE TABLE

LDC#: 30041F

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
PC-97	440-47313-1	water		05/22/13	X	X	X									
PC-90	440-47313-2	water		05/22/13	X	X	X									
PC-108	440-47313-3	water		05/22/13		X	X									
PC-110	440-47313-4	water		05/22/13		X	X									
PC-91	440-47313-5	water		05/22/13	X	X	X									
PC-92	440-47313-6	water		05/22/13	X	X	X									
PC-94	440-47313-7	water		05/22/13	X	X	X									
ART-7B	440-47313-8	water		05/22/13	X	X	X									
PC-97MS	440-47313-1MS	water	MS	05/22/13	X											
PC-97MSD	440-47313-1MSD	water	MSD	05/22/13	X											
PC-97DUP	440-47313-1DUP	water	DUP	05/22/13			X									

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate



## Project Name: 2013 Annual Remedial Performance Sampling

## Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)										
TR-2	440-4710-01	water		05/20/13	X	X	X										
M-152	440-4710-02	water		05/20/13	X	X	X										
M-156	440-4710-03	water		05/20/13	X	X	X										
M-164	440-4710-04	water		05/20/13	X	X	X										
M-162	440-4710-05	water		05/20/13	X	X	X										
M-163	440-4710-06	water	FD15	05/20/13	X	X	X										
M-163-FD	440-4710-07	water	FD15	05/20/13	X	X	X										
E-EB-1	440-4710-08	water	EB	05/20/13	X	X	X										
M-161	440-4710-09	water		05/20/13	X	X	X										
M-150	440-4710-10	water		05/21/13	X	X	X										
M-154	440-4710-11	water		05/21/13	X	X	X										
TR-3	440-4710-12	water		05/21/13	X	X	X										
TR-1	440-4710-13	water		05/21/13	X	X	X										
TR-4	440-4710-14	water		05/21/13	X	X	X										
M-120	440-4710-15	water		05/21/13	X	X	X										
M-121	440-4710-16	water		05/21/13	X	X	X										
M-118	440-4710-17	water		05/21/13	X	X	X										
M-117	440-4710-18	water		05/21/13	X	X	X										
TR-12	440-4710-19	water		05/22/13	X	X	X										
TR-6	440-4710-20	water		05/22/13	X	X	X										

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-47410-1

## VALIDATION SAMPLE TABLE

LDC#: 30051D

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
TR-5	440-4710-21	water		05/22/13	X	X	X									
M-155	440-4710-22	water		05/22/13	X	X	X									
M-151	440-4710-23	water		05/22/13	X	X	X									
M-165	440-4710-24	water		05/22/13	X	X	X									
M-182	440-4710-25	water		05/22/13	X	X	X									
M-181	440-4710-26	water		05/22/13	X	X	X									
E-EB-2	440-4710-27	water	EB	05/22/13	X	X	X									
TR-11	440-4710-28	water	FD16	05/22/13	X	X	X									
TR-11-FD	440-4710-29	water	FD16	05/22/13	X	X	X									
E-EB-1MS	440-4710-08MS	water	MS	05/20/13	X											
E-EB-1MSD	440-4710-08MSD	water	MSD	05/20/13	X											
M-117MS	440-4710-18MS	water	MS	05/21/13	X											
M-117MSD	440-4710-18MSD	water	MSD	05/21/13	X											
TR-11MS	440-4710-28MS	water	MS	05/22/13	X											
TR-11MSD	440-4710-28MSD	water	MSD	05/22/13	X											
M-164DUP	440-4710-04DUP	water	DUP	05/20/13			X									
TR-6DUP	440-4710-20DUP	water	DUP	05/22/13			X									

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-47414-1

## VALIDATION SAMPLE TABLE

LDC#: 30094B

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
PC-122	440-47414-1	water		05/23/13	X	X	X									
PC-53	440-47414-2	water		05/23/13	X	X	X									
MW-K5	440-47414-3	water		05/23/13	X	X	X									
ARP-7	440-47414-4	water		05/23/13	X	X	X									
ARP-6B	440-47414-5	water		05/23/13	X	X	X									
ARP-5A	440-47414-6	water		05/23/13	X	X	X									
ARP-4A	440-47414-7	water		05/23/13	X	X	X									
ARP-3A	440-47414-8	water		05/23/13	X	X	X									
ARP-2A	440-47414-9	water		05/23/13	X	X	X									
PC-101R	440-47414-10	water		05/23/13	X	X	X									
PC-18	440-47414-11	water		05/23/13	X	X	X									
PC-122DUP	440-47414-1DUP	water	DUP	05/23/13			X									
ARP-5AMS	440-47414-6MS	water	MS	05/23/13	X											
ARP-5AMSD	440-47414-6MSD	water	MSD	05/23/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-47431-1

**VALIDATION SAMPLE TABLE**

LDC#: 30051E

**Project Name:** 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
PC-55	440-47431-1	water		05/23/13	X	X	X									
ARP-1	440-47431-2	water		05/23/13	X	X	X									
PC-103	440-47431-3	water		05/23/13	X	X	X									
PC-98R	440-47431-4	water		05/23/13	X	X	X									

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-47528-1

## VALIDATION SAMPLE TABLE

LDC#: 30041G

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)										
M-130	440-47528-1	water		05/23/13	X	X	X										
CLD1-R	440-47528-2	water		05/23/13	X	X	X										
M-129	440-47528-3	water		05/23/13	X	X	X										
TR-10	440-47528-4	water		05/23/13	X	X	X										
TR-9	440-47528-5	water		05/23/13	X	X	X										
M-103	440-47528-6	water		05/23/13	X	X	X										
TR-8	440-47528-7	water		05/23/13	X	X	X										
TR-7	440-47528-8	water		05/23/13	X	X	X										
M-153	440-47528-9	water		05/23/13	X	X	X										
E-EB-4	440-47528-10	water	EB	05/23/13	X	X	X										
M-149	440-47528-11	water		05/23/13	X	X	X										
M-186	440-47528-12	water	FD17	05/23/13	X	X	X										
M-186-FD	440-47528-13	water	FD17	05/23/13	X	X	X										
M-130MS	440-47528-1MS	water	MS	05/23/13	X												
M-130MSD	440-47528-1MSD	water	MSD	05/23/13	X												

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-48113-1

## VALIDATION SAMPLE TABLE

LDC#: 30094C

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C)										
ART-1	440-48113-1	water		06/03/13	X	X										
ART-2	440-48113-2	water		06/03/13	X	X										
ART-3	440-48113-3	water		06/03/13	X	X										
ART-4	440-48113-4	water		06/03/13	X	X										
ART-6	440-48113-5	water		06/03/13	X	X										
ART-7	440-48113-6	water		06/03/13	X	X										
ART-8	440-48113-7	water		06/03/13	X	X										
ART-9	440-48113-8	water		06/03/13	X	X										
PC-99R2/R3	440-48113-9	water		06/03/13	X	X										
PC-115R	440-48113-10	water		06/03/13	X	X										
PC-116R	440-48113-11	water		06/03/13	X	X										
PC-117	440-48113-12	water		06/03/13	X	X										
PC-118	440-48113-13	water		06/03/13	X	X										
PC-119	440-48113-14	water		06/03/13	X	X										
PC-120	440-48113-15	water		06/03/13	X	X										
PC-121	440-48113-16	water		06/03/13	X	X										
PC-133	440-48113-17	water		06/03/13	X	X										
ART-1DUP	440-48113-1DUP	water	DUP	06/03/13		X										

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-49007-1

## VALIDATION SAMPLE TABLE

LDC#: 30041H

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C)											
PC-86	440-49007-1	water		06/10/13	X	X											
PC-90	440-49007-2	water		06/10/13	X	X											
PC-91	440-49007-3	water		06/10/13	X	X											
PC-97	440-49007-4	water		06/10/13	X	X											
PC-18	440-49007-5	water		06/10/13	X	X											
PC-55	440-49007-6	water		06/10/13	X	X											
PC-101R	440-49007-7	water		06/11/13	X	X											
ARP-1	440-49007-8	water		06/11/13	X	X											
ARP-2A	440-49007-9	water		06/11/13	X	X											
ARP-3A	440-49007-10	water		06/11/13	X	X											
ARP-4A	440-49007-11	water		06/11/13	X	X											
ARP-5A	440-49007-12	water		06/11/13	X	X											
ARP-6B	440-49007-13	water		06/11/13	X	X											
ARP-7	440-49007-14	water		06/11/13	X	X											
PC-53	440-49007-15	water		06/11/13	X	X											
PC-103	440-49007-16	water		06/11/13	X	X											
MW-K5	440-49007-17	water		06/11/13	X	X											
M-83	440-49007-18	water		06/11/13	X	X											
PC-98R	440-49007-19	water		06/11/13	X	X											
PC-58	440-49007-20	water		06/10/13	X	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: 440-49007-1

## VALIDATION SAMPLE TABLE

LDC#: 30041H

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	CLO <sub>4</sub> (314.0)	TDS (2540C)										
PC-56	440-49007-21	water		06/10/13	X	X										
PC-60	440-49007-22	water		06/10/13	X	X										
PC-59	440-49007-23	water		06/10/13	X	X										
PC-62	440-49007-24	water		06/10/13	X	X										
PC-68	440-49007-25	water		06/10/13	X	X										
PC-122	440-49007-26	water		06/11/13	X	X										
EB-M1	440-49007-27	water	EB	06/11/13	X	X										
PC-86DUP	440-49007-1DUP	water	DUP	06/10/13		X										

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate



SDG#: 440-50221-1

## VALIDATION SAMPLE TABLE

LDC#: 30051F

Project Name: 2013 Annual Remedial Performance Sampling

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	QC Type	Date Collected	Cr (200.7)	CLO <sub>4</sub> (314.0)	TDS (2540C)									
I-AA	440-50221-1	water		06/25/13	X	X	X									
I-AB	440-50221-2	water		06/25/13	X	X	X									
I-Y	440-50221-3	water		06/25/13	X	X	X									
M-140	440-50221-4	water		06/25/13	X	X	X									
I-X	440-50221-5	water		06/25/13	X	X	X									
I-W	440-50221-6	water		06/25/13	X	X	X									
I-AADUP	440-50221-1DUP	water	DUP	06/25/13			X									
I-AAMS	440-50221-1MS	water	MS	06/25/13	X											
I-AAMSD	440-50221-1MSD	water	MSD	06/25/13	X											

Shaded cells indicate sample underwent Stage 4

EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate

DUP = Laboratory Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

TABLE II

**Table II. Qualification Codes and Definitions**

<b>Reason Code</b>	<b>Explanation</b>
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)
nd	qualified due to non-detected target analyte
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 III

Table III. Overall Qualified Results

SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validator Qualifier	Reason Code	Reason Code Definition	Qualification Finding
440-46072-1	M-23	05/09/13	EPA 314.0	14797-73-0	Perchlorate	210,000		ug/l	J	fd	Field Duplicate	32 %
440-46077-1	VD-6	05/09/13	EPA 314.0	14797-73-0	Perchlorate	290,000		ug/l	J	fd	Field Duplicate	32 %
440-47528-1	M-153	05/23/13	EPA 314.0	14797-73-0	Perchlorate	27		ug/l	J+	be	Equipment Blank	18 ug/L
440-47528-1	TR-8	05/23/13	EPA 314.0	14797-73-0	Perchlorate	95		ug/l	J+	be	Equipment Blank	18 ug/L
440-47528-1	TR-9	05/23/13	EPA 314.0	14797-73-0	Perchlorate	2.4		ug/l	J+	be	Equipment Blank	18 ug/L
440-46840-1	M-95	05/16/13	EPA 218.6	18540-29-9	Hexavalent chromium (Cr VI)	630	H	ug/l	J-	h	Holding Time	24.25 Hours
423999	FB-1	02/04/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)		u	mg/l	UJ	h	Holding Time	28.75 Hours
423999	M-44	02/04/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)	1.0		mg/l	J-	h	Holding Time	29.25 Hours
423999	M-95	02/04/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)	0.68		mg/l	J-	h	Holding Time	30.25 Hours
423999	VD-3	02/04/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)	0.69		mg/l	J-	h	Holding Time	30.25 Hours
424392	EB-1	02/05/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)		u	mg/l	R	h	Holding Time	3 Days
424394	EB-2	02/06/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)		u	mg/l	R	h	Holding Time	51.75 Hours
424394	M-10	02/06/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)	0.042		mg/l	J-	h	Holding Time	49.75 Hours
424394	M-11	02/06/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)	1.7		mg/l	J-	h	Holding Time	51 Hours
424394	M-12A	02/06/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)	8.4		mg/l	J-	h	Holding Time	51.75 Hours
424394	M-37	02/06/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)		u	mg/l	R	h	Holding Time	49.5 Hours
424394	VD-4	02/06/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)	1.4		mg/l	J-	h	Holding Time	51.25 Hours
424556	M-36	02/07/13	SW-7196A	18540-29-9	Hexavalent chromium (Cr VI)	25		mg/l	J-	h	Holding Time	4 Days
424010	I-AR	02/04/13	SM2540C/160.1	10-33-3	Total Dissolved Solid (TDS)	5,900		mg/l	J-	h	Holding Time	29 Days
424392	M-25	02/05/13	SM2540C/160.1	10-33-3	Total Dissolved Solid (TDS)	8,100		mg/l	J-	h	Holding Time	14 Days
424392	VD-2	02/05/13	SM2540C/160.1	10-33-3	Total Dissolved Solid (TDS)	14,000		mg/l	J-	h	Holding Time	14 Days

ATTACHMENT A

Metals Data Validation Report

## Chromium by EPA SW 846 Method 6010 and EPA Method 200.7

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. ICPMS Tune

ICP-MS was not utilized in these SDGs.

### III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met for samples on which a Stage 4 review was performed.

Calibration data were not evaluated for the samples reviewed by Stage 2A criteria.

### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

Samples EB-1 (from SDGs 424392 and 440-46009-1), EB-2 (from SDGs 424394 and 440-46077-1), EB-3 (from SDG 440-46454-1), EB-4 (from SDG 440-46744-1), E-EB-1 (from SDG 440-47410-1), E-EB-2 (from SDG 440-47410-1), and E-EB-4 (from SDG 440-47528-1) were identified as equipment blanks. No chromium was found with the following exceptions:

SDG	Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
440-46009-1	EB-1	5/8/13	Chromium	0.0029 mg/L	PC-54 M-95 PC-21A M-48A VD-3 VD-4 VD-5 M-44

Samples FB-1 (from SDGs 423999 and 440-45716-1) and FB-2 (from SDG 440-46454-1) were identified as field blanks. No chromium was found.

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis and criteria were met for samples on which a Stage 4 review was performed.

ICP Interference check sample analysis data were not evaluated for the samples reviewed by Stage 2A criteria.

## **VI. Matrix Spike Analysis**

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## **VII. Duplicate Sample Analysis**

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in all SDGs, and therefore duplicate analyses were not performed.

## **VIII. Laboratory Control Samples (LCS)**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## **IX. Internal Standards (ICP-MS)**

ICP-MS was not utilized in these SDGs.

## **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in these SDGs.

## **XI. ICP Serial Dilution**

ICP serial dilution was not performed for these SDGs.

## **XII. Sample Result Verification**

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2A criteria.

## **XIII. Overall Assessment of Data**

Data flags are summarized at the end of this report if data has been qualified.



#### XIV. Field Duplicates

Samples PC-150 and VD-1 (from SDG 424392) and samples M-66 and VD-2 (from SDG 424392), samples M-95 and VD-3 (from SDG 423999), samples M-11 and VD-4 (from SDG 424394), samples M-146 and VD-1 (from SDG 440-46840-1), samples M-144 and VD-2 (from SDG 440-46840-1), samples M-48A and VD-3 (from SDG 440-46009-1), samples PC-21A and VD-4 (from SDG 440-46009-1), samples PC-37 (from SDG 440-45976-1) and VD-5 (from SDG 440-46009-1), samples VD-6 (from SDG 440-46077-1) and M-23 (from SDG 440-46072-1), samples M-65 and VD-7 (from SDG 440-46077-1), samples M-35 (from SDG 440-46367-1) and VD-8 (from SDG 440-46598-1), samples VD-9 (from SDG 440-46736-1) and M-13 (from SDG 440-46744-1), samples VD-10 (from SDG 440-46454-1) and M-10 (from SDG 440-46459-1), samples M-163 and M-163-FD (from SDG 440-47410-1), samples TR-11 and TR-11-FD (from SDG 440-47410-1), and samples M-186 and M-186-FD (from SDG 440-47528-1) were identified as field duplicates. No chromium was detected in any of the samples with the following exceptions:

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		PC-150	VD-1				
424392	Chromium	0.22	0.22	0 (≤30)	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-66	VD-2				
424392	Chromium	26	26	0 (≤30)	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-95	VD-3				
423999	Chromium	0.69	0.68	1 (≤30)	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-11	VD-4				
424394	Chromium	1.7	1.7	0 (≤30)	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-146	VD-1				
440-46840-1	Chromium	0.093	0.11	-	0.017 (≤0.025)	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-144	VD-2				
440-46840-1	Chromium	0.058	0.065	-	0.007 ( $\leq 0.025$ )	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-48A	VD-3				
440-46009-1	Chromium	1.7	1.7	0 ( $\leq 30$ )	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		PC-21A	VD-4				
440-46009-1	Chromium	0.18	0.18	0 ( $\leq 30$ )	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		PC-37	VD-5				
440-45976-1/ 440-46009-1	Chromium	0.21	0.18	15 ( $\leq 30$ )	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference	Flag	A or P
		VD-6	M-23				
440-46077-1/ 440-46072-1	Chromium	0.45	0.42	7 ( $\leq 30$ )	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference	Flag	A or P
		M-65	VD-7				
440-46077-1	Chromium	24	25	4 ( $\leq 30$ )	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-35	VD-8				
440-46367-1/ 440-46589-1	Chromium	4.3	4.6	7 ( $\leq 30$ )	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		VD-9	M-13				
440-46736-1/ 440-46744-1	Chromium	0.64	0.64	0 (≤30)	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-10	VD-10				
440-46454-1/ 440-46459-1	Chromium	0.52	0.59	13 (≤30)	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-163	M-163-FD				
440-47410-1	Chromium	0.029	0.026	11 (≤30)	-	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		TR-11	TR-11-FD				
440-47410-1	Chromium	0.015	0.015	-	0 (≤0.005)	-	-

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-186	M-186-FD				
440-47528-1	Chromium	4.3	4.5	5 (≤30)	-	-	-

**2013 Annual Remedial Performance Sampling**

**Chromium - Data Qualification Summary - SDGs 420318, 423999, 424008, 424010, 424394, 424439, 424556, 440-45612-1, 440-45619-1, 440-45623-1, 440-45716-1, 440-45723-1, 440-45890-1, 440-45976-1, 440-46077-1, 440-46367-1, 440-46369-1, 440-46454-1, 440-46457-1, 440-46459-1, 440-46598-1, 440-46736-1, 440-46832-1, 440-46840-1, 440-47272-1, 440-47313-1, 440-47528-1, 440-46744-1, 440-47414-1, 440-45624-1, 440-46009-1, 440-46072-1, 440-47410-1, 440-47431-1, 440-50221-1, 424392**

No Sample Data Qualified in these SDGs

**2013 Annual Remedial Performance Sampling**

**Chromium - Laboratory Blank Data Qualification Summary - SDGs 420318, 423999, 424008, 424010, 424394, 424439, 424556, 440-45612-1, 440-45619-1, 440-45623-1, 440-45716-1, 440-45723-1, 440-45890-1, 440-45976-1, 440-46077-1, 440-46367-1, 440-46369-1, 440-46454-1, 440-46457-1, 440-46459-1, 440-46598-1, 440-46736-1, 440-46832-1, 440-46840-1, 440-47272-1, 440-47313-1, 440-47528-1, 440-46744-1, 440-47414-1, 440-45624-1, 440-46009-1, 440-46072-1, 440-47410-1, 440-47431-1, 440-50221-1, 424392**

No Sample Data Qualified in these SDGs

**2013 Annual Remedial Performance Sampling**

**Chromium - Field Blank Data Qualification Summary - SDGs 420318, 423999, 424008, 424010, 424394, 424439, 424556, 440-45612-1, 440-45619-1, 440-45623-1, 440-45716-1, 440-45723-1, 440-45890-1, 440-45976-1, 440-46077-1, 440-46367-1, 440-46369-1, 440-46454-1, 440-46457-1, 440-46459-1, 440-46598-1, 440-46736-1, 440-46832-1, 440-46840-1, 440-47272-1, 440-47313-1, 440-47528-1, 440-46744-1, 440-47414-1, 440-45624-1, 440-46009-1, 440-46072-1, 440-47410-1, 440-47431-1, 440-50221-1, 424392**

No Sample Data Qualified in these SDGs

ATTACHMENT B

Wet Chemistry Data Validation Report

**Hexavalent Chromium by EPA SW 846 Method 7196 and EPA Method 218.6  
Perchlorate by EPA Method 314.0  
Total Dissolved Solids by Standard Method 2540C and EPA Method 160.1**

**I. Technical Holding Times**

All technical holding time requirements were met with the following exceptions:

<b>SDG</b>	<b>Sample</b>	<b>Analyte</b>	<b>Total Time From Sample Collection Until Analysis</b>	<b>Required Holding Time From Sample Collection Until Analysis</b>	<b>Flag</b>	<b>A or P</b>
423999	M-95 VD-3 VD-3MS VD-3MSD	Hexavalent chromium	30.25 hours	24 hours	J- (all detects) UJ (all non-detects)	P
423999	M-44	Hexavalent chromium	29.25 hours	24 hours	J- (all detects) UJ (all non-detects)	P
423999	FB-1	Hexavalent chromium	28.75 hours	24 hours	J- (all detects) UJ (all non-detects)	P
424010	I-AR	Total dissolved solids	29 days	7 days	J- (all detects) R (all non-detects)	P
424394	M-12A EB-2	Hexavalent chromium	51.75 hours	24 hours	J- (all detects) R (all non-detects)	P
424394	M-11 M-11MS M-11MSD	Hexavalent chromium	51 hours	24 hours	J- (all detects) R (all non-detects)	P
424394	M-10	Hexavalent chromium	49.75 hours	24 hours	J- (all detects) R (all non-detects)	P
424394	VD-4	Hexavalent chromium	51.25 hours	24 hours	J- (all detects) R (all non-detects)	P
424394	M-37	Hexavalent chromium	49.5 hours	24 hours	J- (all detects) R (all non-detects)	P
424556	M-36	Hexavalent chromium	4 days	24 hours	J- (all detects) R (all non-detects)	P
440-46840-1	M-95	Hexavalent chromium	24.25 hours	24 hours	J- (all detects) UJ (all non-detects)	P
424392	EB-1	Hexavalent chromium	3 days	24 hours	J- (all detects) R (all non-detects)	P
424392	M-25 VD-2	Total dissolved solids	14 days	7 days	J- (all detects) UJ (all non-detects)	P

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

All criteria for the initial calibration of each method were met for samples on which a Stage 4 review was performed.

Initial calibration data were not evaluated for the samples reviewed by Stage 2A criteria.

## III. Continuing Calibration

Calibration verification frequency and analysis criteria were met for samples on which a Stage 4 review was performed.

Calibration verification data were not evaluated for the samples reviewed by Stage 2A criteria.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Samples EB-1 (from SDGs 424392 and 440-46009-1), EB-2 (from SDGs 424394 and 440-46077-1), EB-3 (from SDG 440-46454-1), EB-4 (from SDG 440-46744-1), E-EB-1 (from SDG 440-47410-1), E-EB-2 (from SDG 440-47410-1), E-EB-4 (from SDG 440-47528-1), and EB-M1 (from SDG 440-49007-1) were identified as equipment blanks. No contaminant concentrations were found with the following exceptions:

SDG	Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
440-46009-1	EB-1	5/8/13	Perchlorate	6.2 ug/L	PC-54 M-95 PC-21A M-48A VD-3 VD-4 VD-5 M-44

SDG	Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
424392	EB-1	2/5/13	Perchlorate	38 ug/L	PC-135A PC-136 PC-144 PC-148 PC-149 PC-150 M-64 M-65 M-66 M-79 M-69 M-135 M-131 M-57A M-37 M-25 VD-1 VD-2
424394	EB-2	2/6/13	Perchlorate	6.6 ug/L	M-97 I-V I-K I-J I-Z I-I M-31A M-52 M-35 M-19 M-68 M-67 M-74 M-73 M-12A M-11 M-10 VD-4
440-46077-1	EB-2	5/9/13	Perchlorate	100 ug/L	M-92 M-97 M-64 M-65 M-66 M-79 M-69 I-V VD-6 VD-7
440-46077-1	EB-2	5/9/13	Hexavalent chromium	0.76 ug/L	No associated samples in this SDG
440-46454-1	EB-3	5/14/13	Perchlorate Total dissolved solids	21 ug/L 16 mg/L	M-38 H-11 M-125 M-142 M-36 VD-10
440-46454-1	EB-3	5/14/13	Hexavalent chromium	0.30 ug/L	M-36 VD-10



SDG	Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
440-46744-1	EB-4	5/15/13	Perchlorate Total dissolved solids	4.8 ug/L 20 mg/L	M-77 PC-77 PC-74 M-148A M-31A M-141 M-52 M-139 M-145 M-11 M-13
440-47528-1	E-EB-4	5/23/13	Perchlorate	18 ug/L	M-130 CLD1-R M-129 TR-10 TR-9 M-103 TR-8 TR-7 M-153 M-149 M-186 M-186-FD
440-49007-1	EB-M1	6/11/13	Perchlorate	11 ug/L	PC-86 PC-90 PC-91 PC-97 PC-18 PC-55 PC-101R ARP-1 ARP-2A ARP-3A ARP-4A ARP-5A ARP-6B ARP-7 PC-53 PC-103 MW-K5 M-83 PC-98R PC-58 PC-56 PC-60 PC-59 PC-62 PC-68 PC-122

Samples FB-1 (from SDGs 423999 and 440-45716-1) and FB-2 (from SDG 440-46454-1) were identified as field blanks. No contaminant concentrations were found with the following exceptions:

SDG	Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
440-46454-1	FB- 2	5/14/13	Perchlorate Total dissolved solids	5.8 ug/L 19 mg/L	M-38 H-11 M-125 M-142 M-36 VD-10

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

SDG	Sample	Analyte	Reported Concentration	Modified Final Concentration
440-47528-1	TR-9	Perchlorate	2.4 ug/L	2.4J+ ug/L
440-47528-1	TR-8	Perchlorate	95 ug/L	95J+ ug/L
440-47528-1	M-153	Perchlorate	27 ug/L	27J+ ug/L

## V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VIII. Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2A criteria.

## IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## X. Field Duplicates

Samples PC-150 and VD-1 (from SDG 424392), samples M-66 and VD-2 (from SDG 424392), samples M-95 and VD-3 (from SDG 423999), samples M-11 and VD-4 (from SDG 424394), samples M-146 and VD-1 (from SDG 440-46840-1), samples M-144 and VD-2 (from SDG 440-46840-1), samples M-48A and VD-3 (from SDG 440-46009-1), samples PC-21A and VD-4 (from SDG 440-46009-1), samples PC-37 (from SDG 440-45976-1) and VD-5 (from SDG 440-46009-1), samples VD-6 (from SDG 440-46077-1) and M-23 (from SDG 440-46072-1), samples M-65 and VD-7 (from SDG 440-46077-1), samples M-35 (from SDG 440-46367-1) and VD-8 (from SDG 440-46598-1), samples VD-9 (from SDG 440-46736-1) and M-13 (from SDG 440-46744-1), samples VD-10 (from SDG 440-46454-1) and M-10 (from SDG 440-46459-1), samples M-163 and M-163-FD (from SDG 440-47410-1), samples TR-11 and TR-11-FD (from SDG 440-47410-1), and samples M-186 and M-186-FD (from SDG 440-47528-1) were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		PC-150	VD-1				
424392	Perchlorate	190000 ug/L	200000 ug/L	5 (≤30)	-	-	-
424392	Total dissolved solids	5800 mg/L	5900 mg/L	2 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-66	VD-2				
424392	Perchlorate	1800000 ug/L	1800000 ug/L	0 (≤30)	-	-	-
424392	Total dissolved solids	14000 mg/L	14000 mg/L	0 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-95	VD-3				
423999	Perchlorate	390000 ug/L	380000 ug/L	3 (≤30)	-	-	-
423999	Total dissolved solids	6100 mg/L	6100 mg/L	0 (≤30)	-	-	-
423999	Hexavalent chromium	0.68 mg/L	0.69 mg/L	1 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-11	VD-4				
424394	Perchlorate	25000 ug/L	25000 ug/L	0 (≤30)	-	-	-
424394	Total dissolved solids	2500 mg/L	2500 mg/L	0 (≤30)	-	-	-
424394	Hexavalent chromium	1.7 mg/L	1.4 mg/L	19 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-146	VD-1				
440-46840-1	Perchlorate	2600 ug/L	2500 ug/L	4 (≤30)	-	-	-
440-46840-1	Total dissolved solids	3400 mg/L	3300 mg/L	3 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-144	VD-2				
440-46840-1	Perchlorate	4000 ug/L	3100 ug/L	25 (≤30)	-	-	-
440-46840-1	Total dissolved solids	4600 mg/L	4700 mg/L	2 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-48A	VD-3				
440-46009-1	Perchlorate	150000 ug/L	160000 ug/L	6 (≤30)	-	-	-
440-46009-1	Total dissolved solids	4100 mg/L	4000 mg/L	2 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		PC-21A	VD-4				
440-46009-1	Perchlorate	2400 ug/L	2700 ug/L	12 (≤30)	-	-	-
440-46009-1	Total dissolved solids	10000 mg/L	11000 mg/L	10 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		PC-37	VD-5				
440-45976-1/ 440-46009-1	Perchlorate	400000 ug/L	390000 ug/L	3 (≤30)	-	-	-
440-45976-1/ 440-46009-1	Total dissolved solids	8000 mg/L	8200 mg/L	2 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		VD-6	M-23				
440-46077-1/ 440-46072-1	Perchlorate	290000 ug/L	210000 ug/L	32 (≤30)	-	J (all detects)	A
440-46077-1/ 440-46072-1	Total dissolved solids	4400 mg/L	4400 mg/L	0 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-65	VD-7				
440-46077-1	Perchlorate	1800000 ug/L	1700000 ug/L	6 (≤30)	-	-	-
440-46077-1	Total dissolved solids	15000 mg/L	17000 mg/L	13 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-35	VD-8				
440-46367-1/ 440-46598-1	Perchlorate	180000 ug/L	220000 ug/L	20 (≤30)	-	-	-
440-46367-1/ 440-46598-1	Total dissolved solids	4800 mg/L	5200 mg/L	8 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		VD-9	M-13				
440-46736-1/ 440-46744-1	Perchlorate	21000 ug/L	17000 ug/L	21 (≤30)	-	-	-
440-46736-1/ 440-46744-1	Total dissolved solids	3300 mg/L	3300 mg/L	0 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-10	VD-10				
440-46454-1/ 440-46459-1	Perchlorate	12000 ug/L	11000 ug/L	9 (≤30)	-	-	-
440-46454-1/ 440-46459-1	Total dissolved solids	2800 mg/L	2700 mg/L	4 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-163	M-163-FD				
440-47410-1	Perchlorate	43 ug/L	46 ug/L	-	3 (≤10)	-	-
440-47410-1	Total dissolved solids	560 mg/L	560 mg/L	0 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		TR-11	TR-11-FD				
440-47410-1	Total dissolved solids	760	770	1 (≤30)	-	-	-

SDG	Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
		M-186	M-186-FD				
440-47528-1	Perchlorate	190000 ug/L	200000 ug/L	5 (≤30)	-	-	-
440-47528-1	Total dissolved solids	7800 mg/L	7800 mg/L	0 (≤30)	-	-	-

**2013 Annual Remedial Performance Sampling**

**Wet Chemistry - Data Qualification Summary - SDGs 420318, 422515, 423999, 424008, 424010, 424394, 424439, 424556, 425373, 427572, 428373, 440-42678-1, 440-43599-1, 440-45612-1, 440-45619-1, 440-45623-1, 440-45716-1, 440-45723-1, 440-45890-1, 440-45976-1, 440-46077-1, 440-46367-1, 440-46369-1, 440-46454-1, 440-46457-1, 440-46459-1, 440-46598-1, 440-46736-1, 440-46832-1, 440-46840-1, 440-47272-1, 440-47313-1, 440-47528-1, 440-49007-1, 440-45624-1, 440-46009-1, 440-46072-1, 440-47410-1, 440-47431-1, 440-50221-1, 424392, 440-46744-1, 440-47414-1, 440-48113-1**

SDG	Sample	Analyte	Flag	A or P	Reason
423999/ 440-46840-1	M-95 M-44 FB-1 VD-3 M-95	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding time
424010	I-AR	Total dissolved solids	J- (all detects) R (all non-detects)	P	Technical holding time
424394/ 424556/ 424392	M-12A M-11 M-10 VD-4 EB-2 M-37 M-36 EB-1	Hexavalent chromium	J- (all detects) R (all non-detects)	P	Technical holding time
424392	M-25 VD-2	Total dissolved solids	J- (all detects) UJ (all non-detects)	P	Technical holding time
440-46077-1/ 440-46072-1	VD-6 M-23	Perchlorate	J (all detects)	A	Field duplicate (RPD)

**2013 Annual Remedial Performance Sampling**

**Wet Chemistry - Laboratory Blank Data Qualification Summary - SDGs 420318, 422515, 423999, 424008, 424010, 424394, 424439, 424556, 425373, 427572, 428373, 440-42678-1, 440-43599-1, 440-45612-1, 440-45619-1, 440-45623-1, 440-45716-1, 440-45723-1, 440-45890-1, 440-45976-1, 440-46077-1, 440-46367-1, 440-46369-1, 440-46454-1, 440-46457-1, 440-46459-1, 440-46598-1, 440-46736-1, 440-46832-1, 440-46840-1, 440-47272-1, 440-47313-1, 440-47528-1, 440-49007-1, 440-45624-1, 440-46009-1, 440-46072-1, 440-47410-1, 440-47431-1, 440-50221-1, 424392, 440-46744-1, 440-47414-1, 440-48113-1**

No Sample Data Qualified in these SDGs

**2013 Annual Remedial Performance Sampling**

**Wet Chemistry - Field Blank Data Qualification Summary - SDGs 420318, 422515, 423999, 424008, 424010, 424394, 424439, 424556, 425373, 427572, 428373, 440-42678-1, 440-43599-1, 440-45612-1, 440-45619-1, 440-45623-1, 440-45716-1, 440-45723-1, 440-45890-1, 440-45976-1, 440-46077-1, 440-46367-1, 440-46369-1, 440-46454-1, 440-46457-1, 440-46459-1, 440-46598-1, 440-46736-1, 440-46832-1, 440-46840-1, 440-47272-1, 440-47313-1, 440-47528-1, 440-49007-1, 440-45624-1, 440-46009-1, 440-46072-1, 440-47410-1, 440-47431-1, 440-50221-1, 424392, 440-46744-1, 440-47414-1, 440-48113-1**

<b>SDG</b>	<b>Sample</b>	<b>Analyte</b>	<b>Modified Final Concentration</b>	<b>A or P</b>
440-47528-1	TR-9	Perchlorate	2.4J+ ug/L	A
440-47528-1	TR-8	Perchlorate	95J+ ug/L	A
440-47528-1	M-153	Perchlorate	27J+ ug/L	A