APPENDIX C

DATA VALIDATION MEMORANDA

MEMORANDUM

To:	File	Date:	June 22, 2017
From:	Rachael Woods, MFA	Project:	0442.06.05

RE: 2016 East Mission Flats Monitoring Summary of Data Validation

This memorandum summarizes the quality of data collected during the 2016 East Mission Flats Repository water monitoring. This document is an appendix to the 2016 East Mission Flats Repository monitoring report. Other appendices to that report are referenced in this memorandum.

APRIL 2016 MONITORING EVENT

TerraGraphics Environmental Engineering, Inc. (TerraGraphics) conducted a Stage 2A validation of the dissolved anion and alkalinity results reported by SVL Analytical Inc. (SVL). The U.S. Environmental Protection Agency (USEPA) conducted a Stage 4 validation of the dissolved-metal and dissolved-cation results reported by Chemtech Consulting Group, Inc. (CCG), the Contract Laboratory Program designated laboratory. TerraGraphics also completed a data validation review. TerraGraphics' data review process and findings are summarized in an October 7, 2016, memorandum, which is included as Attachment 1. The USEPA data validation report is included as an attachment to that memorandum.

Following TerraGraphics' review, Maul Foster & Alongi, Inc. (MFA) also completed a data validation review of the April 2016 results. During that review, MFA identified suspect dissolved-cation results associated with a sample included in the TerraGraphics October 7, 2016 memorandum. Calcium, magnesium, sodium, and potassium results for sample MJGF35 (collected from monitoring well 07-EMF-MW-D on April 5, 2016) were reported by ICP-AES (inter-coupled plasma, auto-emission spectrometry) as non-detect and only slightly above their reporting limits. TerraGraphics had qualified the results as estimated ("J") and estimated, non-detect ("UJ"). MFA's project chemist reviewed the results and noted that they did not correlate with previous results for that monitoring well, or with the associated anion results (summed cation and anion results should be approximately equal). Therefore, MFA's project chemist requested a review of the results.

TerraGraphics contacted CCG to request a review of the laboratory's quality assurance and quality control (QA/QC) results. CCG compared the dissolved-cation results reported by ICP-AES to ICP-MS (inter-coupled plasma, mass spectrometry) results and concluded that the ICP-AES results were invalid because of instrument error. The dissolved-cation results reported by ICP-MS were selected for use in place of the invalid ICP-AES results. USEPA's data validation of the revised results is summarized in their February 8, 2017 memorandum, included as Attachment 2. The original laboratory results and final validation results are also summarized in that memorandum.

OCTOBER 2016 MONITORING EVENT

Laboratory Data Consultants, Inc. (LDC) validated results from both Pace Analytical and SVL. LDC's validation report is included as Attachment 3. A Stage 4 validation was conducted for both laboratory reports; no Stage 2A validation was conducted.

LDC's validation resulted in the following data qualifications:

- Some groundwater sample total lead results were qualified as non-detects and flagged with "U" at elevated reporting limits because of associated field filter blank detections.
- Some groundwater sample total potassium and zinc results were qualified as non-detects and flagged with "J" as estimated because of associated field filter blank detections.

MFA completed a data validation review of the October 2016 results, as discussed below.

DATA QUALITY REVIEW

MFA completed a data validation review of results from both the April and October 2016 monitoring events to ensure compliance with the sampling and analysis plan (SAP)/quality assurance project plan (QAPP) (TerraGraphics, 2014) and subsequent Sample Plan Alteration Form (SPAFs) Nos. 1 and 002 (TerraGraphics, 2015; MFA, 2016), the programmatic QAPP (MFA, 2011), the water monitoring QAPP (MFA, 2013), and the data management plan (MFA, 2014). Information was reviewed for sample naming convention, holding times, appropriate preservation, field QA/QC sample collection frequency and results, laboratory verification and validation, and data completeness.

MFA's data validation review indicates that field procedures for sample collection were conducted in accordance with the SAP/QAPP and SPAF #1. Field QC samples included one aqueous field filter blank and one field duplicate sample (Appendix A); analytical results are included in the laboratory reports (Appendix B). Sample results qualified because of field QC sample exceedances were discussed in the previous section.

REFERENCES

MFA. 2011. Programmatic quality assurance project plan. Prepared for Successor Coeur d'Alene Custodial and Work Trust. Maul Foster & Alongi, Inc., Portland, Oregon. April 27.

MFA. 2013. Water monitoring quality assurance project plan. Prepared for Successor Coeur d'Alene Custodial and Work Trust. Maul Foster & Alongi, Inc., Kellogg, Idaho. April 30.

MFA. 2014. Data management plan. Prepared for Successor Coeur d'Alene Custodial and Work Trust. Maul Foster & Alongi, Inc., Kellogg, Idaho. June 13.

MFA. 2016. Sample plan alteration form (QAPP addendum—SPAF #002) East Mission Flats Repository. September 12. Final approval September 14, 2016.

TerraGraphics. 2014. Sampling and analysis plan (SAP)/quality assurance project plan (QAPP) for water monitoring at the East Mission Flats Repository. Rev. 2. TerraGraphics Environmental Engineering, Inc. December 12.

TerraGraphics. 2015. Sample plan alteration form (QAPP addendum—SPAF #1), East Mission Flats Repository. Prepared for Idaho Department of Environmental Quality. TerraGraphics Environmental Engineering, Inc. June.

Attachments: 1 – October 7, 2016 Data Validation Memorandum
2 – February 8, 2017 Data Validation Memorandum
3 – December 21, 2016 Data Validation Memorandum

ATTACHMENT 1

OCTOBER 7, 2016 DATA VALIDATION MEMORANDUM

TerraGraphics
Environmental Engineering, Inc.

www.terragraphics.com

Corporate Office:
121 S. Jackson St., Moscow, Idaho 83843
Ph: (208) 882-7858; Fax: (208) 883-3785

Other Office Locations:
Kellogg, Idaho
Boise, Idaho
Deer Lodge, Montana
Las Vegas, Nevada
Pasco, Washington

I N T E R N A L P R O J E C T M E M O R A N D U M

To: Robin Nimmer, Project Manager, Moscow
Susan Spalinger, Principal-in-Charge, Moscow

From: Mara Thorhaug, QA/QC Manager, Kellogg
Mandy Allen, Environmental Scientist

Date: October 7, 2016

Project Code: IDEQ C985 16028-09-02

Subject: QA/QC Review of the April 2016 Semi-Annual Water Monitoring Event at the East Mission Flats Repository

1 Introduction

This memorandum provides a summary of the data validation and data quality assessment performed on data from the April 2016 Semi-Annual Water Monitoring Event at the East Mission Flats Repository (EMFR). The field crew conducted groundwater sampling on April 5, 2016. Sampling procedures and the quality assurance/quality control (QA/QC) review followed guidelines set forth in the following documents:

- *Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) for Water Monitoring at the East Mission Flats Repository, Revision No. 2* (EMFR SAP/QAPP) (TerraGraphics 2014) and subsequent addendum (TerraGraphics 2015)
- *National Functional Guidelines for Inorganic Superfund Data Review* (USEPA 2014)
- *Guidance on Environmental Data Verification and Data Validation* (USEPA 2002)
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (USEPA 2009)

However, an exception to the SAP/QAPP addendum is that no resampling was conducted based on the prediction limits because the U.S. Environmental Protection Agency (USEPA) is completing an optimization review of past data that may result in changes to the prediction limits or sampling approach currently in use.

This memo discusses the data quality assessment and data validation performed for the Sample Delivery Groups (SDGs) listed in Table 1. Data qualifiers used in this review are defined in the *National Functional Guidelines for Inorganic Superfund Data Review* (USEPA 2014). Any qualified data should be reviewed by an experienced data analyst before data analysis and interpretation.

Table 1. SDG Data Validation Summary

Laboratory	Case Number	SDG	Analyses	Data Validation Level (USEPA 2009)	Review Conducted by
CLP	46090	MJHF30	Dissolved cations [a] and dissolved metals [b]	Stage 4	USEPA chemist
SVL	--	W6D0042	Dissolved anions [c] and alkalinity [d]	Stage 2A	TerraGraphics

[a] calcium (Ca), magnesium (Mg), potassium (K), and sodium (Na)
[b] arsenic (As), cadmium (Cd), lead (Pb), and zinc (Zn)
[c] chloride (Cl) and sulfate (SO_4)
[d] bicarbonate (HCO_3), carbonate (CO_3), hydroxide (OH), and total alkalinity
CLP = Contract Laboratory Program
SVL = SVL Analytical, Inc. in Kellogg, Idaho
USEPA = U.S. Environmental Protection Agency
-- = not applicable

2 Data Validation and Quality Review Summary

The laboratories submitted all required deliverables. Attachment A contains the SVL data report. Attachment B contains the data validation report (DVR) documenting the Stage 4 validation review. Attachment C contains all of the laboratory data. TerraGraphics' review of the field data, the Stage 2A evaluation of the SDG listed in Table 1, and the field blank and field duplicate evaluation is summarized in Table 2. Procedures/checks that require further discussion are explained below the table, as necessary.

Table 2. TerraGraphics Data Quality Review Summary

Data Validation/Review Procedure or Check	Acceptable Frequency? [a]	Acceptable Performance? [b]	Data Qualified?	Discussion Item Number
Manual depth-to-water measurements compared to datalogger data	--	Y	N	
Depth-to-water measurements compared to previous data	--	Y	N	
Field parameters stabilized	--	Y	N	
Field parameters compared to previous data	--	Y	N	
Sample condition upon receipt at laboratory	--	Y	N	
Preservation	--	Y	N	
Holding times	--	Y	N	
Laboratories followed specified analytical methods	--	Y	N	
Method Blanks	Y	Y	N	
Laboratory Control Samples	Y	Y	N	
Matrix Spikes	Y	Y	N	1
Laboratory Duplicates and Matrix Spike Duplicates	Y	Y	N	2
Field Blanks (Table 3)	Y	N	Y	3
Field Duplicates (Table 4)	Y	Y	N	
Analytical data compared to previous data	--	--	Y	4

[a] Frequencies as defined in the EMFR SAP/QAPP (TerraGraphics 2014).

[b] Based on i) criteria defined in the EMFR SAP/QAPP (TerraGraphics 2014) or ii) professional judgment of the data validator.

-- = not applicable

1) Matrix Spike: The percent recovery could not be evaluated for chloride or sulfate, because the concentrations in the spiked sample were greater than four times the spike level.
2) Matrix Spike Duplicate: the relative percent difference (RPD) could not be evaluated for chloride or sulfate because the concentrations in the spiked sample were greater than four times the spike level.
3) Field Blank: The laboratory detected the following analyte in the field blank (Table 3):
    - Dissolved zinc (0.0072 mg/L)

    The following results were qualified as estimates, biased high (*J*+) because the sample concentrations were less than 10 times the associated field blank concentration:
    - Dissolved zinc for 07-EMF-MW-B, 09-EMF-MW-C-Deep, and 08-EMF-MW-E.
4) Analytical data compared to previous data: The dissolved cation results for 07-EMF-MW-D differ greatly compared to historical data, and it is not possible to identify whether an error

occurred in the field or at the lab. As a result, calcium, magnesium, and sodium results were qualified as estimates (*J* and *UJ*).

3 Overall Assessment

Based on this data quality review, the laboratory and field data are determined to be of acceptable quality; accuracy and precision are also considered acceptable.

The following laboratory data were qualified as estimates (*J, UJ,* or *J+*):

- Dissolved arsenic results at 07-EMF-MW-A, 07-EMF-MW-B, 07-EMF-MW-C, 07-EMF-MW-D, 08-EMF-MW-E, 08-EMF-MW-F (original only), and 09-EMF-MW-C-Deep because the results were greater than the method detection limit (MDL) but less than the contract required quantitation limit (CRQL, Attachment B)
- Dissolved cadmium results at 07-EMF-MW-D because the results were greater than the MDL but less than the CRQL (Attachment B)
- Dissolved lead results at 08-EMF-MW-F (duplicate only) because the results were greater than the MDL but less than the CRQL (Attachment B)
- Dissolved potassium at 07-EMF-MW-A and 08-EMF-MW-F (duplicate only) because the result was greater than the MDL but less than the CRQL (Attachment B)
- Dissolved zinc results at 07-EMF-MW-B, 08-EMF-MW-E, and 09-EMF-MW-C-Deep due to the field blank results
- Dissolved calcium, magnesium, and sodium results due to differences when comparing results to historical data

Completeness for this sampling event is calculated at 100% according to the method in the EMFR SAP/QAPP (TerraGraphics 2014).

4 References

TerraGraphics Environmental Engineering, Inc. (TerraGraphics), 2014. Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) for Water Monitoring at the East Mission Flats Repository, Revision No. 2. December.

TerraGraphics, 2015. Sample Plan Alteration Form (QAPP Addendum 1 - SPAF #1). June.

U.S. Environmental Protection Agency (USEPA), 2002. Guidance on Environmental Data Verification and Data Validation. USEPA QA/G-8. November.

USEPA, 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85, EPA 540-R-08-005. January.

USEPA, 2014. National Functional Guidelines for Inorganic Superfund Data Review, OSWER 9355.0-131, EPA 540-R-013-001. August.

Table 3. Field Blank Analysis

Site Name	Sample Date	Analyte	Concentration (mg/L)	Lab
07-EMF-MW-D	4/5/2016	Dissolved Ca	0.0400 U	CLP
		Dissolved Mg	0.0600 U	CLP
		Dissolved K	0.500 U	CLP
		Dissolved Na	0.500 U	CLP
		Dissolved As	0.0010 U	CLP
		Dissolved Cd	0.00020 U	CLP
		Dissolved Pb	0.0010 U	CLP
		Dissolved Zn	**0.0072**	CLP
		Alkalinity-HCO_3	< 1.0	SVL
		Alkalinity-CO_3	< 1.0	SVL
		Alkalinity-OH	< 1.0	SVL
		Alkalinity-Total	< 1.0	SVL
		Dissolved Cl	< 0.20	SVL
		Dissolved SO_4	< 0.30	SVL

< = Concentration was not detected (SVL uses method reporting limit).
U = Concentration was not detected (CLP uses the contract required quantitation limit).

Bold values are detected concentrations.
mg/L = milligrams per liter

Table 4. Field Duplicate Sample Analysis

Site Name	Sample Date	Analyte	Original Concentration (mg/L)	Duplicate Concentration (mg/L)	RPD	Lab
08-EMF-MW-F	4/5/2016	Dissolved Ca	19.6	19.7	0.5%	CLP
		Dissolved Mg	9.52	9.66	1.5%	CLP
		Dissolved K	0.50 U	0.0864 J	NA	CLP
		Dissolved Na	24.6	24.9	1.2%	CLP
		Dissolved As	0.00011 J	0.0010 U	NA	CLP
		Dissolved Cd	0.0019	0.0020	5.1%	CLP
		Dissolved Pb	0.0010 U	0.00007 J	NA	CLP
		Dissolved Zn	4.14	4.08	1.5%	CLP
		Alkalinity-HCO_3	12.7	12.6	0.8%	SVL
		Alkalinity-CO_3	< 1.0	< 1.0	NA	SVL
		Alkalinity-OH^-	< 1.0	< 1.0	NA	SVL
		Alkalinity-Total	12.7	12.6	0.8%	SVL
		Dissolved Cl	52.2	51.6	1.2%	SVL
		Dissolved SO_4	71.8	71.8	0.0%	SVL

Relative Percent Difference (RPD) =(|X1-X2|/((X1+X2)/2))*100

X1 = Original Concentration

X2 = Duplicate Concentration

< = Concentration was not detected (SVL uses method reporting limit).

U = Concentration was not detected (CLP uses the contract required quantitation limit).

J = The associated value is an estimate.

NA = RPD cannot be calculated because one or more of the results are not detected.

mg/L = milligrams per liter

Attachment A
SVL Laboratory Report

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
(07-EMF-MW-A)040516	W6D0042-01	Ground Water	05-Apr-16 10:10	GM	05-Apr-2016	
(07-EMF-MW-B)040516	W6D0042-02	Ground Water	05-Apr-16 10:44	GM	05-Apr-2016	
(09-EMF-MW-CDEEP)040516	W6D0042-03	Ground Water	05-Apr-16 11:33	GM	05-Apr-2016	
(07-EMF-MW-C)040516	W6D0042-04	Ground Water	05-Apr-16 11:58	GM	05-Apr-2016	
(08-EMF-MW-E)040516	W6D0042-05	Ground Water	05-Apr-16 12:36	GM	05-Apr-2016	
(07-EMF-MW-D)040516	W6D0042-06	Ground Water	05-Apr-16 13:45	GM	05-Apr-2016	
(07-EMF-MW-D)040516-E	W6D0042-07	Ground Water	05-Apr-16 15:15	GM	05-Apr-2016	
(08-EMF-MW-F)040516	W6D0042-08	Ground Water	05-Apr-16 14:48	GM	05-Apr-2016	
(08-EMF-MW-F)040516-C	W6D0042-09	Ground Water	05-Apr-16 14:48	GM	05-Apr-2016	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.
Sample preparation is defined by the client as per their Data Quality Objectives.
This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.
The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Client Sample ID: **(07-EMF-MW-A)040516**
SVL Sample ID: **W6D0042-01 (Ground Water)**

Sampled: 05-Apr-16 10:10
Received: 05-Apr-16
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Classical Chemistry Parameters										
SM 2320B	**Total Alkalinity**	8.7	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:21	
SM 2320B	**Bicarbonate**	8.7	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:21	
SM 2320B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:21	
SM 2320B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:21	
Filtered Anions by Ion Chromatography										
EPA 300.0	**Chloride**	11.1	mg/L	0.20	0.07		W615158	DT	04/08/16 13:06	
EPA 300.0	**Sulfate as SO4**	52.5	mg/L	1.50	0.65	5	W615158	DT	04/08/16 15:14	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

SVL holds the following certifications:
AZ:0538, **CA**:2080, **ID**:ID00019 & ID00965 (Microbiology), **NV**:ID000192007A, **UT**(**TNI**):ID000192015-1, **WA**:C573

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Client Sample ID: **(07-EMF-MW-B)040516**
SVL Sample ID: **W6D0042-02 (Ground Water)**

Sampled: 05-Apr-16 10:44
Received: 05-Apr-16
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Classical Chemistry Parameters										
SM 2320B	**Total Alkalinity**	15.5	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:26	
SM 2320B	**Bicarbonate**	15.5	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:26	
SM 2320B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:26	
SM 2320B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:26	
Filtered Anions by Ion Chromatography										
EPA 300.0	**Chloride**	11.4	mg/L	0.20	0.07		W615158	DT	04/08/16 13:16	
EPA 300.0	**Sulfate as SO4**	24.8	mg/L	0.30	0.13		W615158	DT	04/08/16 13:16	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Client Sample ID: **(09-EMF-MW-CDEEP)040516**
SVL Sample ID: **W6D0042-03 (Ground Water)**

Sampled: 05-Apr-16 11:33
Received: 05-Apr-16
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Classical Chemistry Parameters										
SM 2320B	**Total Alkalinity**	25.9	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:33	
SM 2320B	**Bicarbonate**	25.9	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:33	
SM 2320B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:33	
SM 2320B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:33	
Filtered Anions by Ion Chromatography										
EPA 300.0	**Chloride**	1.28	mg/L	0.20	0.07		W615158	DT	04/08/16 13:26	
EPA 300.0	**Sulfate as SO4**	11.7	mg/L	0.30	0.13		W615158	DT	04/08/16 13:26	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Client Sample ID: **(07-EMF-MW-C)040516**
SVL Sample ID: **W6D0042-04 (Ground Water)**

Sampled: 05-Apr-16 11:58
Received: 05-Apr-16
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Classical Chemistry Parameters										
SM 2320B	**Total Alkalinity**	22.4	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:40	
SM 2320B	**Bicarbonate**	22.4	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:40	
SM 2320B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:40	
SM 2320B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:40	
Filtered Anions by Ion Chromatography										
EPA 300.0	**Chloride**	10.1	mg/L	1.00	0.33	5	W615158	DT	04/08/16 13:35	D2
EPA 300.0	**Sulfate as SO4**	38.9	mg/L	1.50	0.65	5	W615158	DT	04/08/16 13:35	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Client Sample ID: **(08-EMF-MW-E)040516**
SVL Sample ID: **W6D0042-05 (Ground Water)**

Sampled: 05-Apr-16 12:36
Received: 05-Apr-16
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Classical Chemistry Parameters										
SM 2320B	**Total Alkalinity**	486	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:51	
SM 2320B	**Bicarbonate**	486	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:51	
SM 2320B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:51	
SM 2320B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 08:51	
Filtered Anions by Ion Chromatography										
EPA 300.0	**Chloride**	425	mg/L	10.0	3.30	50	W615158	DT	04/08/16 14:25	D2,M3
EPA 300.0	**Sulfate as SO4**	133	mg/L	15.0	6.50	50	W615158	DT	04/08/16 14:25	D2,M3

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Client Sample ID: **(07-EMF-MW-D)040516**
SVL Sample ID: **W6D0042-06 (Ground Water)**

Sampled: 05-Apr-16 13:45
Received: 05-Apr-16
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Classical Chemistry Parameters										
SM 2320B	**Total Alkalinity**	33.6	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:02	
SM 2320B	**Bicarbonate**	33.6	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:02	
SM 2320B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:02	
SM 2320B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:02	
Filtered Anions by Ion Chromatography										
EPA 300.0	**Chloride**	5.33	mg/L	0.20	0.07		W615158	DT	04/08/16 13:45	
EPA 300.0	**Sulfate as SO4**	9.22	mg/L	0.30	0.13		W615158	DT	04/08/16 13:45	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Client Sample ID: **(07-EMF-MW-D)040516-E**
SVL Sample ID: **W6D0042-07 (Ground Water)**

Sampled: 05-Apr-16 15:15
Received: 05-Apr-16
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Classical Chemistry Parameters										
SM 2320B	Total Alkalinity	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:12	
SM 2320B	Bicarbonate	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:12	
SM 2320B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:12	
SM 2320B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:12	
Filtered Anions by Ion Chromatography										
EPA 300.0	Chloride	< 0.20	mg/L	0.20	0.07		W615158	DT	04/08/16 13:55	
EPA 300.0	Sulfate as SO4	< 0.30	mg/L	0.30	0.13		W615158	DT	04/08/16 13:55	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Client Sample ID: **(08-EMF-MW-F)040516**
SVL Sample ID: **W6D0042-08 (Ground Water)**

Sampled: 05-Apr-16 14:48
Received: 05-Apr-16
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Classical Chemistry Parameters										
SM 2320B	**Total Alkalinity**	12.7	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:14	
SM 2320B	**Bicarbonate**	12.7	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:14	
SM 2320B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:14	
SM 2320B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:14	
Filtered Anions by Ion Chromatography										
EPA 300.0	**Chloride**	52.2	mg/L	2.00	0.66	10	W615158	DT	04/08/16 14:54	D2
EPA 300.0	**Sulfate as SO4**	71.8	mg/L	3.00	1.30	10	W615158	DT	04/08/16 14:54	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Client Sample ID: **(08-EMF-MW-F)040516-C**
SVL Sample ID: **W6D0042-09 (Ground Water)**

Sampled: 05-Apr-16 14:48
Received: 05-Apr-16
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Classical Chemistry Parameters										
SM 2320B	**Total Alkalinity**	12.6	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:20	
SM 2320B	**Bicarbonate**	12.6	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:20	
SM 2320B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:20	
SM 2320B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W615098	DKS	04/06/16 09:20	
Filtered Anions by Ion Chromatography										
EPA 300.0	**Chloride**	51.6	mg/L	2.00	0.66	10	W615158	DT	04/08/16 15:04	D2
EPA 300.0	**Sulfate as SO4**	71.8	mg/L	3.00	1.30	10	W615158	DT	04/08/16 15:04	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

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Laboratory Director

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Classical Chemistry Parameters								
SM 2320B	Total Alkalinity	mg/L as CaCO3	<1.0		1.0	W615098	06-Apr-16	
SM 2320B	Bicarbonate	mg/L as CaCO3	<1.0		1.0	W615098	06-Apr-16	
SM 2320B	Carbonate	mg/L as CaCO3	<1.0		1.0	W615098	06-Apr-16	
SM 2320B	Hydroxide	mg/L as CaCO3	<1.0		1.0	W615098	06-Apr-16	
Filtered Anions by Ion Chromatography								
EPA 300.0	Chloride	mg/L	<0.20	0.07	0.20	W615158	08-Apr-16	
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.13	0.30	W615158	08-Apr-16	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Classical Chemistry Parameters									
SM 2320B	Total Alkalinity	mg/L as CaCO3	107	99.3	108	85 - 115	W615098	06-Apr-16	
SM 2320B	Bicarbonate	mg/L as CaCO3	107	99.3	108	85 - 115	W615098	06-Apr-16	
Filtered Anions by Ion Chromatography									
EPA 300.0	Chloride	mg/L	2.91	3.00	96.9	90 - 110	W615158	08-Apr-16	
EPA 300.0	Sulfate as SO4	mg/L	10.4	10.0	104	90 - 110	W615158	08-Apr-16	

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
Classical Chemistry Parameters									
SM 2320B	Total Alkalinity	mg/L as CaCO3	493	486	1.4	20	W615098	06-Apr-16	
SM 2320B	Bicarbonate	mg/L as CaCO3	493	486	1.4	20	W615098	06-Apr-16	
SM 2320B	Carbonate	mg/L as CaCO3	<1.0	<1.0	UDL	20	W615098	06-Apr-16	
SM 2320B	Hydroxide	mg/L as CaCO3	<1.0	<1.0	UDL	20	W615098	06-Apr-16	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Filtered Anions by Ion Chromatography										
EPA 300.0	Chloride	mg/L	411	425	3.00	R > 4S	90 - 110	W615158	08-Apr-16	D2,M3
EPA 300.0	Sulfate as SO4	mg/L	141	133	10.0	R > 4S	90 - 110	W615158	08-Apr-16	D2,M3

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well / 15019-08-02
Work Order: **W6D0042**
Reported: 15-Apr-16 12:16

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
Filtered Anions by Ion Chromatography											
EPA 300.0	Chloride	mg/L	412	411	3.00	R > 4S	0.3	20	W615158	08-Apr-16	D2,M3
EPA 300.0	Sulfate as SO4	mg/L	142	141	10.0	R > 4S	1.1	20	W615158	08-Apr-16	D2,M3

Notes and Definitions

D2	Sample required dilution due to high concentration of target analyte.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable

Attachment B
USEPA Data Validation Report

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ENVIRONMENTAL ASSESSMENT

May 6, 2016

MEMORANDUM

SUBJECT: Data Validation for Water Samples Collected at the CDA East Mission Flats Repository, Case# 46090, SDG: MJHF30, Inorganic Analyses

FROM: Don Matheny, Chemist
OEA, Environmental Services Unit

TO: Craig Cameron, Remedial Project Manager
Office of Environmental Cleanup

CC: Robin Nimmer, Terragraphics

The quality assurance (QA) review of the analytical data generated from the analysis of nine (9) waters collected from the above referenced site has been completed. These samples were analyzed for dissolved metals by the Chemtech Consulting Group located in Mountainside, NJ.

Sample analyses were evaluated following EPA's Stage 4 Data Validation Electronic/Manual Process (S4VEM). The validation was conducted according to the Quality Control Specifications outlined in:

- SAP/QAPP for the Ground Water & Surface Water Monitoring at the East Mission Flats Repository, Terragraphics, October, 2010
- USEPA CLP Statement of Work for Inorganic Superfund Methods (ISM02.3)
- Modified Analysis Request 2468.1 and 2469.1
- National Functional Guidelines for Inorganic Superfund Data Review (EPA-540-R-10-011)
- Guidance for Labeling Externally Validated Laboratory Analytical Data (EPA-540-R08-005)

Some data may be qualified using the reviewer's professional judgment. The conclusions presented here are based on the information provided for the review. A summary of samples evaluated in this validation report and the pertinent dates for sample collection, laboratory sample receipt and analyses is attached along with the validated data.

I. QUALITY CONTROL RESULTS SUMMARY

The following table summarizes the major sample quality control (QC) tests, associated test results, criteria for evaluation and identification of outliers. Some criteria for evaluation may be QAPP specific and different from the National Functional Guidelines. Other QC checks (e.g., MS tune, calibration, internal standard recoveries, etc.) were electronically evaluated the results of which are not summarized here though any excursions of these QC results will appear in the *Data Qualifications* section.

Quality Control Test	Result Ranges	Outliers[1] (Y or N)	Evaluation Criteria
Blanks	Not detected or < CRQL No qualified samples	N	Not detected or <10% of Sample
Matrix Spike (MJHF34)	92 - 101%	N	75 - 125% Recovery
Lab Duplicate (MJHF34)	≤ 4% or ± CRQL	N	≤ 20% RPD or ± CRQL
Field Duplicate (MJHF38)	≤ 5% or ± CRQL	N	≤ 20% RPD or ± CRQL
LCS (blank spike)	85 - 107%	N	70 - 130%
Serial Dilution (MJHF34) [2]	≤ 8%	N	≤ 10% Difference

[1] See the "*Data Qualifications*" section below for QC excursions and qualification of affected data.

[2] The Serial Dilution QC evaluation was limited to the Calcium, Magnesium, Sodium, and Zinc data because the native concentrations of the remaining elements were too low for conducting a quantitative comparison of a 1:5 serial dilution.

II. DATA QUALIFICATIONS

Summary of Validation Qualifiers Applied

After the manual and electronic data review, the following data qualifications were applied:

Detection / Quantitation Limits
The following analytes have detected sample results < CRQLs (below the range of quantitation) and the associated laboratory blanks were not detected. Data Qualifications: Sample results are qualified J.
Qualified Analytical Results: **Arsenic -** MJHF30, MJHF31, MJHF32, MJHF33, MJHF34, MJHF35, MJHF37 **Cadmium -** MJHF35 **Lead -** MJHF38 **Potassium -** MJHF30, MJHF38

Data Qualifiers

The following is a list of validation qualifiers applied to the sample result(s) where appropriate.

Data Validation Qualifiers	
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
J	The associated value is an estimated quantity.
UJ	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The data are unusable. The analyte may or may not be present in the sample.

III. SAMPLE INDEX

The sample listing dates of sample collection, laboratory receipt and analysis are provided below.

Sample Number	Matrix	Sampling Date	Date Received	ICP-AES Analysis	ICP-MS Analysis
MJHF30	Water	4/5/2016	4/8/2016	4/26/2016	4/19/2016
MJHF31	Water	4/5/2016	4/8/2016	4/26/2016	4/19/2016
MJHF32	Water	4/5/2016	4/8/2016	4/26/2016	4/19/2016
MJHF33	Water	4/5/2016	4/8/2016	4/26/2016	4/19-22/2016
MJHF34	Water	4/5/2016	4/8/2016	4/27/2016	4/19/2016
MJHF35	Water	4/5/2016	4/8/2016	4/26/2016	4/19/2016
MJHF36	Water	4/5/2016	4/8/2016	4/26/2016	4/19/2016
MJHF37	Water	4/5/2016	4/8/2016	4/26/2016	4/19-22/2016
MJHF38	Water	4/5/2016	4/8/2016	4/26/2016	4/19-22/2016

Sample MJHF38 is the field duplicate for MJHF37. Sample MJHF36 is the field blank.

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF30	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	07-EMF-MW-A	pH:	2	Sample Date:	04/05/2016	Sample Time:	10:10:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	12300		ug/L	12300		1.0	Yes	S4VEM
Magnesium	Target	6290		ug/L	6290		1.0	Yes	S4VEM
Potassium	Target	367	J	ug/L	367	J	1.0	Yes	S4VEM
Sodium	Target	5430		ug/L	5430		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF30	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	07-EMF-MW-A	pH:	2	Sample Date:	04/05/2016	Sample Time:	10:10:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.12	J	ug/L	0.12	J	1.0	Yes	S4VEM
Cadmium	Target	0.36		ug/L	0.36		1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	1680		ug/L	1680		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF31	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	07-EMF-MW-B	pH:	2	Sample Date:	04/05/2016	Sample Time:	10:44:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.11	J	ug/L	0.11	J	1.0	Yes	S4VEM
Cadmium	Target	0.20	U	ug/L	0.20	U	1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	50.5		ug/L	50.5		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF31	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	07-EMF-MW-B	pH:	2	Sample Date:	04/05/2016	Sample Time:	10:44:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	11600		ug/L	11600		1.0	Yes	S4VEM
Magnesium	Target	4050		ug/L	4050		1.0	Yes	S4VEM
Potassium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM
Sodium	Target	4700		ug/L	4700		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF32	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	09-EMF-MW-C-DEEP	pH:	2	Sample Date:	04/05/2016	Sample Time:	11:33:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.73	J	ug/L	0.73	J	1.0	Yes	S4VEM
Cadmium	Target	0.20	U	ug/L	0.20	U	1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	20.8		ug/L	20.8		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF32	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	09-EMF-MW-C-DEEP	pH:	2	Sample Date:	04/05/2016	Sample Time:	11:33:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	8400		ug/L	8400		1.0	Yes	S4VEM
Magnesium	Target	2640		ug/L	2640		1.0	Yes	S4VEM
Potassium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM
Sodium	Target	4230		ug/L	4230		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF33	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	07-EMF-MW-C	pH:	2	Sample Date:	04/05/2016	Sample Time:	11:58:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.15	J	ug/L	0.15	J	1.0	Yes	S4VEM
Cadmium	Target	2.3		ug/L	2.3		1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	2950		ug/L	2950	D	20.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF33	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	07-EMF-MW-C	pH:	2	Sample Date:	04/05/2016	Sample Time:	11:58:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	10700		ug/L	10700		1.0	Yes	S4VEM
Magnesium	Target	6140		ug/L	6140		1.0	Yes	S4VEM
Potassium	Target	756		ug/L	756		1.0	Yes	S4VEM
Sodium	Target	6520		ug/L	6520		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF34	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	08-EMF-MW-E	pH:	2	Sample Date:	04/05/2016	Sample Time:	12:36:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	245000		ug/L	245000		1.0	Yes	S4VEM
Magnesium	Target	85400		ug/L	85400		1.0	Yes	S4VEM
Potassium	Target	1140		ug/L	1140		1.0	Yes	S4VEM
Sodium	Target	42600		ug/L	42600		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF34	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	08-EMF-MW-E	pH:	2	Sample Date:	04/05/2016	Sample Time:	12:36:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.59	J	ug/L	0.59	J	1.0	Yes	S4VEM
Cadmium	Target	0.20	U	ug/L	0.20	U	1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	18.8		ug/L	18.8		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF35	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	07-EMF-MW-D	pH:	2	Sample Date:	04/05/2016	Sample Time:	13:45:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.31	J	ug/L	0.31	J	1.0	Yes	S4VEM
Cadmium	Target	0.13	J	ug/L	0.13	J	1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	118		ug/L	118		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF35	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	07-EMF-MW-D	pH:	2	Sample Date:	04/05/2016	Sample Time:	13:45:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	40.0	U	ug/L	40.0	U	1.0	Yes	S4VEM
Magnesium	Target	60.0	U	ug/L	60.0	U	1.0	Yes	S4VEM
Potassium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM
Sodium	Target	586		ug/L	586		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF36	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	07-EMF-MW-D	pH:	2	Sample Date:	04/05/2016	Sample Time:	15:15:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Cadmium	Target	0.20	U	ug/L	0.20	U	1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	7.2		ug/L	7.2		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF36	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	07-EMF-MW-D	pH:	2	Sample Date:	04/05/2016	Sample Time:	15:15:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	40.0	U	ug/L	40.0	U	1.0	Yes	S4VEM
Magnesium	Target	60.0	U	ug/L	60.0	U	1.0	Yes	S4VEM
Potassium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM
Sodium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF37	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	08-EMF-MW-F	pH:	2	Sample Date:	04/05/2016	Sample Time:	14:48:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	19600		ug/L	19600		1.0	Yes	S4VEM
Magnesium	Target	9520		ug/L	9520		1.0	Yes	S4VEM
Potassium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM
Sodium	Target	24600		ug/L	24600		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF37	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	08-EMF-MW-F	pH:	2	Sample Date:	04/05/2016	Sample Time:	14:48:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.11	J	ug/L	0.11	J	1.0	Yes	S4VEM
Cadmium	Target	1.9		ug/L	1.9		1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	4140		ug/L	4140	D	20.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF38	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	08-EMF-MW-F	pH:	2	Sample Date:	04/05/2016	Sample Time:	14:48:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	19700		ug/L	19700		1.0	Yes	S4VEM
Magnesium	Target	9660		ug/L	9660		1.0	Yes	S4VEM
Potassium	Target	86.4	J	ug/L	86.4	J	1.0	Yes	S4VEM
Sodium	Target	24900		ug/L	24900		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF38	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	08-EMF-MW-F	pH:	2	Sample Date:	04/05/2016	Sample Time:	14:48:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Cadmium	Target	2.0		ug/L	2.0		1.0	Yes	S4VEM
Lead	Target	0.070	J	ug/L	0.070	J	1.0	Yes	S4VEM
Zinc	Target	4080		ug/L	4080	D	20.0	Yes	S4VEM

Attachment C
Laboratory Data

SVL Data

CASE	SDG	EPASAMP	LABID	MATRIX	QCCODE	SMPQUAL	ANDATE	ANTIME	CASNUM	ANALYTE	STATE	CONC	UNITS	RLIMIT	MDL	LABQUAL	IDEQ QUAL	COMB QUAL	SMPDATE	VALDQAL	PRPDATE	LRDATE	LEVEL	PERSOLD	SMPTWTVL	FINLVOL	METHOD	STATLOC	PERCENT_RECOVERY	TRUE_VALUE	RPD
W615098	W615098	PBW	W615098-BLK1	WATER	LRB	.	4/6/2016	7:30	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	Blank	.	.	.
W615098	W615098	PBW	W615098-BLK1	WATER	LRB	.	4/6/2016	7:30	471341	(HCO3)	Alkalinity-HCO3	Total	1	mg/L as CaCO3	1	.	U		U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	Blank	.	.	.
W615098	W615098	PBW	W615098-BLK1	WATER	LRB	.	4/6/2016	7:30	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	Blank	.	.	.
W615098	W615098	PBW	W615098-BLK1	WATER	LRB	.	4/6/2016	7:30	471341	(ALK)	Alkalinity-Total	Total	1	mg/L as CaCO3	1	.	U		U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	Blank	.	.	.
W615098	W615098	LCSW	W615098-BS1	WATER	LCM	.	4/6/2016	7:35	471341	(HCO3)	Alkalinity-HCO3	Total	107	mg/L as CaCO3	1	.	.			4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	LCS	108	99.3	.
W615098	W615098	LCSW	W615098-BS1	WATER	LCM	.	4/6/2016	7:35	471341	(ALK)	Alkalinity-Total	Total	107	mg/L as CaCO3	1	.	.			4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	LCS	108	99.3	.
W615098	W615098	(08-EMF-MW-E)040516DUP1	W615098-DUP1	WATER	LD2	.	4/6/2016	8:01	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	.
W615098	W615098	(08-EMF-MW-E)040516DUP1	W615098-DUP1	WATER	LD2	.	4/6/2016	8:01	471341	(HCO3)	Alkalinity-HCO3	Total	493	mg/L as CaCO3	1	.	.			4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	1.4
W615098	W615098	(08-EMF-MW-E)040516DUP1	W615098-DUP1	WATER	LD2	.	4/6/2016	8:01	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	.
W615098	W615098	(08-EMF-MW-E)040516DUP1	W615098-DUP1	WATER	LD2	.	4/6/2016	8:01	471341	(ALK)	Alkalinity-Total	Total	493	mg/L as CaCO3	1	.	.			4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	1.4
W615158	W615158	PBW	W615158-BLK1	WATER	LRB	.	4/8/2016	12:37	16887006	CL		Dissolved	0.2	mg/L	0.2	0.07	U		U	4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	Blank	.	.	.
W615158	W615158	PBW	W615158-BLK1	WATER	LRB	.	4/8/2016	12:37	14808798	SO4		Dissolved	0.3	mg/L	0.3	0.13	U		U	4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	Blank	.	.	.
W615158	W615158	LCSW	W615158-BS1	WATER	LCM	.	4/8/2016	12:46	16887006	CL		Dissolved	2.91	mg/L	0.2	0.07	.			4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	LCS	96.9	3	.
W615158	W615158	LCSW	W615158-BS1	WATER	LCM	.	4/8/2016	12:46	14808798	SO4		Dissolved	10.4	mg/L	0.3	0.13	.			4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	LCS	104	10	.
W615158	W615158	(08-EMF-MW-E)040516MS1	W615158-MS1	WATER	LSF	.	4/8/2016	14:34	16887006	CL		Dissolved	411	mg/L	10	3.3	.			4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	(08-EMF-MW-E)040516	R>4S	3	.
W615158	W615158	(08-EMF-MW-E)040516MS1	W615158-MS1	WATER	LSF	.	4/8/2016	14:34	14808798	SO4		Dissolved	141	mg/L	15	6.5	.			4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	(08-EMF-MW-E)040516	R>4S	10	.
W615158	W615158	(08-EMF-MW-E)040516MSD1	W615158-MSD1	WATER	LSFD	.	4/8/2016	14:44	16887006	CL		Dissolved	412	mg/L	10	3.3	.			4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	(08-EMF-MW-E)040516	R>4S	3	0.3
W615158	W615158	(08-EMF-MW-E)040516MSD1	W615158-MSD1	WATER	LSFD	.	4/8/2016	14:44	14808798	SO4		Dissolved	142	mg/L	15	6.5	.			4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	(08-EMF-MW-E)040516	R>4S	10	1.1
W615158	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/8/2016	13:06	16887006	CL		Dissolved	11.1	mg/L	0.2	0.07	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-A)040516	.	.	.
W615158	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/8/2016	15:14	14808798	SO4		Dissolved	52.5	mg/L	1.5	0.65	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-A)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/6/2016	8:21	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-A)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/6/2016	8:21	471341	(HCO3)	Alkalinity-HCO3	Total	8.7	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-A)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/6/2016	8:21	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-A)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/6/2016	8:21	471341	(ALK)	Alkalinity-Total	Total	8.7	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-A)040516	.	.	.
W615158	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/8/2016	13:16	16887006	CL		Dissolved	11.4	mg/L	0.2	0.07	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-B)040516	.	.	.
W615158	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/8/2016	13:16	14808798	SO4		Dissolved	24.8	mg/L	0.3	0.13	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-B)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/6/2016	8:26	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-B)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/6/2016	8:26	471341	(HCO3)	Alkalinity-HCO3	Total	15.5	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-B)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/6/2016	8:26	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-B)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/6/2016	8:26	471341	(ALK)	Alkalinity-Total	Total	15.5	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-B)040516	.	.	.
W615158	W6D0042	(09-EMF-MW-CDEEP)040516	W6D0042-03	WATER	FLD	.	4/8/2016	13:26	16887006	CL		Dissolved	1.28	mg/L	0.2	0.07	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(09-EMF-MW-CDEEP)040516	.	.	.
W615158	W6D0042	(09-EMF-MW-CDEEP)040516	W6D0042-03	WATER	FLD	.	4/8/2016	13:26	14808798	SO4		Dissolved	11.7	mg/L	0.3	0.13	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(09-EMF-MW-CDEEP)040516	.	.	.
W615098	W6D0042	(09-EMF-MW-CDEEP)040516	W6D0042-03	WATER	FLD	.	4/6/2016	8:33	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(09-EMF-MW-CDEEP)040516	.	.	.
W615098	W6D0042	(09-EMF-MW-CDEEP)040516	W6D0042-03	WATER	FLD	.	4/6/2016	8:33	471341	(HCO3)	Alkalinity-HCO3	Total	25.9	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(09-EMF-MW-CDEEP)040516	.	.	.
W615098	W6D0042	(09-EMF-MW-CDEEP)040516	W6D0042-03	WATER	FLD	.	4/6/2016	8:33	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(09-EMF-MW-CDEEP)040516	.	.	.
W615098	W6D0042	(09-EMF-MW-CDEEP)040516	W6D0042-03	WATER	FLD	.	4/6/2016	8:33	471341	(ALK)	Alkalinity-Total	Total	25.9	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(09-EMF-MW-CDEEP)040516	.	.	.
W615158	W6D0042	(07-EMF-MW-C)040516	W6D0042-04	WATER	FLD	.	4/8/2016	13:35	16887006	CL		Dissolved	10.1	mg/L	1	0.33	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-C)040516	.	.	.
W615158	W6D0042	(07-EMF-MW-C)040516	W6D0042-04	WATER	FLD	.	4/8/2016	13:35	14808798	SO4		Dissolved	38.9	mg/L	1.5	0.65	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-C)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-C)040516	W6D0042-04	WATER	FLD	.	4/6/2016	8:40	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-C)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-C)040516	W6D0042-04	WATER	FLD	.	4/6/2016	8:40	471341	(HCO3)	Alkalinity-HCO3	Total	22.4	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-C)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-C)040516	W6D0042-04	WATER	FLD	.	4/6/2016	8:40	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-C)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-C)040516	W6D0042-04	WATER	FLD	.	4/6/2016	8:40	471341	(ALK)	Alkalinity-Total	Total	22.4	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-C)040516	.	.	.
W615158	W6D0042	(08-EMF-MW-E)040516	W6D0042-05	WATER	FLD	.	4/8/2016	14:25	16887006	CL		Dissolved	425	mg/L	10	3.3	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(08-EMF-MW-E)040516	.	.	.
W615158	W6D0042	(08-EMF-MW-E)040516	W6D0042-05	WATER	FLD	.	4/8/2016	14:25	14808798	SO4		Dissolved	133	mg/L	15	6.5	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(08-EMF-MW-E)040516	.	.	.
W615098	W6D0042	(08-EMF-MW-E)040516	W6D0042-05	WATER	FLD	.	4/6/2016	8:51	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	.
W615098	W6D0042	(08-EMF-MW-E)040516	W6D0042-05	WATER	FLD	.	4/6/2016	8:51	471341	(HCO3)	Alkalinity-HCO3	Total	486	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	.
W615098	W6D0042	(08-EMF-MW-E)040516	W6D0042-05	WATER	FLD	.	4/6/2016	8:51	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	.
W615098	W6D0042	(08-EMF-MW-E)040516	W6D0042-05	WATER	FLD	.	4/6/2016	8:51	471341	(ALK)	Alkalinity-Total	Total	486	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	.
W615158	W6D0042	(07-EMF-MW-D)040516	W6D0042-06	WATER	FLD	.	4/8/2016	13:45	16887006	CL		Dissolved	5.33	mg/L	0.2	0.07	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-D)040516	.	.	.
W615158	W6D0042	(07-EMF-MW-D)040516	W6D0042-06	WATER	FLD	.	4/8/2016	13:45	14808798	SO4		Dissolved	9.22	mg/L	0.3	0.13	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-D)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-D)040516	W6D0042-06	WATER	FLD	.	4/6/2016	9:02	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-D)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-D)040516	W6D0042-06	WATER	FLD	.	4/6/2016	9:02	471341	(HCO3)	Alkalinity-HCO3	Total	33.6	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-D)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-D)040516	W6D0042-06	WATER	FLD	.	4/6/2016	9:02	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-D)040516	.	.	.
W615098	W6D0042	(07-EMF-MW-D)040516	W6D0042-06	WATER	FLD	.	4/6/2016	9:02	471341	(ALK)	Alkalinity-Total	Total	33.6	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-D)040516	.	.	.
W615158	W6D0042	(07-EMF-MW-D)040516-E	W6D0042-07	WATER	FLD	.	4/8/2016	13:55	16887006	CL		Dissolved	0.2	mg/L	0.2	0.07	U		U	4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-D)040516-E	.	.	.
W615158	W6D0042	(07-EMF-MW-D)040516-E	W6D0042-07	WATER	FLD	.	4/8/2016	13:55	14808798	SO4		Dissolved	0.3	mg/L	0.3	0.13	U		U	4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-D)040516-E	.	.	.
W615098	W6D0042	(07-EMF-MW-D)040516-E	W6D0042-07	WATER	FLD	.	4/6/2016	9:12	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-D)040516-E	.	.	.
W615098	W6D0042	(07-EMF-MW-D)040516-E	W6D0042-07	WATER	FLD	.	4/6/2016	9:12	471341	(HCO3)	Alkalinity-HCO3	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-D)040516-E	.	.	.
W615098	W6D0042	(07-EMF-MW-D)040516-E	W6D0042-07	WATER	FLD	.	4/6/2016	9:12	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-D)040516-E	.	.	.
W615098	W6D0042	(07-EMF-MW-D)040516-E	W6D0042-07	WATER	FLD	.	4/6/2016	9:12	471341	(ALK)	Alkalinity-Total	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-D)040516-E	.	.	.
W615158	W6D0042	(08-EMF-MW-F)040516	W6D0042-08	WATER	FLD	.	4/8/2016	14:54	16887006	CL		Dissolved	52.2	mg/L	2	0.66	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(08-EMF-MW-F)040516	.	.	.
W615158	W6D0042	(08-EMF-MW-F)040516	W6D0042-08	WATER	FLD	.	4/8/2016	14:54	14808798	SO4		Dissolved	71.8	mg/L	3	1.3	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(08-EMF-MW-F)040516	.	.	.
W615098	W6D0042	(08-EMF-MW-F)040516	W6D0042-08	WATER	FLD	.	4/6/2016	9:14	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-F)040516	.	.	.
W615098	W6D0042	(08-EMF-MW-F)040516	W6D0042-08	WATER	FLD	.	4/6/2016	9:14	471341	(HCO3)	Alkalinity-HCO3	Total	12.7	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-F)040516	.	.	.
W615098	W6D0042	(08-EMF-MW-F)040516	W6D0042-08	WATER	FLD	.	4/6/2016	9:14	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-F)040516	.	.	.
W615098	W6D0042	(08-EMF-MW-F)040516	W6D0042-08	WATER	FLD	.	4/6/2016	9:14	471341	(ALK)	Alkalinity-Total	Total	12.7	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-F)040516	.	.	.
W615158	W6D0042	(08-EMF-MW-F)040516-C	W6D0042-09	WATER	FLD	.	4/8/2016	15:04	16887006	CL		Dissolved	51.6	mg/L	2	0.66	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(08-EMF-MW-F)040516-C	.	.	.
W615158	W6D0042	(08-EMF-MW-F)040516-C	W6D0042-09	WATER	FLD	.	4/8/2016	15:04	14808798	SO4		Dissolved	71.8	mg/L	3	1.3	.			4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(08-EMF-MW-F)040516-C	.	.	.
W615098	W6D0042	(08-EMF-MW-F)040516-C	W6D0042-09	WATER	FLD	.	4/6/2016	9:20	471341	(CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-F)040516-C	.	.	.
W615098	W6D0042	(08-EMF-MW-F)040516-C	W6D0042-09	WATER	FLD	.	4/6/2016	9:20	471341	(HCO3)	Alkalinity-HCO3	Total	12.6	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-F)040516-C	.	.	.
W615098	W6D0042	(08-EMF-MW-F)040516-C	W6D0042-09	WATER	FLD	.	4/6/2016	9:20	471341	(OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U		U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-F)040516-C	.	.	.
W615098	W6D0042	(08-EMF-MW-F)040516-C	W6D0042-09	WATER	FLD	.	4/6/2016	9:20	471341	(ALK)	Alkalinity-Total	Total	12.6	mg/L as CaCO3	1	.	.			4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-F)040516-C	.	.	.

Highlighted columns IDEQQAL and COMBQAL entered by TerraGraphics to indicate IDEQ/TG and combined data qualifiers.
Entire electronic data deliverable is available upon request.

CLP Data

CASE NUMBER	SAMPLE DELIVERY GROUP	SAMPLE ID	CAS NUMBER	ANALYTE	FINAL RESULT	RESULT UNITS	FINAL VALIDATION QUALIFIER	IDEQ QUALIFIER	COMB QUALIFIER	DATA VAL LABEL	SAMPLE ADJUSTED CRQL	SAMPLE ADJUSTED MDL	LAB RESULT	LAB QUALIFIERS	METHOD CRQL	NONMOISTURE SAMPLE ADJUSTED CRQL	CRQL UNITS	INSTRUMENT MDL	NONMOISTURE SAMPLE ADJUSTED MDL	MDL UNITS	SAMPLE DATE TIME	LAB SAMPLE TYPE	SPIKE ADDED	STATION LOCATION	SCRIBE SAMPLE NUMBER	PARENT SAMPLE NAME	PARENT SAMPLE LOCATION	LAB REPLICATE TYPE	SAMPLE SOURCE
46090	MJHF30	MJHF34D	7440-38-2	Arsenic	0.57	ug/L	J		J	S4VEM	1.0	0.11	0.57	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-D		FIELD
46090	MJHF30	MJHF34D	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-D		FIELD
46090	MJHF30	MJHF34D	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-D		FIELD
46090	MJHF30	MJHF34D	7440-66-6	Zinc	18.4	ug/L				S4VEM	2.0	0.13	18.4		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-D		FIELD
46090	MJHF30	MJHF30	7440-38-2	Arsenic	0.12	ug/L	J		J	S4VEM	1.0	0.11	0.12	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 10:10:00	Field_Sample		07-EMF-MW-A	(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF30	7440-43-9	Cadmium	0.36	ug/L				S4VEM	0.20	0.054	0.36		0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 10:10:00	Field_Sample		07-EMF-MW-A	(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF30	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 10:10:00	Field_Sample		07-EMF-MW-A	(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF30	7440-66-6	Zinc	1680	ug/L				S4VEM	2.0	0.13	1680		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 10:10:00	Field_Sample		07-EMF-MW-A	(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF31	7440-38-2	Arsenic	0.11	ug/L	J		J	S4VEM	1.0	0.11	0.11	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 10:44:00	Field_Sample		07-EMF-MW-B	(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF31	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 10:44:00	Field_Sample		07-EMF-MW-B	(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF31	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 10:44:00	Field_Sample		07-EMF-MW-B	(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF31	7440-66-6	Zinc	50.5	ug/L		J+	J+	S4VEM	2.0	0.13	50.5		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 10:44:00	Field_Sample		07-EMF-MW-B	(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF32	7440-38-2	Arsenic	0.73	ug/L	J		J	S4VEM	1.0	0.11	0.73	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 11:33:00	Field_Sample		09-EMF-MW-C-DEEP	(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF32	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 11:33:00	Field_Sample		09-EMF-MW-C-DEEP	(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF32	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 11:33:00	Field_Sample		09-EMF-MW-C-DEEP	(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF32	7440-66-6	Zinc	20.8	ug/L		J+	J+	S4VEM	2.0	0.13	20.8		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 11:33:00	Field_Sample		09-EMF-MW-C-DEEP	(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF33	7440-38-2	Arsenic	0.15	ug/L	J		J	S4VEM	1.0	0.11	0.15	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 11:58:00	Field_Sample		07-EMF-MW-C	(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF33	7440-43-9	Cadmium	2.3	ug/L				S4VEM	0.20	0.054	2.3		0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 11:58:00	Field_Sample		07-EMF-MW-C	(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF33	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 11:58:00	Field_Sample		07-EMF-MW-C	(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF33	7440-66-6	Zinc	2950	ug/L				S4VEM	40.0	2.6	2950	D	2	40.0	ug/L	0.13	2.6	ug/L	04/05/2016 11:58:00	Field_Sample		07-EMF-MW-C	(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF34	7440-38-2	Arsenic	0.59	ug/L	J		J	S4VEM	1.0	0.11	0.59	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 12:36:00	Field_Sample		08-EMF-MW-E	(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF34	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 12:36:00	Field_Sample		08-EMF-MW-E	(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF34	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 12:36:00	Field_Sample		08-EMF-MW-E	(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF34	7440-66-6	Zinc	18.8	ug/L		J+	J+	S4VEM	2.0	0.13	18.8		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 12:36:00	Field_Sample		08-EMF-MW-E	(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF35	7440-38-2	Arsenic	0.31	ug/L	J		J	S4VEM	1.0	0.11	0.31	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 13:45:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF35	7440-43-9	Cadmium	0.13	ug/L	J		J	S4VEM	0.20	0.054	0.13	J	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 13:45:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF35	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 13:45:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF35	7440-66-6	Zinc	118	ug/L				S4VEM	2.0	0.13	118		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 13:45:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF36	7440-38-2	Arsenic	1.0	ug/L	U		U	S4VEM	1.0	0.11	1.0	U	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 15:15:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF36	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 15:15:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF36	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 15:15:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF36	7440-66-6	Zinc	7.2	ug/L				S4VEM	2.0	0.13	7.2		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 15:15:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF37	7440-38-2	Arsenic	0.11	ug/L	J		J	S4VEM	1.0	0.11	0.11	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 14:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF37	7440-43-9	Cadmium	1.9	ug/L				S4VEM	0.20	0.054	1.9		0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 14:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF37	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 14:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF37	7440-66-6	Zinc	4140	ug/L				S4VEM	40.0	2.6	4140	D	2	40.0	ug/L	0.13	2.6	ug/L	04/05/2016 14:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF38	7440-38-2	Arsenic	1.0	ug/L	U		U	S4VEM	1.0	0.11	1.0	U	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C DM				FIELD
46090	MJHF30	MJHF38	7440-43-9	Cadmium	2.0	ug/L				S4VEM	0.20	0.054	2.0		0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C DM				FIELD
46090	MJHF30	MJHF38	7439-92-1	Lead	0.070	ug/L	J		J	S4VEM	1.0	0.061	0.070	J	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C DM				FIELD
46090	MJHF30	MJHF38	7440-66-6	Zinc	4080	ug/L				S4VEM	40.0	2.6	4080	D	2	40.0	ug/L	0.13	2.6	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C DM				FIELD
46090	MJHF30	LCS007	7440-38-2	Arsenic	1.8	ug/L				S4VEM	1.0	0.11	1.8		1	1.0	ug/L	0.11	0.11	ug/L		Laboratory_Con	2						LAB
46090	MJHF30	LCS007	7440-43-9	Cadmium	0.38	ug/L				S4VEM	0.20	0.054	0.38		0.2	0.20	ug/L	0.054	0.054	ug/L		Laboratory_Con	0.4						LAB
46090	MJHF30	LCS007	7439-92-1	Lead	1.7	ug/L				S4VEM	1.0	0.061	1.7		1	1.0	ug/L	0.061	0.061	ug/L		Laboratory_Con	2						LAB
46090	MJHF30	LCS007	7440-66-6	Zinc	4.1	ug/L				S4VEM	2.0	0.13	4.1		2	2.0	ug/L	0.13	0.13	ug/L		Laboratory_Con	4						LAB
46090	MJHF30	MJHF34S	7440-38-2	Arsenic	38.4	ug/L				S4VEM	1.0	0.11	38.4		1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 12:36:00	Matrix_Spike	40		(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-E		FIELD
46090	MJHF30	MJHF34S	7440-43-9	Cadmium	46.1	ug/L				S4VEM	0.20	0.054	46.1		0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 12:36:00	Matrix_Spike	50		(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-E		FIELD
46090	MJHF30	MJHF34S	7439-92-1	Lead	18.7	ug/L				S4VEM	1.0	0.061	18.7		1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 12:36:00	Matrix_Spike	20		(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-E		FIELD
46090	MJHF30	MJHF34S	7440-66-6	Zinc	522	ug/L				S4VEM	2.0	0.13	522		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 12:36:00	Matrix_Spike	500		(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-E		FIELD
46090	MJHF30	PBW007	7440-38-2	Arsenic	1.0	ug/L	U		U	S4VEM	1.0	0.11	1.0	U	1	1.0	ug/L	0.11	0.11	ug/L		Method_Blank							LAB
46090	MJHF30	PBW007	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L		Method_Blank							LAB
46090	MJHF30	PBW007	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L		Method_Blank							LAB
46090	MJHF30	PBW007	7440-66-6	Zinc	0.17	ug/L	J		J	S4VEM	2.0	0.13	0.17	J	2	2.0	ug/L	0.13	0.13	ug/L		Method_Blank							LAB
46090	MJHF30	MJHF34D	7440-70-2	Calcium	244000	ug/L				S4VEM	40.0	16.3	244000		40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-D		FIELD
46090	MJHF30	MJHF34D	7439-95-4	Magnesium	84400	ug/L				S4VEM	60.0	25.5	84400		60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-D		FIELD
46090	MJHF30	MJHF34D	7440-09-7	Potassium	1190	ug/L				S4VEM	500	60.4	1190		500	500	ug/L	60.4	60.4	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-D		FIELD
46090	MJHF30	MJHF34D	7440-23-5	Sodium	42400	ug/L				S4VEM	500	158	42400		500	500	ug/L	158	158	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-D		FIELD
46090	MJHF30	MJHF30	7440-70-2	Calcium	12300	ug/L				S4VEM	40.0	16.3	12300		40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 10:10:00	Field_Sample		07-EMF-MW-A	(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF30	7439-95-4	Magnesium	6290	ug/L				S4VEM	60.0	25.5	6290		60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 10:10:00	Field_Sample		07-EMF-MW-A	(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF30	7440-09-7	Potassium	367	ug/L	J		J	S4VEM	500	60.4	367	J	500	500	ug/L	60.4	60.4	ug/L	04/05/2016 10:10:00	Field_Sample		07-EMF-MW-A	(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF30	7440-23-5	Sodium	5430	ug/L				S4VEM	500	158	5430		500	500	ug/L	158	158	ug/L	04/05/2016 10:10:00	Field_Sample		07-EMF-MW-A	(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF31	7440-70-2	Calcium	11600	ug/L				S4VEM	40.0	16.3	11600		40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 10:44:00	Field_Sample		07-EMF-MW-B	(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF31	7439-95-4	Magnesium	4050	ug/L				S4VEM	60.0	25.5	4050		60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 10:44:00	Field_Sample		07-EMF-MW-B	(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF31	7440-09-7	Potassium	500	ug/L	U		U	S4VEM	500	60.4	500	U	500	500	ug/L	60.4	60.4	ug/L	04/05/2016 10:44:00	Field_Sample		07-EMF-MW-B	(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF31	7440-23-5	Sodium	4700	ug/L				S4VEM	500	158	4700		500	500	ug/L	158	158	ug/L	04/05/2016 10:44:00	Field_Sample		07-EMF-MW-B	(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF32	7440-70-2	Calcium	8400	ug/L				S4VEM	40.0	16.3	8400		40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 11:33:00	Field_Sample		09-EMF-MW-C-DEEP	(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF32	7439-95-4	Magnesium	2640	ug/L				S4VEM	60.0	25.5	2640		60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 11:33:00	Field_Sample		09-EMF-MW-C-DEEP	(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF32	7440-09-7	Potassium	500	ug/L	U		U	S4VEM	500	60.4	500	U	500	500	ug/L	60.4	60.4	ug/L	04/05/2016 11:33:00	Field_Sample		09-EMF-MW-C-DEEP	(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF32	7440-23-5	Sodium	4230	ug/L				S4VEM	500	158	4230		500	500	ug/L	158	158	ug/L	04/05/2016 11:33:00	Field_Sample		09-EMF-MW-C-DEEP	(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF33	7440-70-2	Calcium	10700	ug/L				S4VEM	40.0	16.3	10700		40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 11:58:00	Field_Sample		07-EMF-MW-C	(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF33	7439-95-4	Magnesium	6140	ug/L				S4VEM	60.0	25.5	6140		60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 11:58:00	Field_Sample		07-EMF-MW-C	(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF33	7440-09-7	Potassium	756	ug/L				S4VEM	500	60.4	756		500	500	ug/L	60.4	60.4	ug/L	04/05/2016 11:58:00	Field_Sample		07-EMF-MW-C	(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF33	7440-23-5	Sodium	6520	ug/L				S4VEM	500	158	6520		500	500	ug/L	158	158	ug/L	04/05/2016 11:58:00	Field_Sample		07-EMF-MW-C	(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF34	7440-70-2	Calcium	245000	ug/L				S4VEM	40.0	16.3	245000		40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 12:36:00	Field_Sample		08-EMF-MW-E	(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF34	7439-95-4	Magnesium	85400	ug/L				S4VEM	60.0	25.5	85400		60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 12:36:00	Field_Sample		08-EMF-MW-E	(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF34	7440-09-7	Potassium	1140	ug/L				S4VEM	500	60.4	1140		500	500	ug/L	60.4	60.4	ug/L	04/05/2016 12:36:00	Field_Sample		08-EMF-MW-E	(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF34	7440-23-5	Sodium	42600	ug/L				S4VEM	500	158	42600		500	500	ug/L	158	158	ug/L	04/05/2016 12:36:00	Field_Sample		08-EMF-MW-E	(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF35	7440-70-2	Calcium	40.0	ug/L	U	J	UJ	S4VEM	40.0	16.3	40.0	U	40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 13:45:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF35	7439-95-4	Magnesium	60.0	ug/L	U	J	UJ	S4VEM	60.0	25.5	60.0	U	60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 13:45:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF35	7440-09-7	Potassium	500	ug/L	U	J	UJ	S4VEM	500	60.4	500	U	500	500	ug/L	60.4	60.4	ug/L	04/05/2016 13:45:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF35	7440-23-5	Sodium	586	ug/L		J	UJ	S4VEM	500	158	586		500	500	ug/L	158	158	ug/L	04/05/2016 13:45:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF36	7440-70-2	Calcium	40.0	ug/L	U		U	S4VEM	40.0	16.3	40.0	U	40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 15:15:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF36	7439-95-4	Magnesium	60.0	ug/L	U		U	S4VEM	60.0	25.5	60.0	U	60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 15:15:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF36	7440-09-7	Potassium	500	ug/L	U		U	S4VEM	500	60.4	500	U	500	500	ug/L	60.4	60.4	ug/L	04/05/2016 15:15:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF36	7440-23-5	Sodium	500	ug/L	U		U	S4VEM	500	158	500	U	500	500	ug/L	158	158	ug/L	04/05/2016 15:15:00	Field_Sample		07-EMF-MW-D	(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF37	7440-70-2	Calcium	19600	ug/L				S4VEM	40.0	16.3	19600		40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 14:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF37	7439-95-4	Magnesium	9520	ug/L				S4VEM	60.0	25.5	9520		60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 14:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF37	7440-09-7	Potassium	500	ug/L	U		U	S4VEM	500	60.4	500	U	500	500	ug/L	60.4	60.4	ug/L	04/05/2016 14:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF37	7440-23-5	Sodium	24600	ug/L				S4VEM	500	158	24600		500	500	ug/L	158	158	ug/L	04/05/2016 14:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516 DM				FIELD

CLP Data

CASE NUMBER	SAMPLE DELIVERY GROUP	SAMPLE ID	CAS NUMBER	ANALYTE	FINAL RESULT	RESULT UNITS	FINAL VALIDATION QUALIFIER	IDEQ QUALIFIER	COMB QUALIFIER	DATA VAL LABEL	SAMPLE ADJUSTED CRQL	SAMPLE ADJUSTED MDL	LAB RESULT	LAB QUALIFIERS	METHOD CRQL	NONMOISTURE SAMPLE ADJUSTED CRQL	CRQL UNITS	INSTRUMENT MDL	NONMOISTURE SAMPLE ADJUSTED MDL	MDL UNITS	SAMPLE DATE TIME	LAB SAMPLE TYPE	SPIKE ADDED	STATION LOCATION	SCRIBE SAMPLE NUMBER		PARENT SAMPLE NAME	PARENT SAMPLE LOCATION	LAB REPLICATE TYPE	SAMPLE SOURCE
46090	MJHF30	MJHF38	7440-70-2	Calcium	19700	ug/L				S4VEM	40.0	16.3	19700		40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C	DM				FIELD
46090	MJHF30	MJHF38	7439-95-4	Magnesium	9660	ug/L				S4VEM	60.0	25.5	9660		60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C	DM				FIELD
46090	MJHF30	MJHF38	7440-09-7	Potassium	86.4	ug/L	J		J	S4VEM	500	60.4	86.4	J	500	500	ug/L	60.4	60.4	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C	DM				FIELD
46090	MJHF30	MJHF38	7440-23-5	Sodium	24900	ug/L				S4VEM	500	158	24900		500	500	ug/L	158	158	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C	DM				FIELD
46090	MJHF30	LCS001	7440-70-2	Calcium	85.5	ug/L				S4VEM	40.0	16.3	85.5		40	40.0	ug/L	16.3	16.3	ug/L		Laboratory_Con	80							LAB
46090	MJHF30	LCS001	7439-95-4	Magnesium	112	ug/L				S4VEM	60.0	25.5	112		60	60.0	ug/L	25.5	25.5	ug/L		Laboratory_Con	120							LAB
46090	MJHF30	LCS001	7440-09-7	Potassium	995	ug/L				S4VEM	500	60.4	995		500	500	ug/L	60.4	60.4	ug/L		Laboratory_Con	1000							LAB
46090	MJHF30	LCS001	7440-23-5	Sodium	986	ug/L				S4VEM	500	158	986		500	500	ug/L	158	158	ug/L		Laboratory_Con	1000							LAB
46090	MJHF30	PBW001	7440-70-2	Calcium	40.0	ug/L	U		U	S4VEM	40.0	16.3	40.0	U	40	40.0	ug/L	16.3	16.3	ug/L		Method_Blank								LAB
46090	MJHF30	PBW001	7439-95-4	Magnesium	60.0	ug/L	U		U	S4VEM	60.0	25.5	60.0	U	60	60.0	ug/L	25.5	25.5	ug/L		Method_Blank								LAB
46090	MJHF30	PBW001	7440-09-7	Potassium	500	ug/L	U		U	S4VEM	500	60.4	500	U	500	500	ug/L	60.4	60.4	ug/L		Method_Blank								LAB
46090	MJHF30	PBW001	7440-23-5	Sodium	500	ug/L	U		U	S4VEM	500	158	500	U	500	500	ug/L	158	158	ug/L		Method_Blank								LAB

Highlighted columns IDEQ QUALIFIER and COMB QUALIFIER entered by TerraGraphics to show all data qualifiers.
Entire electronic data deliverable is available upon request.

ATTACHMENT 2

FEBRUARY 8, 2017 DATA VALIDATION MEMORANDUM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ENVIRONMENTAL ASSESSMENT

February 8, 2017

MEMORANDUM

SUBJECT: Revised Data Validation for Water Samples Collected at the CDA East Mission Flats Repository, Case# 46090, SDG: MJHF30, Inorganic Analyses

FROM: Don Matheny, Chemist
OEA, Environmental Services Unit

TO: Craig Cameron, Remedial Project Manager
Office of Environmental Cleanup

CC: Robin Nimmer, Terragraphics

A revision to the quality assurance (QA) review of the analytical data generated from the analysis of nine (9) waters collected from the above referenced site has been completed. This additional review was requested based on non-detects that were reported for sample MJGF35 (sample location 07-EMF-MW-D). These samples were analyzed for dissolved metals by the Chemtech Consulting Group located in Mountainside, NJ.

Sample analyses were evaluated following EPA's Stage 4 Data Validation Electronic/Manual Process (S4VEM). The validation was conducted according to the Quality Control Specifications outlined in:

- SAP/QAPP for the Ground Water & Surface Water Monitoring at the East Mission Flats Repository, Terragraphics, October, 2010
- USEPA CLP Statement of Work for Inorganic Superfund Methods (ISM02.3)
- Modified Analysis Request 2468.1 and 2469.1
- National Functional Guidelines for Inorganic Superfund Data Review (EPA-540-R-10-011)
- Guidance for Labeling Externally Validated Laboratory Analytical Data (EPA-540-R08-005)

Some data may be qualified using the reviewer's professional judgment. The conclusions presented here are based on the information provided for the review. A summary of samples evaluated in this validation report and the pertinent dates for sample collection, laboratory sample receipt and analyses is attached along with the validated data.

I. QUALITY CONTROL RESULTS SUMMARY

The following table summarizes the major sample quality control (QC) tests, associated test results, criteria for evaluation and identification of outliers. Some criteria for evaluation may be QAPP specific and different from the National Functional Guidelines. Other QC checks (e.g., MS tune, calibration, internal standard recoveries, etc.) were electronically evaluated the results of which are not summarized here though any excursions of these QC results will appear in the *Data Qualifications* section.

Quality Control Test	Result Ranges	Outliers[1] (Y or N)	Evaluation Criteria
Blanks	Not detected or < CRQL No qualified samples	N	Not detected or <10% of Sample
Matrix Spike (MJHF34)	92 - 101%	N	75 - 125% Recovery
Lab Duplicate (MJHF34)	≤ 4% or ± CRQL	N	≤ 20% RPD or ± CRQL
Field Duplicate (MJHF38)	≤ 5% or ± CRQL	N	≤ 20% RPD or ± CRQL
LCS (blank spike)	85 - 107%	N	70 - 130%
Serial Dilution (MJHF34) [2]	≤ 8%	N	≤ 10% Difference

[1] See the "*Data Qualifications*" section below for QC excursions and qualification of affected data.

[2] The Serial Dilution QC evaluation was limited to the Calcium, Magnesium, Sodium, and Zinc data because the native concentrations of the remaining elements were too low for conducting a quantitative comparison of a 1:5 serial dilution.

II. DATA QUALIFICATIONS

Summary of Validation Qualifiers Applied

After the manual and electronic data review, the following data qualifications were applied:

Detection / Quantitation Limits
The following analytes have detected sample results < CRQLs (below the range of quantitation) and the associated laboratory blanks were not detected. Data Qualifications: Sample results are qualified J.
Qualified Analytical Results: **Arsenic -** MJHF30, MJHF31, MJHF32, MJHF33, MJHF34, MJHF35, MJHF37 **Cadmium -** MJHF35 **Lead -** MJHF38 **Potassium -** MJHF30, MJHF38

Instrument Autosampler Error
Based on historical data, the non-detects reported for the major cations on sample MJHF35 were cause for an additional review of the ICP-AES data. Because valid analysis of the major cations is also performed on the ICP-MS analytical run (for assessment of interferences), the ICP-MS data were compared. Results for all samples were nominally comparable with the exception of MJHF35. In addition, the ICP-AES internal standard counts for yttrium and indium in this sample were elevated by a factor of 5 as compared to the remaining samples which is characteristic of an Autosampler error. Calcium, Magnesium, Potassium and Sodium data for sample MJHF35 were used from the ICP-MS analysis.

Data Qualifiers

The following is a list of validation qualifiers applied to the sample result(s) where appropriate.

Data Validation Qualifiers	
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
J	The associated value is an estimated quantity.
UJ	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The data are unusable. The analyte may or may not be present in the sample.

III. SAMPLE INDEX

The sample listing dates of sample collection, laboratory receipt and analysis are provided below.

Sample Number	Matrix	Sampling Date	Date Received	ICP-AES Analysis	ICP-MS Analysis
MJHF30	Water	4/5/2016	4/8/2016	4/26/2016	4/19/2016
MJHF31	Water	4/5/2016	4/8/2016	4/26/2016	4/19/2016
MJHF32	Water	4/5/2016	4/8/2016	4/26/2016	4/19/2016
MJHF33	Water	4/5/2016	4/8/2016	4/26/2016	4/19-22/2016
MJHF34	Water	4/5/2016	4/8/2016	4/27/2016	4/19/2016
MJHF35	Water	4/5/2016	4/8/2016	4/26/2016	4/19/2016
MJHF36	Water	4/5/2016	4/8/2016	4/26/2016	4/19/2016
MJHF37	Water	4/5/2016	4/8/2016	4/26/2016	4/19-22/2016
MJHF38	Water	4/5/2016	4/8/2016	4/26/2016	4/19-22/2016

Sample MJHF38 is the field duplicate for MJHF37. Sample MJHF36 is the field blank.

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF30	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	07-EMF-MW-A	pH:	2	Sample Date:	04/05/2016	Sample Time:	10:10:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.12	J	ug/L	0.12	J	1.0	Yes	S4VEM
Cadmium	Target	0.36		ug/L	0.36		1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	1680		ug/L	1680		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF30	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	07-EMF-MW-A	pH:	2	Sample Date:	04/05/2016	Sample Time:	10:10:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	12300		ug/L	12300		1.0	Yes	S4VEM
Magnesium	Target	6290		ug/L	6290		1.0	Yes	S4VEM
Potassium	Target	367	J	ug/L	367	J	1.0	Yes	S4VEM
Sodium	Target	5430		ug/L	5430		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF31	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	07-EMF-MW-B	pH:	2	Sample Date:	04/05/2016	Sample Time:	10:44:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	11600		ug/L	11600		1.0	Yes	S4VEM
Magnesium	Target	4050		ug/L	4050		1.0	Yes	S4VEM
Potassium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM
Sodium	Target	4700		ug/L	4700		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF31	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	07-EMF-MW-B	pH:	2	Sample Date:	04/05/2016	Sample Time:	10:44:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.11	J	ug/L	0.11	J	1.0	Yes	S4VEM
Cadmium	Target	0.20	U	ug/L	0.20	U	1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	50.5		ug/L	50.5		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF32	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	09-EMF-MW-C-DEEP	pH:	2	Sample Date:	04/05/2016	Sample Time:	11:33:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.73	J	ug/L	0.73	J	1.0	Yes	S4VEM
Cadmium	Target	0.20	U	ug/L	0.20	U	1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	20.8		ug/L	20.8		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF32	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	09-EMF-MW-C-DEEP	pH:	2	Sample Date:	04/05/2016	Sample Time:	11:33:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	8400		ug/L	8400		1.0	Yes	S4VEM
Magnesium	Target	2640		ug/L	2640		1.0	Yes	S4VEM
Potassium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM
Sodium	Target	4230		ug/L	4230		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF33	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	07-EMF-MW-C	pH:	2	Sample Date:	04/05/2016	Sample Time:	11:58:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.15	J	ug/L	0.15	J	1.0	Yes	S4VEM
Cadmium	Target	2.3		ug/L	2.3		1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	2950		ug/L	2950	D	20.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF33	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	07-EMF-MW-C	pH:	2	Sample Date:	04/05/2016	Sample Time:	11:58:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	10700		ug/L	10700		1.0	Yes	S4VEM
Magnesium	Target	6140		ug/L	6140		1.0	Yes	S4VEM
Potassium	Target	756		ug/L	756		1.0	Yes	S4VEM
Sodium	Target	6520		ug/L	6520		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF34	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	08-EMF-MW-E	pH:	2	Sample Date:	04/05/2016	Sample Time:	12:36:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	245000		ug/L	245000		1.0	Yes	S4VEM
Magnesium	Target	85400		ug/L	85400		1.0	Yes	S4VEM
Potassium	Target	1140		ug/L	1140		1.0	Yes	S4VEM
Sodium	Target	42600		ug/L	42600		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF34	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	08-EMF-MW-E	pH:	2	Sample Date:	04/05/2016	Sample Time:	12:36:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.59	J	ug/L	0.59	J	1.0	Yes	S4VEM
Cadmium	Target	0.20	U	ug/L	0.20	U	1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	18.8		ug/L	18.8		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF35	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2468.1
Sample Location:	07-EMF-MW-D	pH:	2	Sample Date:	04/05/2016	Sample Time:	13:45:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	7490		ug/L	40.0	U	1.0	Yes	S4VEM
Magnesium	Target	3680		ug/L	60.0	U	1.0	Yes	S4VEM
Potassium	Target	977		ug/L	500	U	1.0	Yes	S4VEM
Sodium	Target	4450		ug/L	586		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF35	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	07-EMF-MW-D	pH:	2	Sample Date:	04/05/2016	Sample Time:	13:45:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.31	J	ug/L	0.31	J	1.0	Yes	S4VEM
Cadmium	Target	0.13	J	ug/L	0.13	J	1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	118		ug/L	118		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF36	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	07-EMF-MW-D	pH:	2	Sample Date:	04/05/2016	Sample Time:	15:15:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Cadmium	Target	0.20	U	ug/L	0.20	U	1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	7.2		ug/L	7.2		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF36	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	07-EMF-MW-D	pH:	2	Sample Date:	04/05/2016	Sample Time:	15:15:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	40.0	U	ug/L	40.0	U	1.0	Yes	S4VEM
Magnesium	Target	60.0	U	ug/L	60.0	U	1.0	Yes	S4VEM
Potassium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM
Sodium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF37	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	08-EMF-MW-F	pH:	2	Sample Date:	04/05/2016	Sample Time:	14:48:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	19600		ug/L	19600		1.0	Yes	S4VEM
Magnesium	Target	9520		ug/L	9520		1.0	Yes	S4VEM
Potassium	Target	500	U	ug/L	500	U	1.0	Yes	S4VEM
Sodium	Target	24600		ug/L	24600		1.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF37	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	08-EMF-MW-F	pH:	2	Sample Date:	04/05/2016	Sample Time:	14:48:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	0.11	J	ug/L	0.11	J	1.0	Yes	S4VEM
Cadmium	Target	1.9		ug/L	1.9		1.0	Yes	S4VEM
Lead	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Zinc	Target	4140		ug/L	4140	D	20.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF38	Method:	Metals by ICP-MS	Matrix:	Water	MA Number:	2469.1
Sample Location:	08-EMF-MW-F	pH:	2	Sample Date:	04/05/2016	Sample Time:	14:48:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Arsenic	Target	1.0	U	ug/L	1.0	U	1.0	Yes	S4VEM
Cadmium	Target	2.0		ug/L	2.0		1.0	Yes	S4VEM
Lead	Target	0.070	J	ug/L	0.070	J	1.0	Yes	S4VEM
Zinc	Target	4080		ug/L	4080	D	20.0	Yes	S4VEM

Case No:	46090	Contract:	EPW14030	SDG No:	MJHF30	Lab Code:	CHM
Sample Number:	MJHF38	Method:	Metals by ICP-AES	Matrix:	Water	MA Number:	2468.1
Sample Location:	08-EMF-MW-F	pH:	2	Sample Date:	04/05/2016	Sample Time:	14:48:00
% Moisture :				% Solids :			

Analyte Name	Analyte Type	Validation Result	Validation Flag	Units	Lab Result	Lab Flag	Dilution Factor	Reportable	Validation Level
Calcium	Target	19700		ug/L	19700		1.0	Yes	S4VEM
Magnesium	Target	9660		ug/L	9660		1.0	Yes	S4VEM
Potassium	Target	86.4	J	ug/L	86.4	J	1.0	Yes	S4VEM
Sodium	Target	24900		ug/L	24900		1.0	Yes	S4VEM

ATTACHMENT 3

DECEMBER 21, 2016 DATA VALIDATION MEMORANDUM

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Maul Foster
2001 NW 19th Avenue, suite 200
Portland, OR 97209
ATTN: Mr. Brian Fauth
CC: R. Gruen

December 21, 2016

SUBJECT: 2016_05 East Mission Flats Repository, Data Validation

Dear Mr. Fauth,

Enclosed is the final validation report for the fraction listed below. This SDG was received on November 29, 2016. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #37591:

SDG #	Fraction
10367776	Dissolved Metals, Wet Chemistry

The data validation was performed under Tier IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Water Site-Specific Sampling and Analysis Plan, March 15, 2015
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Christina Rink
Project Manager/Chemist

378 pages-SF R1 (added wet chem) Attachment 1

EDD Tier IV **LDC #37591 (Maul Foster-Portland, OR / 2016-05 East Mission Flats Repository)**

LDC	SDG#	DATE REC'D	(2) DATE DUE	(8)Diss Metals (200.8)		Alk. (2320B)		Diss Cl, SO_4 (300.0)																													
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	10367776/ W6J0496	11/29/16	12/13/16	9	0	8	0	9	0																												
Total	T/CR			9	0	8	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26

Shaded cells indicate Tier IV review (all other cells are Tier II review). These sample counts do not include MS/MSD, and DUPs

LDC Report# 37591A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: 2016_WQ Monitoring

LDC Report Date: December 13, 2016

Parameters: Dissolved Metals

Validation Level: Tier IV

Laboratory: Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 10367776

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
EMFR-07-EMF-MW-A-20161025-GW	10367776001	Water	10/25/16
EMFR-07-EMF-MW-B-20161025-GW	10367776002	Water	10/25/16
EMFR-09-EMF-MWCDEEP-20161025-GW	10367776003	Water	10/25/16
EMFR-07-EMF-MW-C-20161025-GW	10367776004	Water	10/25/16
EMFR-08-EMF-MW-E-20161025-GW	10367776005	Water	10/25/16
EMFR-08-EMF-MW-E-20161025-GW-B	10367776006	Water	10/25/16
EMFR-07-EMF-MW-D-20161025-GW	10367776007	Water	10/25/16
EMFR-08-EMF-MW-F-20161025-GW	10367776008	Water	10/25/16
EMFR-08-EMF-MW-F-20161025-FB	10367776009	Water	10/25/16
EMFR-07-EMF-MW-B-20161025-GWMS	10367776002MS	Water	10/25/16
EMFR-07-EMF-MW-B-20161025-GWMSD	10367776002MSD	Water	10/25/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Water Site-Specific Sampling and Analysis Plan (March 15, 2015) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Arsenic, Cadmium, Calcium, Lead, Magnesium, Potassium, Sodium, and Zinc by Environmental Protection Agency (EPA) Method 200.8

All sample results were subjected to Tier IV evaluation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the method.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Magnesium	2.5 ug/L	All samples in SDG 10367776

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EMFR-08-EMF-MW-F-20161025-FB	Magnesium	9.8 ug/L	10.0U ug/L

VI. Field Blanks

Sample EMFR-08-EMF-MW-F-20161025-FB was identified as a filter blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
EMFR-08-EMF-MW-F-20161025-FB	10/25/16	Calcium Lead Magnesium Potassium Sodium Zinc	180 ug/L 0.015 ug/L 9.8 ug/L 110 ug/L 140 ug/L 5.9 ug/L	EMFR-07-EMF-MW-A-20161025-GW EMFR-07-EMF-MW-B-20161025-GW EMFR-09-EMF-MWCDEEP-20161025-GW EMFR-07-EMF-MW-C-20161025-GW EMFR-08-EMF-MW-E-20161025-GW EMFR-08-EMF-MW-E-20161025-GW-B EMFR-07-EMF-MW-D-20161025-GW EMFR-08-EMF-MW-F-20161025-GW

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EMFR-07-EMF-MW-B-20161025-GW	Lead Potassium Zinc	0.040 ug/L 539 ug/L 34.3 ug/L	0.10U ug/L 539J ug/L 34.3J ug/L
EMFR-09-EMF-MWCDEEP-20161025-GW	Potassium Zinc	720 ug/L 25.2 ug/L	720J ug/L 25.2J ug/L
EMFR-07-EMF-MW-C-20161025-GW	Lead	0.035 ug/L	0.10U ug/L
EMFR-08-EMF-MW-E-20161025-GW	Zinc	9.2 ug/L	9.2J ug/L
EMFR-08-EMF-MW-E-20161025-GW-B	Zinc	8.9 ug/L	8.9J ug/L
EMFR-07-EMF-MW-D-20161025-GW	Potassium	1100 ug/L	1100J ug/L
EMFR-08-EMF-MW-F-20161025-GW	Lead Potassium	0.073 ug/L 887 ug/L	0.10U ug/L 887J ug/L

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

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

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

XI. Field Duplicates

Samples EMFR-08-EMF-MW-E-20161025-GW and EMFR-08-EMF-MW-E-20161025-GW-B were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	EMFR-08-EMF-MW-E-20161025-GW	EMFR-08-EMF-MW-E-20161025-GW-B			
Arsenic	6.4	6.4	0 (≤20)	-	-
Cadmium	0.046	0.043	7 (≤20)	-	-
Calcium	230000	231000	0 (≤20)	-	-
Magnesium	84700	83900	1 (≤20)	-	-
Potassium	4420	4400	0 (≤20)	-	-
Sodium	58900	58400	1 (≤20)	-	-
Zinc	9.2	8.9	3 (≤20)	-	-

XII. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

XIII. Sample Result Verification

All sample result verifications were acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to laboratory blank contamination, data were qualified as not detected in one sample.

Due to filter blank contamination, data were qualified as not detected in seven samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

2016_WQ Monitoring
Dissolved Metals - Data Qualification Summary - SDG 10367776

No Sample Data Qualified in this SDG

2016_WQ Monitoring
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 10367776

Sample	Analyte	Modified Final Concentration	A or P
EMFR-08-EMF-MW-F-20161025-FB	Magnesium	10.0U ug/L	A

2016_WQ Monitoring
Dissolved Metals - Field Blank Data Qualification Summary - SDG 10367776

Sample	Analyte	Modified Final Concentration	A or P
EMFR-07-EMF-MW-B-20161025-GW	Lead Potassium Zinc	0.10U ug/L 539J ug/L 34.3J ug/L	A
EMFR-09-EMF-MWCDEEP-20161025-GW	Potassium Zinc	720J ug/L 25.2J ug/L	A
EMFR-07-EMF-MW-C-20161025-GW	Lead	0.10U ug/L	A
EMFR-08-EMF-MW-E-20161025-GW	Zinc	9.2J ug/L	A
EMFR-08-EMF-MW-E-20161025-GW-B	Zinc	8.9J ug/L	A
EMFR-07-EMF-MW-D-20161025-GW	Potassium	1100J ug/L	A
EMFR-08-EMF-MW-F-20161025-GW	Lead Potassium	0.10U ug/L 887J ug/L	A

LDC #: 37591A4a

VALIDATION COMPLETENESS WORKSHEET

SDG #: ~~10368901~~ 10367776

Tier IV

Laboratory: Pace Analytical Services, Inc.

Date: 12/9/16

Page: 1 of 1

Reviewer: JB

2nd Reviewer:

METHOD: Dissolved Metals (EPA Method 200.8)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A A	
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	SW	Filter Blank = 9
VII.	Matrix Spike/Matrix Spike Duplicates	A	(10, 11)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	SW	(5, 6)
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	A	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	EMFR-07-EMF-MW-A-20161025-GW	10367776001	Water	10/25/16
2	EMFR-07-EMF-MW-B-20161025-GW	10367776002	Water	10/25/16
3	EMFR09-EMF-MWCDEEP-20161025-GW	10367776003	Water	10/25/16
4	EMFR-07-EMF-MW-C-20161025-GW	10367776004	Water	10/25/16
5	EMFR-08-EMF-MW-E-20161025-GW	10367776005	Water	10/25/16
6	EMFR-08-EMF-MW-E-20161025-GW-B	10367776006	Water	10/25/16
7	EMFR-07-EMF-MW-D-20161025-GW	10367776007	Water	10/25/16
8	EMFR-08-EMF-MW-F-20161025-GW	10367776008	Water	10/25/16
9	EMFR-08-EMF-MW-F-20161025-FB	10367776009	Water	10/25/16
10	EMFR-07-EMF-MW-B-20161025-GWMS	10367776002MS	Water	10/25/16
11	EMFR-07-EMF-MW-B-20161025-GWMSD	10367776002MSD	Water	10/25/16
12				
13				
14				

Notes:

.DC #: 37591A4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: VB
2nd reviewer: [signature]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1 - 9	Water	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
10, 11	Water	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Analysis Method

ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

VALIDATION FINDINGS CHECKLIST

Reviewer: JB
2nd Reviewer:

Method: Metals (EPA SW 846 Method 6010/6020/7000)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were the low standard checks within 70-130%	✓			
Were all initial calibration correlation coefficients within limits as specified by the method?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XIII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 37591A4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: VB
2nd Reviewer: Q

METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Soil preparation factor applied: NA
Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Level	9								
Mg		2.5			9.8 / 10.0								

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 37591A4b

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JB
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 10/25/16 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank Associated Samples: ~~All~~ 1-8

Analyte	Blank ID	Sample Identification										
	9	Action Limit	2	3	4	5	6	7	8			
Ca	180	1800										
Pb	0.015		0.040 / 0.10 U		0.035 / 0.10 U				0.073 / 0.10 U			
Mg	9.8											
K	110	1100	539 U J	720 U J				1100 U J	887 U J			
Na	140	1400										
Zn	5.9	59	34.3 U J	25.2 U J		9.2 U J	8.9 U J					

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC#: 37591A4a
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JB
2nd Reviewer:

METHOD: Metals (EPA Method 200.8)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (ug/L)		RPD (≤ 20)	
	5	6		
Arsenic	6.4	6.4	0	
Cadmium	0.046	0.043	7	
Calcium	230000	231000	0	
Magnesium	84700	83900	1	
Potassium	4420	4400	0	
Sodium	58900	58400	1	
Zinc	9.2	8.9	3	

LDC #: 37591A4a

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: KS
2nd Reviewer: [illegible]

METHOD: Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	11/2 15:45 ICP (Initial calibration)	As	80.819901	80ug/L	101.07%	101.0%	Y
CCV	ICP (Continuing calibration)	Cd	84.489374	80ug/L	105.67%	105.67%	Y
	11/3 02:19 ICP-MS (Initial calibration)						
	ICP-MS (Continuing calibration)						
	CVAA (Initial calibration)						
	CVAA (Contining calibration)						
	FLAA (Initial calibration)						
	FLAA (Continuing calibation)						

Comments: _____

LDC #: 37591A4a

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: JB
2nd Reviewer: a

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	11/2 15:58 ICP interference check	Ca	27513.27203 ug/L	26250 ug/L	104.8%	104.8%	Y
LCS	11/3 01:56 Laboratory control sample	Mg	2100.438288 ug/L	2000 ug/L	105%	105%	Y
MS	11/3 02:04 Matrix spike	Zn	SR = 34.3 (SSR-SR) 28.483126x5 142.415x - 34.3 = 108.115 ug/L	100 ug/L	108%	108%	Y
MSD	02:11 Duplicate	Zn	28.095829x5 = 140.479 ug/L	Found = 142.415 ug/L	1 RPD	1 RPD	Y
24280146D	02:04 ICP serial dilution	Na	1020.125396x5 = 5100.625 ug/L	IR = 4970 ug/L	2.6%	2.7% 1)	Y

Comments: _____

DC #: 37591A4a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JB
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Mg were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

5 - From Raw Data: 4236.08034g x 20 = 84726.6006 (84721.606)

#	Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
	1	As	0.24	0.24	Y
	2	Cd	0.036	0.036	Y
	3	Ca	8470	8470	Y
	4	Pb	0.035	0.035	Y
20	5	Mg	84700	84700	Y
	6	K	4400	4400	Y
	7	Na	4670	4670	Y
20	8	Zn	3120	3120	Y
	9	Ca	180	180	Y

Note:

LDC Report# 37591A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: 2016_WQ Monitoring

LDC Report Date: December 21, 2016

Parameters: Wet Chemistry

Validation Level: Tier IV

Laboratory: Pace Analytical Services, Inc./SVL Analytical, Inc.

Sample Delivery Group (SDG): 10367776/W6J0496

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
EMFR-07-EMF-MW-A-20161025-GW	10367776001	Water	10/25/16
EMFR-07-EMF-MW-B-20161025-GW	10367776002	Water	10/25/16
EMFR09-EMF-MW-CDEEP-20161025-GW	10367776003	Water	10/25/16
EMFR-07-EMF-MW-C-20161025-GW	10367776004	Water	10/25/16
EMFR-08-EMF-MW-E-20161025-GW	10367776005	Water	10/25/16
EMFR-08-EMF-MW-E-20161025-GW-B	10367776006	Water	10/25/16
EMFR-07-EMF-MW-D-20161025-GW	10367776007	Water	10/25/16
EMFR-08-EMF-MW-F-20161025-GW	10367776008	Water	10/25/16
EMFR-08-EMF-MW-F-20161025-FB	10367776009	Water	10/25/16
EMFR-07-EMF-MW-B-20161025-GWMS	10367776002MS	Water	10/25/16
EMFR-07-EMF-MW-B-20161025-GWMSD	10367776002MSD	Water	10/25/16
EMFR-07-EMF-MW-B-20161025-GWDUP	10367776002DUP	Water	10/25/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Water Site-Specific Sampling and Analysis Plan (March 15, 2015) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Total Alkalinity by Standard Method 2320B
Dissolved Chloride and Dissolved Sulfate by Environmental Protection Agency (EPA) Method 300.0

All sample results were subjected to Tier IV evaluation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Sulfate	0.0500 mg/L	EMFR-07-EMF-MW-A-20161025-GW EMFR09-EMF-MW-CDEEP-20161025-GW EMFR-07-EMF-MW-C-20161025-GW EMFR-08-EMF-MW-E-20161025-GW EMFR-08-EMF-MW-E-20161025-GW-B EMFR-07-EMF-MW-D-20161025-GW EMFR-08-EMF-MW-F-20161025-GW EMFR-08-EMF-MW-F-20161025-FB
ICB/CCB	Sulfate	0.0300 mg/L	EMFR-07-EMF-MW-B-20161025-GW

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks.

V. Field Blanks

Sample EMFR-08-EMF-MW-F-20161025-FB was identified as a filter blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples EMFR-08-EMF-MW-E-20161025-GW and EMFR-08-EMF-MW-E-20161025-GW-B were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD (Limits)	Flag	A or P
	EMFR-08-EMF-MW-E-20161025-GW	EMFR-08-EMF-MW-E-20161025-GW-B			
Alkalinity	404	404	0 (≤20)	-	-
Chloride	112	113	1 (≤20)	-	-
Sulfate	480	476	1 (≤20)	-	-

X. Sample Result Verification

All sample result verifications were acceptable.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

2016_WQ Monitoring
Wet Chemistry - Data Qualification Summary - SDG 10367776/W6J0496

No Sample Data Qualified in this SDG

2016_WQ Monitoring
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 10367776/W6J0496

No Sample Data Qualified in this SDG

2016_WQ Monitoring
Wet Chemistry - Field Blank Data Qualification Summary - SDG 10367776/W6J0496

No Sample Data Qualified in this SDG

LDC #: 37591A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/20/16

SDG #: 10368901 / WGJ0496 Tier IV Page: 1 of 1

Laboratory: Pace Analytical Services, Inc. / SVL Analytical, Inc. Reviewer: CR

2nd Reviewer: MK

METHOD: (Analyte) Total/~~Dissolved~~ Alkalinty (SM 2340B), Chloride, Sulfate (EPA Method 300.0)

Dissolved Dissolved

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	ND	Filter Blank = 9
VI.	Matrix Spike/Matrix Spike Duplicates	A	
VII.	Duplicate sample analysis	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	SW	(5,6)
X.	Sample result verification	A	
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	EMFR-07-EMF-MW-A-20161025-GW	10367776001	Water	10/25/16
2	EMFR-07-EMF-MW-B-20161025-GW	10367776002	Water	10/25/16
3	EMFR09-EMF-MW~~C~~DEEP-20161025-GW	10367776003	Water	10/25/16
4	EMFR-07-EMF-MW-C-20161025-GW	10367776004	Water	10/25/16
5	EMFR-08-EMF-MW-E-20161025-GW	10367776005	Water	10/25/16
6	EMFR-08-EMF-MW-E-20161025-GW-B	10367776006	Water	10/25/16
7	EMFR-07-EMF-MW-D-20161025-GW	10367776007	Water	10/25/16
8	EMFR-08-EMF-MW-F-20161025-GW	10367776008	Water	10/25/16
9	EMFR-08-EMF-MW-F-20161025-FB	10367776009	Water	10/25/16
10	EMFR-07-EMF-MW-B-20161025-GWMS	10367776002MS	Water	10/25/16
11	EMFR-07-EMF-MW-B-20161025-GWMSD	10367776002MSD	Water	10/25/16
12	EMFR-07-EMF-MW-B-20161025-GWDUP	10367776002DUP	Water	10/25/16
13				
14				
15				

Notes:

SDC #: 375916

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: amy

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

DC #: 37591A6

VALIDATION FINDINGS CHECKLIST

Reviewer: AL
2nd Reviewer: AMA

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 37591A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: amy

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-8		pH TDS **Cl** F NO_3 NO_2 **SO_4** PO_4 **ALK** CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
9		pH TDS **Cl** F NO_3 NO_2 **SO_4** PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
QC:10,11		pH TDS **Cl** F NO_3 NO_2 **SO_4** PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
12		pH TDS **Cl** F NO_3 NO_2 **SO_4** PO_4 **ALK** CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments: ____________________

LDC #: 37591A6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: G
2nd Reviewer: gmH

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 1, 3-9

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No qual (>5x)									
SO4		0.0500	0.25										

Conc. units: mg/L **Associated Samples:** 2

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No qual (>5x)									
SO4		0.0300	0.15										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC#: 37591A6

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CA
2nd Reviewer: amy

Inorganics, Method See Cover

Analyte	Concentration (mg/L)		RPD (≤20)	Qualification (Parent only)
	5	6		
Alkalinity	404	404	0	
Chloride	112	113	1	
Sulfate	480	476	1	

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LDC #: 37591A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: a
2nd Reviewer: gmk

Method: Inorganics, Method see cal

The correlation coefficient (r) for the calibration of Cl was recalculated. Calibration date: 11/8/16

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial Calibration Verification	Cl	s1	0	0.000	*1.0000*	na	Y
		s2	0.2	0.026			
		s3	1	0.135			
		s4	2	0.273			
		s5	5	0.692			
		s6	10	1.422			
		s7	12	1.740			
Calibration verification	Cl	ICV	3	3.075	103	103	
Calibration verification	SO4	CCV	10	10.3170	103	103	
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 37516

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
2nd Reviewer: AMB

METHOD: Inorganics, Method see cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Cl	3.08	3.0	103	103	Y
10	Matrix spike sample	SO_4	(SSR-SR) 10.8	10.0	108	108	↓
12	Duplicate sample	Alk	16.9	17.1	0.8	0.8	↓

Comments: _____

LDC #: 37591A6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: AW

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for Cl reported with a positive detect were recalculated and verified using the following equation:

Concentration = $y = 0.0009x^2 + 0.13x + 0.0009$

Recalculation:

$$\frac{\sqrt{4(0.0009)(1.687 - 0.0009) + (0.13)^2} - 0.13}{2(0.0009)(5} \times 5.05 = 11.80 \text{ mg/L}$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Cl	11.8	11.8	Y
	2	SO4	25.8	25.8	
	3	Alk	29.3	29.3	
	4	Cl	7.81	7.81	
	5	SO4	112	112	
	6	Alk	476	476	
	7	Cl	4.70	4.70	
	8	SO4	56.9	56.9	

Note:

The attached zipped file contains three files:

File	Format	Description
1) Readme_EMissionFlats_122016.doc	MS Word 2003	A "Readme" file (this document).
2) 10367776_L4_EQuIS 4-File Format_validation LDC.xlsx	MS Excel 2007	A spreadsheet for the following SDG(s): 10367776/W6J0496 37591A
3) W6J0496_L4_EQuIS 4-File Format_validation LDC.xlsx		

Although a 100% verification of the EDD was not performed, LDC observed the following discrepancies between hardcopy data packages and the electronic data deliverables:

SDG/File	Analytical Method	Discrepancy	LDC's approach to the discrepancy
W6J0496	2320-B and 300	The following sample ID discrepancy was noted: Form I EMFR09-EMF-MW-CDEEP-20161025-GW EDD 09-EMF-MW-CDEEP-20161025-GW	LDC made no changes in the EDD to the sample ID. Validation qualifiers were applied, as needed.

Please contact Christina Rink at (760) 827-1100 if you have any questions regarding this electronic data submittal.

LDC #: 37591

EDD POPULATION COMPLETENESS WORKSHEET

Date: 12/14/16

2nd Reviewer: CG

The LDC job number listed above was entered by BA.

	EDD Process		Comments/Action
I.	EDD Completeness	-	
Ia.	- All methods present?	Y	
Ib.	- All samples present/match report?	Y	
Ic.	- All reported analytes present?	Y	
Id.	-10% or 100% verification of EDD?	Y	
II.	EDD Preparation/Entry	-	
IIa.	- Carryover U/J?	Y	
IIb.	- Reason Codes used? If so, note which codes	Y	LDC
IIc.	-Additional Information (QC Level, Validator, Date Validated Y/N, etc.)	Y	
III.	Reasonableness Checks	-	
IIIa.	- Do all qualified ND results have ND qualifier (i.e. UJ)?	Y	
IIIb.	- Do all qualified detect results have detect qualifier (i.e. J)?	Y	
IIIc.	- If reason codes used, do all qualified results have reason code field populated?	Y	
IIId.	-Does the detect flag require changing for blank qualifiers? If so, are all U results marked ND?	Y / Y	
IIIe.	- Do blank concentrations in report match EDD, where data was qualified due to blank?	Y	
IIIf.	- Were any results rejected for overall assessment? If so, were results changed to nonreportable?	N/A	
IIIg.	- Is the readme complete? If applicable, were edits or discrepancies listed in the readme?	Y	

Notes: _____