

OCTOBER 7, 2013

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-3807-1

TestAmerica Sample Delivery Group: SL1399
Client Project/Site: F13-045

For:

CH2M Hill Plateau Remediation Company
PO BOX 1600, MS H8-41
Richland, Washington 99352

Attn: General Mailbox



Authorized for release by:
10/7/2013 5:15:42 PM

Jayna Awalt, Project Manager I
(314)298-8566

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Client: CH2M Hill Plateau Remediation Company
Project/Site: F13-045

TestAmerica Job ID: 160-3807-1
SDG: SL1399

Job ID: 160-3807-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

CH2MHill Plateau Remediation Company
P.O. Box 1600
MS B3-60
Richland, Washington 99352
October 7, 2013
Attention: Scot Fitzgerald

SDG : SL1399
Number of Samples : 1 sample
Sample Matrix : Water
Data Deliverable : Summary
Date SDG Closed : September 19, 2013

II. Introduction

On September 19, 2013, 1 water sample was received by TestAmerica - St. Louis for chemical analysis. The samples were received within temperature criteria. See the COC and CUR forms for documentation of any variations on receipt conditions and temperature. Upon receipt, the samples were given laboratory Ids to correspond with specific client Ids. Please refer to the Sample Summary sheets attached to this case narrative. This report is incomplete without the narrative.

The following SAFs are associated with this SDG: F13-045

III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits. All results are based upon samples as they were received, i.e. wet weight, unless otherwise noted on the data sheets. See the attached Methods Summary Form for the methods used in this SDG.

MS/MSD/Dup analysis was done per the client requirements. Analytical batches that did not contain matrix QC were analyzed with a LCS/LCS duplicate.

Deviation from Request: None

IV. Definitions

QCBLK- Quality Control Blank, Method Blank
QCLCS- Quality Control Laboratory Control Sample, Blank Spike
DUP- Laboratory Duplicate
MS- Matrix Spike
MSD- Matrix Spike Duplicate

The term "Detection Limit" used in the analytical data report refers to either the lab's standard reporting limits or contractually required reporting limits, whichever is applicable.

The following data qualifiers may be applicable to the results in this report, as appropriate.

- **B** - For inorganic analyses, the sample result is greater than the MDL but less than the RL.
- **B** - For organic analyses, Method Blank contamination. The Method Blank contains the target analyte at a concentration above the



Job ID: 160-3807-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

MDL.

- **J** - For organic analyses, the sample is estimated and less than the RL.
- **C** - For inorganic analyses, Method Blank contamination. The Method Blank contains the target analyte at a concentration above the MDL.
- **D** - For all analyses, the sample result was obtained from the analysis of a dilution.
- **N** - For inorganics and GC analyses, the spike/spike duplicate recoveries are outside QC limits.
- **T** - For GCMS analyses, the spike/spike duplicate recoveries are outside QC limits.
- **O** - For all analyses, the LCS (LCSD) recoveries are outside QC limits.
- **M** - For inorganic analyses, the precision was outside control limits.
- **P** - For organic analyses (PCB/Pests only), the aroclor target analyte has greater than 25% difference for detected concentrations between the two GC columns.

Ion Chromatography

Batch: 73834

The following sample was diluted to bring the concentrations of Nitrate and Sulfate within the calibration range in IC batch 73834: B2R299 (160-3807-1). Elevated reporting limits (RLs) are provided. These analytes have been qualified accordingly with a "D" flag in the associated sample.

There were no observations or nonconformances for the following methods:

ICP Metals

Alkalinity

I certify that this Summary Package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. The Laboratory Manager or a designee, as verified by the signature on the cover page has authorized release of the data contained in this hard copy data package.

Reviewed and approved:

Jayna Awalt
St. Louis Project Manager



IMPORTANT!
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796717552950		
Ship (P/U) date : Wed 9/18/2013 3:52 pm RICHLAND, WA US	 Delivered <i>Signed for by: J. CLARK</i>	Actual delivery : Thur 9/19/2013 9:15 am EARTH CITY, MO US

Travel History

Date/Time	Activity	Location
- 9/19/2013 - Thursday		
9:15 am	Delivered	EARTH CITY, MO
7:20 am	On FedEx vehicle for delivery	EARTH CITY, MO
7:16 am	At local FedEx facility	EARTH CITY, MO
5:11 am	At destination sort facility	BERKELEY, MO
4:20 am	Departed FedEx location	MEMPHIS, TN
12:41 am	Arrived at FedEx location	MEMPHIS, TN
- 9/18/2013 - Wednesday		
5:11 pm	Left FedEx origin facility	PASCO, WA
3:52 pm	Picked up	PASCO, WA
3:06 pm	Shipment information sent to FedEx	

Local Scan Time ▾

Shipment Facts

Tracking number	796717552950	Service	FedEx Priority Overnight
Weight	21 lbs	Delivered To	Shipping/Receiving
Total pieces	1	Total shipment weight	21 lbs / 9.5 kgs
Shipper reference	GWS-272	Packaging	Your Packaging
Special handling section	Deliver Weekday, Additional Handling Surcharge		



OCTOBER 7, 2013

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 160-3807-1

SDG Number: SL1399

Login Number: 3807

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Qualifiers

Metals

Qualifier	Qualifier Description
U	Analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
U	Analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: CH2M Hill Plateau Remediation Company
Project/Site: F13-045

TestAmerica Job ID: 160-3807-1
SDG: SL1399

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL SL
300.0	Anions, Ion Chromatography	MCAWW	TAL SL
SM 2320B	Alkalinity	SM	TAL SL

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



OCTOBER 7, 2013
Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F13-045

TestAmerica Job ID: 160-3807-1
SDG: SL1399

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-3807-1	B2R299	Water	09/18/13 10:45	09/19/13 09:15

- 1
- 2
- 3
- 4
- 5
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- 7
- 8
- 9
- 10
- 11
- 12

OCTOBER 7, 2013 Detection Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: F13-045

TestAmerica Job ID: 160-3807-1
SDG: SL1399

Client Sample ID: B2R299

Lab Sample ID: 160-3807-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	71000		1000	106	ug/L	1		6010C	Total/NA
Chromium	360		10.0	3.1	ug/L	1		6010C	Total/NA
Potassium	6240		5000	1650	ug/L	1		6010C	Total/NA
Magnesium	18500		1000	132	ug/L	1		6010C	Total/NA
Alkalinity, Total	94.0		5.0	0.54	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	94.0		5.0	0.54	mg/L	1		SM 2320B	Total/NA
Nitrate as N - DL	5.9	D	0.40	0.080	mg/L	20		300.0	Total/NA
Sulfate - DL	175	D	10.0	1.0	mg/L	20		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica St. Louis



OCTOBER 7, 2013
Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: F13-045

TestAmerica Job ID: 160-3807-1
SDG: SL1399

Method: 6010C - Metals (ICP)

Client Sample ID: B2R299
Date Collected: 09/18/13 10:45
Date Received: 09/19/13 09:15

Lab Sample ID: 160-3807-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	71000		1000	106	ug/L		09/20/13 08:46	09/30/13 14:07	1
Chromium	360		10.0	3.1	ug/L		09/20/13 08:46	09/30/13 14:07	1
Potassium	6240		5000	1650	ug/L		09/20/13 08:46	09/30/13 14:07	1
Magnesium	18500		1000	132	ug/L		09/20/13 08:46	09/30/13 14:07	1

General Chemistry

Client Sample ID: B2R299
Date Collected: 09/18/13 10:45
Date Received: 09/19/13 09:15

Lab Sample ID: 160-3807-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Total	94.0		5.0	0.54	mg/L			10/02/13 10:51	1
Carbonate Alkalinity as CaCO3	0.54	U	5.0	0.54	mg/L			10/02/13 10:51	1
Bicarbonate Alkalinity as CaCO3	94.0		5.0	0.54	mg/L			10/02/13 10:51	1

General Chemistry - DL

Client Sample ID: B2R299
Date Collected: 09/18/13 10:45
Date Received: 09/19/13 09:15

Lab Sample ID: 160-3807-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	5.9	D	0.40	0.080	mg/L			09/19/13 19:13	20
Sulfate	175	D	10.0	1.0	mg/L			09/19/13 19:13	20

Client: CH2M Hill Plateau Remediation Company
Project/Site: F13-045

TestAmerica Job ID: 160-3807-1
SDG: SL1399

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 160-73817/1-A
Matrix: Water
Analysis Batch: 75356

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 73817

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	106	U	1000	106	ug/L		09/20/13 08:46	09/30/13 14:00	1
Chromium	3.1	U	10.0	3.1	ug/L		09/20/13 08:46	09/30/13 14:00	1
Potassium	1650	U	5000	1650	ug/L		09/20/13 08:46	09/30/13 14:00	1
Magnesium	132	U	1000	132	ug/L		09/20/13 08:46	09/30/13 14:00	1

Lab Sample ID: LCS 160-73817/2-A
Matrix: Water
Analysis Batch: 75356

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 73817

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	10000	10380		ug/L		104	80 - 120
Chromium	1000	1042		ug/L		104	80 - 120
Potassium	10000	10920		ug/L		109	80 - 120
Magnesium	10000	9257		ug/L		93	80 - 120

Lab Sample ID: 160-3764-E-2-E MS
Matrix: Water
Analysis Batch: 75356

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 73817

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	66300		10000	75290		ug/L		90	75 - 125
Chromium	3.5	B	1000	1066		ug/L		106	75 - 125
Potassium	6340		10000	17190		ug/L		109	75 - 125
Magnesium	12900		10000	22420		ug/L		96	75 - 125

Lab Sample ID: 160-3764-E-2-F MSD
Matrix: Water
Analysis Batch: 75356

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 73817

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Calcium	66300		10000	77480		ug/L		112	75 - 125	3	20
Chromium	3.5	B	1000	1057		ug/L		105	75 - 125	1	20
Potassium	6340		10000	17310		ug/L		110	75 - 125	1	20
Magnesium	12900		10000	22700		ug/L		98	75 - 125	1	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 160-73834/9
Matrix: Water
Analysis Batch: 73834

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.0040	U	0.020	0.0040	mg/L			09/19/13 17:15	1
Sulfate	0.050	U	0.50	0.050	mg/L			09/19/13 17:15	1

Client: CH2M Hill Plateau Remediation Company
Project/Site: F13-045

TestAmerica Job ID: 160-3807-1
SDG: SL1399

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 160-73834/10
Matrix: Water
Analysis Batch: 73834

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	0.400	0.397		mg/L		99	90 - 110
Sulfate	8.00	7.79		mg/L		97	90 - 110

Method: 300.0 - Anions, Ion Chromatography - DL

Lab Sample ID: 160-3807-1 MS
Matrix: Water
Analysis Batch: 73834

Client Sample ID: B2R299
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N - DL	5.9	D	8.00	13.75	D	mg/L		98	90 - 110
Sulfate - DL	175	D	80.0	252.7	D	mg/L		97	90 - 110

Lab Sample ID: 160-3807-1 DU
Matrix: Water
Analysis Batch: 73834

Client Sample ID: B2R299
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Nitrate as N - DL	5.9	D	5.90	D	mg/L		0.6	20
Sulfate - DL	175	D	174.0	D	mg/L		0.6	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 160-75788/1
Matrix: Water
Analysis Batch: 75788

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Total	0.14	U	1.3	0.14	mg/L			10/02/13 10:51	1
Bicarbonate Alkalinity as CaCO3	0.14	U	1.3	0.14	mg/L			10/02/13 10:51	1

Lab Sample ID: LCS 160-75788/3
Matrix: Water
Analysis Batch: 75788

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity, Total	400	364.0		mg/L		91	90 - 110
Bicarbonate Alkalinity as CaCO3	400	364.0		mg/L		91	90 - 110

Lab Sample ID: LLCS 160-75788/2
Matrix: Water
Analysis Batch: 75788

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity, Total	200	180.0		mg/L		90	90 - 110
Bicarbonate Alkalinity as CaCO3	200	180.0		mg/L		90	90 - 110

Client: CH2M Hill Plateau Remediation Company
Project/Site: F13-045

TestAmerica Job ID: 160-3807-1
SDG: SL1399

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 160-3807-1 MS
Matrix: Water
Analysis Batch: 75788

Client Sample ID: B2R299
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity, Total	94.0		20.0	112.0		mg/L		90	80 - 120
Bicarbonate Alkalinity as CaCO3	94.0		20.0	112.0		mg/L		90	80 - 120

Lab Sample ID: 160-3807-1 DU
Matrix: Water
Analysis Batch: 75788

Client Sample ID: B2R299
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity, Total	94.0		93.00		mg/L		1	20
Carbonate Alkalinity as CaCO3	0.54	U	0.54	U	mg/L		NC	20
Bicarbonate Alkalinity as CaCO3	94.0		93.00		mg/L		1	20



Client: CH2M Hill Plateau Remediation Company
 Project/Site: F13-045

TestAmerica Job ID: 160-3807-1
 SDG: SL1399

Metals

Prep Batch: 73817

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3764-E-2-E MS	Matrix Spike	Total/NA	Water	3010A	
160-3764-E-2-F MSD	Matrix Spike Duplicate	Total/NA	Water	3010A	
160-3807-1	B2R299	Total/NA	Water	3010A	
LCS 160-73817/2-A	Lab Control Sample	Total/NA	Water	3010A	
MB 160-73817/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 75356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3764-E-2-E MS	Matrix Spike	Total/NA	Water	6010C	73817
160-3764-E-2-F MSD	Matrix Spike Duplicate	Total/NA	Water	6010C	73817
160-3807-1	B2R299	Total/NA	Water	6010C	73817
LCS 160-73817/2-A	Lab Control Sample	Total/NA	Water	6010C	73817
MB 160-73817/1-A	Method Blank	Total/NA	Water	6010C	73817

General Chemistry

Analysis Batch: 73834

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3807-1 - DL	B2R299	Total/NA	Water	300.0	
160-3807-1 DU - DL	B2R299	Total/NA	Water	300.0	
160-3807-1 MS - DL	B2R299	Total/NA	Water	300.0	
LCS 160-73834/10	Lab Control Sample	Total/NA	Water	300.0	
MB 160-73834/9	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 75788

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-3807-1	B2R299	Total/NA	Water	SM 2320B	
160-3807-1 DU	B2R299	Total/NA	Water	SM 2320B	
160-3807-1 MS	B2R299	Total/NA	Water	SM 2320B	
LCS 160-75788/3	Lab Control Sample	Total/NA	Water	SM 2320B	
LLCS 160-75788/2	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 160-75788/1	Method Blank	Total/NA	Water	SM 2320B	