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: 160-18238-1
TestAmerica Sample Delivery Group: SL2257
Client Project/Site: X16-043

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

Attn: Mr. Scot Fitzgerald

Authorized for release by:
7/26/2016 10:36:16 AM

Jayna Awalt, Project Manager II
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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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Job ID: 160-18238-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

CH2MHill Plateau Remediation Company
P.O. Box 1600
Richland, Washington 99352
July 26, 2016
Attention: Scot Fitzgerald

SDG	: SL2257
Number of Samples	: 1 sample
Sample Matrix	: Water
Data Deliverable	: Summary
Date SDG Closed	: July 19, 2016

II. Introduction

On July 19, 1 sample was received by TestAmerica - St. Louis for chemical analysis. The samples were received within temperature criteria. See the COC and receipt checklists for documentation of any variations on receipt conditions and temperature. Upon receipt, 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: X16-043

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 an LCS/LCS duplicate.

Note: For Metals analyses, per standard practice, all 6020 water and soil samples are initially prepared at 2x dilution. This standard dilution does not affect reporting limits as MDL studies are also prepared in the same manner. These dilutions do not necessitate flagging unless otherwise noted in the case narrative.

For solid matrices, all Metals analyses (including Hg) use a Standard Reference Material for the Laboratory Control Sample (LCS). Certificate for this source material may be obtained from TASL.

For Anion analysis, samples have been started at a 2x dilution per CHPRC direction. The samples are flagged accordingly with a “D” flag if sample concentration is above the MDL/RL. Non-conformance will be included in the below section only if dilution is greater than 2x.

For WTPH methods, the lab utilizes method 8015B. Per CHPRC direction, the method name in the electronic data has been modified to read WTPH in the place of 8015B.

Per CHPRC direction (June 2014), Boron will be reported for Metals using method 6010. Boron will no longer be reported by method 6020.

Per CHPRC direction, due to the short hold times for Nitrate, Nitrite and Phosphate by IC (48 hours) as well as pH analysis (24 hours), a SIR request is not needed when samples are run outside 1x hold but within 2x hold. A narrative comment will be included below if a sample is run outside the lab-specified hold time for waters.

Job ID: 160-18238-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

For extractable and volatile organic analyses, several analytes are considered poor performers and will not meet CHPRC QC limits. Per CHPRC direction, the lab's statistical limits have been reported. Excursions outside these statistical limits will include a non-conformance in the sections below.

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 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. For Metals analyses, per standard practice, all solid samples are initially prepared at a 2x dilution. This standard dilution does not affect reporting limits as MDL studies are also prepared in the same manner. These dilutions do not necessitate qualification unless otherwise noted in the case narrative.
- **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.

Volatiles

Batch: 261239

The following compounds did not meet the minimum relative response factor limits in the continuing calibration verification (CCV) associated with batch 160-261239: 2-Butanone. A low level CCV was analyzed at the base reporting limit of 1ug/L and the affected analytes were detected. Affected target analytes recovering above the reporting limit in the associated samples will be qualified and reported. (CCVIS 160-261239/5)

Batch: 261518

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 160-261518. Laboratory control sample (LCS) and duplicate (LCSD) were analyzed in order to demonstrate accuracy and replicate precision. (LCS 160-261518/6) and (LCSD 160-261518/7) This is a re-analysis for Acetone due to failed QC in the original batch.

The following compounds did not meet the minimum relative response factor limits in the continuing calibration verification (CCV) associated with batch 160-261518: 2-Butanone and Acetone. A low level CCV was analyzed at the base reporting limit of 1ug/L and the affected analytes were detected. Affected target analytes recovering above the reporting limit in the associated samples will be qualified and reported. (CCVIS 160-261518/5)

We certify that this data package is in compliance with the SOW, both technically and for completeness, including a full description of,

Job ID: 160-18238-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager or designee and the laboratory's client services representative as verified by their signature on this report.

Reviewed and approved:

Jayna Awalt
St. Louis Project Manager

Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 160-18238-1
SDG Number: SL2257

Login Number: 18238
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	0.8
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 (excluding tests with immediate HTs)	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").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

CH2MHill Plateau Remediation Company 82257

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # X16-043-027

Collector	Frank Hall /CHPRC	Contact/Requester	WATERS-HUSTED, K	Telephone No.	376-4650
SAF No.	X16-043	Sampling Origin	Hanford Site	Purchase Order/Charge Code	304027
Project Title	100-KW Rebound Study, June 27, 2016	Logbook No.	HNF-N-506 87/1	Ice Chest No.	GWS-350
Shipped To (Lab)	TestAmerica St. Louis	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.	776778092365
Protocol	CERCLA	Priority: 30 Days	PRIORITY	Offsite Property No.	N/A

POSSIBLE SAMPLE HAZARDS/REMARKS

*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☑ No ☐

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B360D8	N	W	7/17/16	0916	4x40-mL aGs*	8260_VOA_GCMS: COMMON	14 Days	HCl or H2SO4 to pH <2/Cool <=6C

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
Frank Hall /CHPRC			JUL 17 2016 1555	SSU #1			JUL 17 2016 1555
SSU #1			JUL 18 2016 0830	Lesly Wall /CHPRC		Lesly Wall	JUL 18 2016 0830
Lesly Wall /CHPRC		Lesly Wall	JUL 18 2016 1400	FEDEX			
FEDEX				JILL CLARKE		Jill Clarke	7.19.16 0930

Matrix *

S	Soil	DS	Drum Solids
SE	Sediment	DL	Drum Liquids
SO	Solid	T	Tissue
SL	Sludge	WI	Wipe
W	Water	L	Liquid
O	Oil	V	Vegetation
A	Air	X	Other

FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time

PRINTED ON 6/16/2016 FSR ID = FSR33484 A-6004-842 (REV 2)

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Delivered

Tracking No.or Nickname	Shipper city, state	Origin Terminal	Ship date	Status	Recipient city, state	Delivery date
776778092365	RICHLAND, WA	PASCO, WA	7/18/2016		EARTH CITY, MO	7/19/2016 9:20 am
776778079975	RICHLAND, WA	PASCO, WA	7/18/2016		EARTH CITY, MO	7/19/2016 9:20 am

Launch FedEx Tracking

776778092365

Ship date:
Mon 7/18/2016

RICHLAND, WA US

Delivered
Signed for by: J.CLARKE

Actual delivery:
Tue 7/19/2016 9:20 am

EARTH CITY, MO US

Travel History

Date/Time	Activity	Location
- 7/19/2016 - Tuesday		
9:20 am	Delivered	[illegible]
7:05 am	On FedEx vehicle for delivery	[illegible]
6:59 am	At local FedEx facility	EARTH CITY, MO
5:12 am	At destination sort facility	BERKELEY, MO
4:26 am	Departed FedEx location	MEMPHIS, TN
12:13 am	Arrived at FedEx location	MEMPHIS, TN
- 7/18/2016 - Monday		
4:49 pm	Left FedEx origin facility	[illegible]
3:34 pm	Picked up	[illegible]
11:15 am	Shipment information sent to FedEx	

Shipment Facts

Tracking number	776778092365	**Service**	FedEx Standard Overnight
Weight	82 lbs / 37.19 kgs	**Delivered To**	Shipping/Receiving
Total pieces	1	**Total shipment weight**	82 lbs / 37.19 kgs
Terms	Recipient	**Shipper reference**	GWS-350
Packaging	Your Packaging	**Special handling section**	Deliver Weekday, Additional Handling Surcharge
Standard transit	7/19/2016 by 3:00 pm		

Ask FedEx

Your virtual support assistant

Definitions/Glossary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC/MS VOA TICs

Qualifier	Qualifier Description
J	Indicates an Estimated Value for TICs
N	Presumptive evidence of material.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
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)

Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds (GC/MS)	SW846	TAL SL

Protocol References:

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

Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-18238-1	B360D8	Water	07/17/16 09:16	07/19/16 09:30

Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Method: 8260C - Volatile Organic Compounds (GC/MS)

Client Sample ID: B360D8
Date Collected: 07/17/16 09:16
Date Received: 07/19/16 09:30

Lab Sample ID: 160-18238-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.17	U	1.0	0.17	ug/L			07/20/16 12:59	1
1,1,2-Trichloroethane	0.13	U	1.0	0.13	ug/L			07/20/16 12:59	1
1,1-Dichloroethane	0.070	U	1.0	0.070	ug/L			07/20/16 12:59	1
1,1-Dichloroethene	0.10	U	1.0	0.10	ug/L			07/20/16 12:59	1
1,2-Dichloroethane	0.22	U	1.0	0.22	ug/L			07/20/16 12:59	1
2-Butanone (MEK)	0.47	U	5.0	0.47	ug/L			07/20/16 12:59	1
4-Methyl-2-pentanone (MIBK)	0.22	U	5.0	0.22	ug/L			07/20/16 12:59	1
Acetone	**2.5**		2.0	0.55	ug/L			07/21/16 17:05	1
Benzene	0.10	U	1.0	0.10	ug/L			07/20/16 12:59	1
Carbon disulfide	0.10	U	1.0	0.10	ug/L			07/20/16 12:59	1
Carbon tetrachloride	0.18	U	1.0	0.18	ug/L			07/20/16 12:59	1
Chlorobenzene	0.11	U	1.0	0.11	ug/L			07/20/16 12:59	1
Chloroform	**0.27**	**J**	1.0	0.10	ug/L			07/20/16 12:59	1
Ethylbenzene	0.12	U	1.0	0.12	ug/L			07/20/16 12:59	1
Methylene Chloride	0.27	U	1.0	0.27	ug/L			07/20/16 12:59	1
Tetrachloroethene	0.18	U	1.0	0.18	ug/L			07/20/16 12:59	1
Toluene	0.14	U	1.0	0.14	ug/L			07/20/16 12:59	1
Trichloroethene	**6.2**		1.0	0.25	ug/L			07/20/16 12:59	1
Vinyl chloride	0.19	U	2.0	0.19	ug/L			07/20/16 12:59	1
Xylenes, Total	0.26	U	3.0	0.26	ug/L			07/20/16 12:59	1

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/L*					*07/20/16 12:59*	*1*
Tentatively Identified Compound	*None*		*ug/L*					*07/21/16 17:05*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*75 - 129*		*07/20/16 12:59*	*1*
1,2-Dichloroethane-d4 (Surr)	*100*		*75 - 129*		*07/21/16 17:05*	*1*
4-Bromofluorobenzene (Surr)	*101*		*81 - 130*		*07/20/16 12:59*	*1*
4-Bromofluorobenzene (Surr)	*99*		*81 - 130*		*07/21/16 17:05*	*1*
Dibromofluoromethane (Surr)	*96*		*81 - 124*		*07/20/16 12:59*	*1*
Dibromofluoromethane (Surr)	*96*		*81 - 124*		*07/21/16 17:05*	*1*
Toluene-d8 (Surr)	*99*		*87 - 128*		*07/20/16 12:59*	*1*
Toluene-d8 (Surr)	*97*		*87 - 128*		*07/21/16 17:05*	*1*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Method: 8260C - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-261239/9
Matrix: Water
Analysis Batch: 261239

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.17	U	1.0	0.17	ug/L			07/20/16 10:40	1
1,1,2-Trichloroethane	0.13	U	1.0	0.13	ug/L			07/20/16 10:40	1
1,1-Dichloroethane	0.070	U	1.0	0.070	ug/L			07/20/16 10:40	1
1,1-Dichloroethene	0.10	U	1.0	0.10	ug/L			07/20/16 10:40	1
1,2-Dichloroethane	0.22	U	1.0	0.22	ug/L			07/20/16 10:40	1
2-Butanone (MEK)	0.47	U	5.0	0.47	ug/L			07/20/16 10:40	1
4-Methyl-2-pentanone (MIBK)	0.22	U	5.0	0.22	ug/L			07/20/16 10:40	1
Benzene	0.10	U	1.0	0.10	ug/L			07/20/16 10:40	1
Carbon disulfide	0.10	U	1.0	0.10	ug/L			07/20/16 10:40	1
Carbon tetrachloride	0.18	U	1.0	0.18	ug/L			07/20/16 10:40	1
Chlorobenzene	0.11	U	1.0	0.11	ug/L			07/20/16 10:40	1
Chloroform	0.10	U	1.0	0.10	ug/L			07/20/16 10:40	1
Ethylbenzene	0.12	U	1.0	0.12	ug/L			07/20/16 10:40	1
Methylene Chloride	0.27	U	1.0	0.27	ug/L			07/20/16 10:40	1
Tetrachloroethene	0.18	U	1.0	0.18	ug/L			07/20/16 10:40	1
Toluene	0.14	U	1.0	0.14	ug/L			07/20/16 10:40	1
Trichloroethene	0.25	U	1.0	0.25	ug/L			07/20/16 10:40	1
Vinyl chloride	0.19	U	2.0	0.19	ug/L			07/20/16 10:40	1
Xylenes, Total	0.26	U	3.0	0.26	ug/L			07/20/16 10:40	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/L*					*07/20/16 10:40*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*75 - 129*		*07/20/16 10:40*	*1*
4-Bromofluorobenzene (Surr)	*99*		*81 - 130*		*07/20/16 10:40*	*1*
Dibromofluoromethane (Surr)	*94*		*81 - 124*		*07/20/16 10:40*	*1*
Toluene-d8 (Surr)	*97*		*87 - 128*		*07/20/16 10:40*	*1*

Lab Sample ID: LCS 160-261239/6
Matrix: Water
Analysis Batch: 261239

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	10.0	9.83		ug/L		98	85 - 116
1,1,2-Trichloroethane	10.0	9.43		ug/L		94	80 - 120
1,1-Dichloroethane	10.0	9.50		ug/L		95	80 - 120
1,1-Dichloroethene	10.0	9.55		ug/L		96	80 - 120
1,2-Dichloroethane	10.0	9.66		ug/L		97	80 - 115
2-Butanone (MEK)	10.0	8.34		ug/L		83	67 - 127
4-Methyl-2-pentanone (MIBK)	10.0	8.66		ug/L		87	75 - 126
Benzene	10.0	9.65		ug/L		97	80 - 120
Carbon disulfide	10.0	9.57		ug/L		96	80 - 121
Carbon tetrachloride	10.0	9.85		ug/L		99	83 - 125
Chlorobenzene	10.0	9.76		ug/L		98	80 - 120
Chloroform	10.0	9.66		ug/L		97	80 - 120
Ethylbenzene	10.0	9.84		ug/L		98	80 - 120

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-261239/6
Matrix: Water
Analysis Batch: 261239

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methylene Chloride	10.0	9.00		ug/L		90	80 - 120
Tetrachloroethene	10.0	9.86		ug/L		99	83 - 123
Toluene	10.0	9.60		ug/L		96	80 - 120
Trichloroethene	10.0	9.63		ug/L		96	80 - 120
Vinyl chloride	10.0	9.98		ug/L		100	77 - 122
Xylenes, Total	20.0	19.9		ug/L		99	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*99*		*75 - 129*
4-Bromofluorobenzene (Surr)	*98*		*81 - 130*
Dibromofluoromethane (Surr)	*99*		*81 - 124*
Toluene-d8 (Surr)	*99*		*87 - 128*

Lab Sample ID: LCSD 160-261239/7
Matrix: Water
Analysis Batch: 261239

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	10.0	9.73		ug/L		97	85 - 116	1	20
1,1,2-Trichloroethane	10.0	9.43		ug/L		94	80 - 120	0	20
1,1-Dichloroethane	10.0	9.52		ug/L		95	80 - 120	0	20
1,1-Dichloroethene	10.0	9.59		ug/L		96	80 - 120	0	20
1,2-Dichloroethane	10.0	9.45		ug/L		94	80 - 115	2	20
2-Butanone (MEK)	10.0	9.08		ug/L		91	67 - 127	9	20
4-Methyl-2-pentanone (MIBK)	10.0	8.74		ug/L		87	75 - 126	1	20
Benzene	10.0	9.69		ug/L		97	80 - 120	0	20
Carbon disulfide	10.0	9.56		ug/L		96	80 - 121	0	20
Carbon tetrachloride	10.0	9.89		ug/L		99	83 - 125	0	20
Chlorobenzene	10.0	9.90		ug/L		99	80 - 120	1	20
Chloroform	10.0	9.71		ug/L		97	80 - 120	0	20
Ethylbenzene	10.0	10.0		ug/L		100	80 - 120	2	20
Methylene Chloride	10.0	8.95		ug/L		89	80 - 120	1	20
Tetrachloroethene	10.0	9.96		ug/L		100	83 - 123	1	20
Toluene	10.0	9.79		ug/L		98	80 - 120	2	20
Trichloroethene	10.0	9.80		ug/L		98	80 - 120	2	20
Vinyl chloride	10.0	9.98		ug/L		100	77 - 122	0	20
Xylenes, Total	20.0	20.3		ug/L		102	80 - 120	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*75 - 129*
4-Bromofluorobenzene (Surr)	*100*		*81 - 130*
Dibromofluoromethane (Surr)	*98*		*81 - 124*
Toluene-d8 (Surr)	*99*		*87 - 128*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-18237-B-17 MS
Matrix: Water
Analysis Batch: 261239

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	0.17	U	10.0	10.2		ug/L		102	82 - 124
1,1,2-Trichloroethane	0.13	U	10.0	9.28		ug/L		93	80 - 120
1,1-Dichloroethane	0.070	U	10.0	9.81		ug/L		98	80 - 122
1,1-Dichloroethene	0.10	U	10.0	9.63		ug/L		96	80 - 120
1,2-Dichloroethane	0.22	U	10.0	9.76		ug/L		98	80 - 120
2-Butanone (MEK)	0.47	U	10.0	8.90		ug/L		89	53 - 145
4-Methyl-2-pentanone (MIBK)	0.22	U	10.0	8.12		ug/L		81	70 - 131
Benzene	0.10	U	10.0	9.80		ug/L		98	80 - 120
Carbon disulfide	0.10	U	10.0	9.57		ug/L		96	80 - 121
Carbon tetrachloride	0.18	U	10.0	10.3		ug/L		103	77 - 131
Chlorobenzene	0.11	U	10.0	9.88		ug/L		99	80 - 120
Chloroform	0.10	U	10.0	10.0		ug/L		100	80 - 120
Ethylbenzene	0.12	U	10.0	10.1		ug/L		101	84 - 125
Methylene Chloride	0.27	U	10.0	9.74		ug/L		97	80 - 120
Tetrachloroethene	0.18	U	10.0	9.97		ug/L		100	80 - 126
Toluene	0.14	U	10.0	9.74		ug/L		97	85 - 123
Trichloroethene	0.25	U	10.0	10.0		ug/L		100	81 - 125
Vinyl chloride	0.19	U	10.0	9.58		ug/L		96	70 - 129
Xylenes, Total	0.26	U	20.0	20.3		ug/L		102	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*99*		*75 - 129*
4-Bromofluorobenzene (Surr)	*99*		*81 - 130*
Dibromofluoromethane (Surr)	*98*		*81 - 124*
Toluene-d8 (Surr)	*98*		*87 - 128*

Lab Sample ID: 160-18237-C-17 MSD
Matrix: Water
Analysis Batch: 261239

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	0.17	U	10.0	10.1		ug/L		101	82 - 124	1	20
1,1,2-Trichloroethane	0.13	U	10.0	9.35		ug/L		93	80 - 120	1	20
1,1-Dichloroethane	0.070	U	10.0	9.70		ug/L		97	80 - 122	1	20
1,1-Dichloroethene	0.10	U	10.0	9.59		ug/L		96	80 - 120	0	20
1,2-Dichloroethane	0.22	U	10.0	9.63		ug/L		96	80 - 120	1	20
2-Butanone (MEK)	0.47	U	10.0	8.75		ug/L		88	53 - 145	2	20
4-Methyl-2-pentanone (MIBK)	0.22	U	10.0	8.25		ug/L		82	70 - 131	2	20
Benzene	0.10	U	10.0	9.83		ug/L		98	80 - 120	0	20
Carbon disulfide	0.10	U	10.0	9.51		ug/L		95	80 - 121	1	20
Carbon tetrachloride	0.18	U	10.0	10.2		ug/L		102	77 - 131	1	20
Chlorobenzene	0.11	U	10.0	9.91		ug/L		99	80 - 120	0	20
Chloroform	0.10	U	10.0	9.96		ug/L		100	80 - 120	1	20
Ethylbenzene	0.12	U	10.0	9.98		ug/L		100	84 - 125	1	20
Methylene Chloride	0.27	U	10.0	9.65		ug/L		96	80 - 120	1	20
Tetrachloroethene	0.18	U	10.0	9.87		ug/L		99	80 - 126	1	20
Toluene	0.14	U	10.0	9.81		ug/L		98	85 - 123	1	20
Trichloroethene	0.25	U	10.0	9.87		ug/L		99	81 - 125	2	20

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-18237-C-17 MSD
Matrix: Water
Analysis Batch: 261239

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vinyl chloride	0.19	U	10.0	9.99		ug/L		100	70 - 129	4	20
Xylenes, Total	0.26	U	20.0	20.4		ug/L		102	80 - 120	0	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*75 - 129*
4-Bromofluorobenzene (Surr)	*99*		*81 - 130*
Dibromofluoromethane (Surr)	*100*		*81 - 124*
Toluene-d8 (Surr)	*100*		*87 - 128*

Lab Sample ID: MB 160-261518/9
Matrix: Water
Analysis Batch: 261518

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.17	U	1.0	0.17	ug/L			07/21/16 12:05	1
1,1,2-Trichloroethane	0.13	U	1.0	0.13	ug/L			07/21/16 12:05	1
1,1-Dichloroethane	0.070	U	1.0	0.070	ug/L			07/21/16 12:05	1
1,1-Dichloroethene	0.10	U	1.0	0.10	ug/L			07/21/16 12:05	1
1,2-Dichloroethane	0.22	U	1.0	0.22	ug/L			07/21/16 12:05	1
2-Butanone (MEK)	0.47	U	5.0	0.47	ug/L			07/21/16 12:05	1
4-Methyl-2-pentanone (MIBK)	0.22	U	5.0	0.22	ug/L			07/21/16 12:05	1
Acetone	0.55	U	2.0	0.55	ug/L			07/21/16 12:05	1
Benzene	0.10	U	1.0	0.10	ug/L			07/21/16 12:05	1
Carbon disulfide	0.10	U	1.0	0.10	ug/L			07/21/16 12:05	1
Carbon tetrachloride	0.18	U	1.0	0.18	ug/L			07/21/16 12:05	1
Chlorobenzene	0.11	U	1.0	0.11	ug/L			07/21/16 12:05	1
Chloroform	0.10	U	1.0	0.10	ug/L			07/21/16 12:05	1
Ethylbenzene	0.12	U	1.0	0.12	ug/L			07/21/16 12:05	1
Methylene Chloride	0.27	U	1.0	0.27	ug/L			07/21/16 12:05	1
Tetrachloroethene	0.18	U	1.0	0.18	ug/L			07/21/16 12:05	1
Toluene	0.14	U	1.0	0.14	ug/L			07/21/16 12:05	1
Trichloroethene	0.25	U	1.0	0.25	ug/L			07/21/16 12:05	1
Vinyl chloride	0.19	U	2.0	0.19	ug/L			07/21/16 12:05	1
Xylenes, Total	0.26	U	3.0	0.26	ug/L			07/21/16 12:05	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
N-Methyl-1-adamantaneacetamide	*1.54*	*N J*	*ug/L*		*18.31*	*1000211-60-4*		*07/21/16 12:05*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*75 - 129*		*07/21/16 12:05*	*1*
4-Bromofluorobenzene (Surr)	*96*		*81 - 130*		*07/21/16 12:05*	*1*
Dibromofluoromethane (Surr)	*95*		*81 - 124*		*07/21/16 12:05*	*1*
Toluene-d8 (Surr)	*98*		*87 - 128*		*07/21/16 12:05*	*1*

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-261518/6
Matrix: Water
Analysis Batch: 261518

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	10.0	9.68		ug/L		97	85 - 116
1,1,2-Trichloroethane	10.0	9.70		ug/L		97	80 - 120
1,1-Dichloroethane	10.0	9.49		ug/L		95	80 - 120
1,1-Dichloroethene	10.0	9.67		ug/L		97	80 - 120
1,2-Dichloroethane	10.0	9.80		ug/L		98	80 - 115
2-Butanone (MEK)	10.0	9.87		ug/L		99	67 - 127
4-Methyl-2-pentanone (MIBK)	10.0	9.31		ug/L		93	75 - 126
Acetone	10.0	10.5		ug/L		105	69 - 129
Benzene	10.0	9.67		ug/L		97	80 - 120
Carbon disulfide	10.0	9.58		ug/L		96	80 - 121
Carbon tetrachloride	10.0	9.70		ug/L		97	83 - 125
Chlorobenzene	10.0	9.75		ug/L		98	80 - 120
Chloroform	10.0	9.65		ug/L		97	80 - 120
Ethylbenzene	10.0	9.73		ug/L		97	80 - 120
Methylene Chloride	10.0	9.01		ug/L		90	80 - 120
Tetrachloroethene	10.0	9.74		ug/L		97	83 - 123
Toluene	10.0	9.46		ug/L		95	80 - 120
Trichloroethene	10.0	9.68		ug/L		97	80 - 120
Vinyl chloride	10.0	9.90		ug/L		99	77 - 122
Xylenes, Total	20.0	19.9		ug/L		99	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*100*		*75 - 129*
4-Bromofluorobenzene (Surr)	*98*		*81 - 130*
Dibromofluoromethane (Surr)	*99*		*81 - 124*
Toluene-d8 (Surr)	*98*		*87 - 128*

Lab Sample ID: LCSD 160-261518/7
Matrix: Water
Analysis Batch: 261518

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	10.0	9.67		ug/L		97	85 - 116	0	20
1,1,2-Trichloroethane	10.0	9.81		ug/L		98	80 - 120	1	20
1,1-Dichloroethane	10.0	9.56		ug/L		96	80 - 120	1	20
1,1-Dichloroethene	10.0	9.73		ug/L		97	80 - 120	1	20
1,2-Dichloroethane	10.0	9.65		ug/L		97	80 - 115	2	20
2-Butanone (MEK)	10.0	10.0		ug/L		100	67 - 127	1	20
4-Methyl-2-pentanone (MIBK)	10.0	9.33		ug/L		93	75 - 126	0	20
Acetone	10.0	9.78		ug/L		98	69 - 129	7	20
Benzene	10.0	9.72		ug/L		97	80 - 120	1	20
Carbon disulfide	10.0	9.64		ug/L		96	80 - 121	1	20
Carbon tetrachloride	10.0	9.72		ug/L		97	83 - 125	0	20
Chlorobenzene	10.0	9.80		ug/L		98	80 - 120	1	20
Chloroform	10.0	9.77		ug/L		98	80 - 120	1	20
Ethylbenzene	10.0	9.83		ug/L		98	80 - 120	1	20
Methylene Chloride	10.0	9.17		ug/L		92	80 - 120	2	20
Tetrachloroethene	10.0	9.92		ug/L		99	83 - 123	2	20

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 160-261518/7
Matrix: Water
Analysis Batch: 261518

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

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Toluene			10.0	9.59		ug/L		96	80 - 120	1	20
Trichloroethene			10.0	9.76		ug/L		98	80 - 120	1	20
Vinyl chloride			10.0	9.91		ug/L		99	77 - 122	0	20
Xylenes, Total			20.0	20.0		ug/L		100	80 - 120	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*100*		*75 - 129*
4-Bromofluorobenzene (Surr)	*101*		*81 - 130*
Dibromofluoromethane (Surr)	*100*		*81 - 124*
Toluene-d8 (Surr)	*100*		*87 - 128*

QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

GC/MS VOA

Analysis Batch: 261239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18238-1	B360D8	Total/NA	Water	8260C	
MB 160-261239/9	Method Blank	Total/NA	Water	8260C	
LCS 160-261239/6	Lab Control Sample	Total/NA	Water	8260C	
LCSD 160-261239/7	Lab Control Sample Dup	Total/NA	Water	8260C	
160-18237-B-17 MS	Matrix Spike	Total/NA	Water	8260C	
160-18237-C-17 MSD	Matrix Spike Duplicate	Total/NA	Water	8260C	

Analysis Batch: 261518

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18238-1	B360D8	Total/NA	Water	8260C	
MB 160-261518/9	Method Blank	Total/NA	Water	8260C	
LCS 160-261518/6	Lab Control Sample	Total/NA	Water	8260C	
LCSD 160-261518/7	Lab Control Sample Dup	Total/NA	Water	8260C	

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-043

TestAmerica Job ID: 160-18238-1
SDG: SL2257

Method: 8260C - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	DBFM	TOL
Lab Sample ID	**Client Sample ID**	**(75-129)**	**(81-130)**	**(81-124)**	**(87-128)**
160-18237-B-17 MS	Matrix Spike	99	99	98	98
160-18237-C-17 MSD	Matrix Spike Duplicate	98	99	100	100
160-18238-1	B360D8	99	101	96	99
160-18238-1	B360D8	100	99	96	97
LCS 160-261239/6	Lab Control Sample	99	98	99	99
LCS 160-261518/6	Lab Control Sample	100	98	99	98
LCSD 160-261239/7	Lab Control Sample Dup	96	100	98	99
LCSD 160-261518/7	Lab Control Sample Dup	100	101	100	100
MB 160-261239/9	Method Blank	97	99	94	97
MB 160-261518/9	Method Blank	96	96	95	98

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)