Solutia Inc.
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February 26, 2018

Ms. Carolyn Bury - LU-16J
U.S. EPA Region 5
Corrective Action Section
77 West Jackson Boulevard
Chicago, IL 60604-3507

Re: Long-Term Monitoring Program
4th Quarter 2017 Data Report
Solutia Inc., W. G. Krummrich Plant, Sauget, IL

Dear Ms. Bury:

Enclosed please find the Long-Term Monitoring Program 4th Quarter 2017 Data Report for Solutia Inc.'s W. G. Krummrich Plant, Sauget, IL. Results from sampling of supplemental piezometers GWE-1D, 2D, and 3D and supplemental wells GWE-5D, ESL-MW-A and D1, and PM1D are also included in this report.

Per EPA's February 9, 2016, response to Solutia's December 23, 2015, submittal:

- sampling of supplemental piezometers GWE-5S and 5M and supplemental wells ESL-MW-C1and PM1M has been discontinued; and
- the sampling frequency for supplemental piezometer GWE-1D and supplemental well ESL-MW-A has been reduced to the first and third quarters.

On May 2, 2017, Solutia submitted a "Periodic Technical Review" recommending changes to this groundwater monitoring program, along with similar Reviews for the other programs. Solutia would like to receive - and resolve - US EPA's comments as soon as possible before June 1, the latest date to begin implementation of 2nd quarter 2018 monitoring, but which we would not otherwise perform per our recommendations.

If you have any questions or comments regarding this report, please contact me at (314) 674-3312 or gmrina@eastman.com

Sincerely,

Gerald M. Rinaldi
Manager, Remediation Services

Enclosure

cc: Distribution List

DISTRIBUTION LIST

Long-Term Monitoring Program
4th Quarter 2017 Data Report
Solutia Inc., W. G. Krummrich Plant, Sauget, IL

USEPA

Stephanie Linebaugh
USEPA Region 5 - SR6J, 77 West Jackson Boulevard, Chicago, IL 60604

Solutia

Donn Haines 500 Monsanto Avenue, Sauget, IL 62206-1198

GSI Environmental (CD only)

Chuck Newell 2211 Norfolk Street, Suite 1000, Houston, TX 77098-4044

GROUNDWATER MONITORING REPORT

GROUNDWATER MONITORING REPORT

4th QUARTER 2017 DATA REPORT
LONG-TERM MONITORING PROGRAM
SOLUTIA INC., W.G. KRUMMRICH FACILITY
SAUGET, ILLINOIS

Prepared For: Solutia Inc.
575 Maryville Centre Drive
St. Louis, MO 63141 USA

Submitted By: Golder Associates Inc.
820 S. Main Street, Suite 100
St. Charles, MO 63301 USA

February 2018 **140-3345**

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Golder Associates

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1.0 INTRODUCTION

Golder Associates Inc. (Golder) is pleased to submit this report summarizing the 4th Quarter 2017 (4Q17) Long-Term Monitoring Program (LTMP) groundwater sampling activities at the Solutia Inc. (Solutia) W.G. Krummrich (WGK) plant (Site) in Sauget, Illinois. The facility is located at 500 Monsanto Avenue, Sauget, Illinois as shown on Figure 1.

The 4Q17 sampling event was performed in general accordance with the Revised LTMP Work Plan (Work Plan) (Solutia 2009). Work conducted during the LTMP is designed to evaluate the effectiveness of monitored natural attenuation (MNA). The effectiveness of MNA at the Site, is shown by the following:

- A clear and meaningful trend of decreasing contaminant mass
- Data that indirectly demonstrate the types and rates of natural attenuation process active at the Site
- Data that directly demonstrate the occurrence of biodegradation processes at the Site

The Work Plan addresses quarterly sampling requirements from the United States Environmental Protection Agency's (USEPA) February 26, 2008, Final Decision (USEPA, 2008). According to the Work Plan, ten (10) groundwater samples are to be collected from monitoring wells from two (2) source areas, former Benzene Storage Area and former Chlorobenzene Process Area; four (4) monitoring wells located downgradient of the former Benzene Storage Area; and four (4) monitoring wells located downgradient of the former Chlorobenzene Process Area. Monitoring wells are located in the Shallow Hydrogeologic Unit (SHU), Middle Hydrogeologic Unit (MHU) and Deep Hydrogeologic Unit (DHU). One (1) monitoring well is screened in the SHU at the former Benzene Storage Area. The remaining nine (9) wells are screened in the MHU and DHU. Analytical data from these wells are used to evaluate the attenuation processes in the America Bottoms aquifer, as impacted groundwater from these source areas migrates toward and discharges to the Mississippi River.

In addition to the monitoring wells specified in the Work Plan, the USEPA has also requested that groundwater samples be collected from additional monitoring wells and piezometers (supplemental wells) approximately 1.0 to 1.5 miles north of the Site. In response to Solutia's December 23, 2015, request, on February 9, 2016, the USEPA reduced the number of supplemental wells from eleven (11) to seven (7) for the first and third quarter sampling events and to five (5) for the second and fourth quarter sampling events.

The scope of work detailed in the Work Plan is summarized below.

Fifteen (15) monitoring wells and piezometers are sampled during the 4Q17 LTMP event. The locations of the monitoring wells, piezometers and source areas are shown on Figure 2 and the sample locations are included on the following table.

Area	Location Relative to Area	Sample Identification
Former Benzene Storage	Source Area Well	BSA-MW-1S
	Downgradient	BSA-MW-2D
		BSA-MW-3D
		BSA-MW-4D
		BSA-MW-5D
Former Chlorobenzene Process	Source Area Well	CPA-MW-1D
	Downgradient	CPA-MW-2D
		CPA-MW-3D
		CPA-MW-4D
		CPA-MW-5D
Supplemental Wells North of the Site	---	ESL-MW-D1
		GWE-2D
		GWE-3D
		GWE-5D
		PM1D

Water levels in the monitoring wells and piezometers are measured quarterly and total depths are measured in the 1st quarter of each year.

During the quarterly sampling events, monitoring wells and piezometers are sampled for the following volatile organic compound (VOC) analytes: benzene; chlorobenzene; 1,2-dichlorobenzene; 1,3-dichlorobenzene; and 1,4-dichlorobenzene. During the 1st and 3rd quarters, monitoring wells and piezometers are sampled for the following semi-volatile organic compound (SVOC) analytes: 4-chloroaniline (CPA-MW-3D, CPA-MW-4D and CPA-MW-5D); 2-chlorophenol (BSA and CPA wells); 1,2,4-trichlorobenzene (BSA and CPA wells); and 1,4-dioxane (BSA-MW-2D, BSA-MW-3D, BSA-MW-4D, and BSA-MW-5D). The following MNA parameters are sampled quarterly to evaluate active natural attenuation occurring at the Site:

- Electron Donors – total and dissolved organic carbon
- Electron Acceptors – iron, manganese, nitrate, sulfate
- Biodegradation Byproducts – carbon dioxide, chloride, methane
- Biodegradation Indicators – alkalinity

Microbial Insights BioTrap® samplers for Phospholipid Fatty Acid (PLFA) analysis and Stable Isotope Probes (SIPs) baited with benzene or chlorobenzene are deployed quarterly to demonstrate the occurrence of biodegradation occurring at the Site.

2.0 FIELD ACTIVITIES

Golder conducted 4Q17 sampling events between December 4 and December 7, 2017. Activities were performed in general accordance with the Work Plan.

2.1 Water Level Measurement

Prior to sampling during the 4Q17 event, Golder performed a synoptic round of water level measurements at 76 monitoring wells and piezometers on November 30 and December 1, 2017. The following monitoring well and piezometer series are included in the LTMP:

- BSA-series
- CPA-series
- ESL-series
- GM-series
- GWE-series
- K-series
- PS-MW-series
- PMA-series
- PM-series
- Piezometer clusters installed for Sauget Area 2 RI/FS and WGK CA-750 Environmental Indicator projects

An oil/water interface probe was used to measure the water level (to 0.01 feet) and, if present, detect and measure the thickness of non-aqueous phase liquid (NAPL). During the 4Q17 sampling event, NAPL was not detected in any of the monitoring wells or piezometers. Total depths are measured during the 1st quarter of each year. The 4Q17 well gauging information is shown on Table 1. The information collected from the MHU and the DHU was used to create a groundwater potentiometric surface map, as shown on Figure 3.

2.2 Groundwater Sample Collection

Monitoring wells and piezometers sampled during the 4Q17 LTMP event were purged and sampled using low-flow sampling techniques, low-density polyethylene tubing (LDPE) and a submersible or peristaltic pump (GWE-2D and GWE-3D). The pump intake was placed at approximately the middle of the screened interval for each well. Purging was conducted at a rate of approximately 300 mL/min to reduce drawdown. Drawdown was measured throughout purging activities to ensure that it did not exceed 25% of the distance between the pump intake and the top of the screen. Measurement of field parameters began once the flow rate and drawdown were stable. Parameters were measured for each system volume purged using a SmartTROLL™ multi-parameter meter. The system volume includes the volume of the tubing, the volume of the pump and the volume of flow-through cell containing the multi-parameter meter. Samples were

collected after field parameters were stabilized within the ranges below for three (3) consecutive measurements:

- Dissolved Oxygen (DO): +/- 10% or +/- 0.2 mg/L, whichever is greatest
- Oxidation-Reduction Potential (ORP): +/- 20 mV
- pH: +/-0.2 standard units
- Specific Conductivity: +/- 3%

The flow rate was adjusted as needed to maintain approximately 300 mL/min during sampling activities. To reduce possible sample cross contamination, the flow-through cell was bypassed and gloves were replaced prior to sampling.

Sample bottles were provided by TestAmerica Laboratories, Inc. (TestAmerica) for the following analyses:

- VOCs – USEPA SW-846 Method 8260B
- MNA parameters – alkalinity (Methods 310.1 and SM 2320B), carbon dioxide (Method SM 4500 CO2C), chloride (USEPA Method 352.5), total and dissolved iron and total and dissolved manganese (USEPA SW-846 Method 6010C), methane, ethane and ethylene (RSK-175), nitrate (USEPA Method 353.2), sulfate (USEPA Method 375.4), and total and dissolved organic carbon (USEPA Method 415.1)

VOC sample bottles were filled first followed by gas sensitive parameters and general chemistry parameters. Ferrous iron was field analyzed with a HACH 890 Colorimeter and HACH AccuVac® ampules. Samples collected for ferrous iron and dissolved analyses were field filtered using an in-line 0.2 micron disposable filter. Groundwater purging and sampling forms are included in Appendix A.

2.3 Quality Assurance and Sample Handling

Two (2) analytical duplicates (AD), two (2) equipment blanks (EB) and one (1) matrix spike/matrix spike duplicate (MS/MSD) pairs were collected during the 4Q17 LTMP sampling event. Laboratory provided trip blanks were included in each cooler containing samples for VOC analysis, for a total of four (4) trip blanks. Sample bottles were labeled with the date and time of sample collection, sampler initials, analysis requested, preservative used, and sample identification based on the following nomenclature “AAA-MW#-MMYY-QA/QC” or “BBBB-MMYY-QA/QC” where:

- **“AAA”** denotes “Benzene Storage Area (BSA)”, “Chlorobenzene Process Area (CPA)”, “East St. Louis (ESL)”, or “Groundwater Elevation (GWE)” and **“MW#”** denotes “Monitoring Well Number”
- **“BBBB”** denotes PM1M or PM1D for monitoring wells installed in January 2015
- **“MMYY”** denotes month and year of sampling quarter, e.g.: December (4th quarter), 2017 (1217)
- **“QA/QC”** denotes QA/QC sample
  - **AD** – Analytical Duplicate
  - **EB** – Equipment Blank
  - **MS or MSD** – Matrix Spike or Matrix Spike Duplicate

Samples that were field filtered with an in-line 0.2 micron filter include “F(0.2)” prior to the “MMYY” portion of the sample identification. Sample information was recorded on a chain-of-custody (COC) that included project identification, sample identification, date and time of sample collection, analysis requested, preservative used, sample matrix and type, number of sample containers, sampler signature, and date COC was completed. Copies of the COCs are included in Appendix B.

Directly after sampling, sample bottles were placed in an iced cooler to maintain a sample temperature of approximately 4°C. Prior to sample shipment, samples and ice were placed inside two (2) contractor trash bags. The bags were tied and the cooler was sealed between the lid and sides with a signed and dated custody seal. Samples were shipped overnight via FedEx to the TestAmerica facility in Savannah, Georgia.

2.4 Biodegradation Sampling

Bio-Trap® and SIP results are evaluated to provide biodegradation potential information in the SHU, the MHU and the DHU. Bio-Trap® samplers and SIPs are passive sampling tools that collect microbes across the samplers membrane that is, after time, analyzed. SIPs are baited with a specially synthesized form of the contaminant (i.e., benzene, chlorobenzene) in order to measure the degradation of a specific contaminant.

Bio-Trap® samplers and Stable Isotope Probing samplers (SIPs), provided by Microbial Insights, Inc. in Rockford, Tennessee, were deployed on November 1, 2017 in monitoring wells downgradient of the former Chlorobenzene Process Area (CPA-MW-1D through CPA-MW-5D) and downgradient of the former Benzene Storage Area (BSA-MW-1S and BSA-MW-2D through BSA-MW-5D) for PLFA analysis. A benzene SIP was deployed in monitoring well BSA-MW-2D and a chlorobenzene SIP was deployed in monitoring well CPA-MW-3D. Bio-Trap® samplers and SIPs were weighted and fastened to a stainless steel cable. The cable was secured to the well cap and the Bio-Trap® or SIP was lowered into the well and placed in the middle of the well screen.

On November 30, 2017, Bio-Trap® samplers and SIPs were collected from the wells, placed in laboratory provided bags, labeled with appropriate well identification, placed in a cooler with ice, properly sealed, and shipped overnight to the Microbial Insights, Inc. facility in Rockford, Tennessee for analysis.

2.5 Decontamination and Investigation Derived Waste

Sampling equipment was decontaminated prior to mobilizing to the Site, between sample locations and prior to demobilizing from the Site. Non-dedicated sampling equipment was decontaminated between samples with a non-phosphatic detergent solution and a deionized water rinse.

Investigation derived waste (IDW) was placed in 55-gallon drums, labeled with the generation date and staged for disposal by Solutia. IDW such as gloves and other disposable sampling equipment was bagged for disposal by Solutia.

3.0 QUALITY ASSURANCE

Sample results were provided by TestAmerica in electronic format and reviewed for quality and completeness by Golder in accordance with the Work Plan. Results were submitted in four (4) sample delivery groups (SDGs) as follows:

Sample Delivery Group (SDG)	Sample Identification
KPS205	PM1D-1217
	ESL-MW-D1-1217
	GWE-5D-1217
	4Q17 LTM Trip Blank #1
KPS206	GWE-2D-1217
	GWE-3D-1217
	BSA-MW-5D-1217
	CPA-MW-4D-1217
	CPA-MW-5D-1217
	4Q17 LTM Trip Blank #2
KPS200	BSA-MW-2D-1217
	BSA-MW-3D-1217
	BSA-MW-3D-1217-EB
	BSA-MW-4D-1217
	CPA-MW-1D-1217
	CPA-MW-3D-1217
	CPA-MW-3D-1217-AD
	4Q17 LTM Trip Blank #3
KPS201	BSA-MW-1S-1217
	BSA-MW-1S-1217-EB
	CPA-MW-2D-1217
	CPA-MW-2D-1217-AD
	4Q17 LTM Trip Blank #4

Golder completed validation of the analytical data following the general guidelines in Section 4.4 Data Review and Validation of the Work Plan. The most recent versions of the national data validation guidelines were used for data review. The following guidelines were generally used:

- USEPA Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review, EPA-540-R-2017-002, January 2017
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review, EPA 540-R-2017-001, January 2017

Although some data required qualifications due to quality control criteria that were not achieved, the data was deemed usable. The completeness for the data set was 100%. Qualifications are included in Appendix C.

4.0 OBSERVATIONS

Groundwater analytical data for VOCs and MNA parameters are discussed below and presented in Table 2 and 3, respectively. The groundwater analytical laboratory results including data validation reports are included in Appendix D.

4.1 Benzene

Benzene was detected in six (6) of the fifteen (15) monitoring wells and piezometers at concentrations ranging from 3.4 µg/L (GWE-5D) to 430,000 µg/L (BSA-MW-1S). Benzene results are summarized below.

- Former Benzene Storage Area: Benzene was detected in the former Benzene Storage Area source area well (BSA-MW-1S) at a concentration of 430,000 µg/L.
- Downgradient of Former Benzene Storage Area: Benzene was detected in two (2) of four (4) wells downgradient of the former Benzene Storage Area at concentrations ranging from 20 µg/L (BSA-MW-3D) to 16,000 µg/L (BSA-MW-2D).
- Former Chlorobenzene Process Area: Benzene was detected in the former Chlorobenzene Process Area source area well (CPA-MW-1D) at a concentration of 3,400 µg/L.
- Downgradient of Former Chlorobenzene Process Area: Benzene was detected in one (1) of the four (4) wells downgradient of the former Chlorobenzene Process Area at a concentration of 6.8 / 6.6 µg/L (CPA-MW-3D and AD).
- North of the Site: Benzene was detected in one (1) of five (5) wells and piezometers north of the Site at a concentration of 3.4 µg/L (GWE-5D).

4.2 Chlorobenzenes (Total)

Total chlorobenzenes (i.e., sum of chlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene) were detected in fourteen (14) of the fifteen (15) wells at concentrations ranging from 37 µg/L (PM1D) to 35,500 µg/L (CPA-MW-1D). Total chlorobenzenes results are summarized below.

- Former Benzene Storage Area: Total chlorobenzenes were not detected in the former Benzene Storage Area source area well (BSA-MW-1S).
- Downgradient of Former Benzene Storage Area: Total chlorobenzenes were detected in four (4) of four (4) wells downgradient of the former Benzene Storage Area with concentrations ranging from 100 µg/L (BSA-MW-5D) to 1,859 µg/L (BSA-MW-4D) in the DHU north of the GMCS.
- Former Chlorobenzene Process Area: Total chlorobenzenes were detected in the former Chlorobenzene Process Area source area well (CPA-MW-1D) at a concentration of 35,500 µg/L.
- Downgradient of Former Chlorobenzene Process Area: Total chlorobenzenes were detected in four (4) of four (4) wells downgradient of the former Chlorobenzene Process Area with concentrations ranging from 142.2 µg/L (CPA-MW-4D) to 22,700 / 22,730 µg/L (CPA-MW-2D and AD).

- North of the Site: Total chlorobenzenes were detected in five (5) of five (5) wells and piezometers north of the Site with concentrations ranging from 37 µg/L (PM1D) to 1,850 µg/L (GWE-3D).

4.3 Monitored Natural Attenuation

MNA parameter data for this quarter are presented in Table 3. Laboratory results for PLFA and SIP analysis are included in Appendix F. The SIP study (Appendix F) states the following:

- "The detection of ^{13}C-enriched biomass confirmed that benzene biodegradation had occurred at BSA-MW-2D-1217 during the deployment period".
- Dissolved inorganic carbon (DIC) data for BSA-MW-2D-1217 indicate that "moderate benzene mineralization occurred during the deployment period."
- "The detection of ^{13}C-enriched biomass confirmed that chlorobenzene biodegradation had occurred at CPA-MW-3D-1217 during the deployment period."
- The DIC data for CPA-MW-3D-1217 indicate that "little to no chlorobenzene mineralization occurred during the deployment period."
- The PLFA analysis in the remaining BSA and CPA wells also show a community structure containing contaminant-reducing bacteria.

5.0 CLOSING

Golder appreciates the opportunity to assist Solutia Inc. with the Long-Term Monitoring Program sampling events. Please contact the undersigned if you need additional information.

Sincerely,

GOLDER ASSOCIATES INC.

Samantha J. DiCenso, E.I.T.
Staff Environmental Engineer

Mark N. Haddock, R.G., P.E.
Principal, Senior Consultant

6.0 REFERENCES

Solutia Inc., 2009. Revised Long Term Monitoring Program Work Plan, Solutia Inc., W.G. Krummrich Facility, Sauget, Illinois, May 2009.

USEPA, 2017. Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review.

USEPA, 2017. Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review.

USEPA, 2008. Final Decision, Solutia Inc., Sauget, Illinois, February 2008.

FIGURES

FORMER CHLOROBENZENE PROCESS AREA

STERLING STEEL

SITE H

SITE L

SITE M

DEAD CREEK

SITE I

CERRO FLOW PRODUCTS

SITE G

CONTAINMENT CELL

W.G. KRUMMRICH FACILITY

QUEENY AVE

ROUTE 3

AFTON CHEMICAL

MONSANTO AVENUE

MIDWEST RUBBER

BIG RIVER ZINC

ROUTE 3

CENTER ETHANOL COMPANY, LLC.

FORMER BENZENE STORAGE AREA

LOT F

SITE O

SITE P

AMEREN

PCHEM POTW

AMERICAN BOTTOMS POTW

CLAYTON CHEMICAL

SITE S

VEOLIA INCINERATION

IDOT DEWATERING WELL SYSTEM

WATCO

SITE R

SITE Q

BARRIER WALL

GROUNDWATER PUMPING WELLS

MISSISSIPPI RIVER

LEGEND

- W.G. KRUMMRICH FACILITY
- SAUGET AREA #1
- SAUGET AREA #2

0 500 1000
SCALE FEET

CLIENT
SOLUTIA INC.
W.G. KRUMMRICH PLANT
SAUGET, ILLINOIS

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-08
PREPARED	SJD
DESIGN	SJD
REVIEW	TJG
APPROVED	CMR

PROJECT
LONG-TERM MONITORING PROGRAM
4TH QUARTER 2017 DATA REPORT

TITLE
SITE LOCATION MAP

PROJECT No.	PHASE	Rev.	FIGURE
140-3345	0056	0	1

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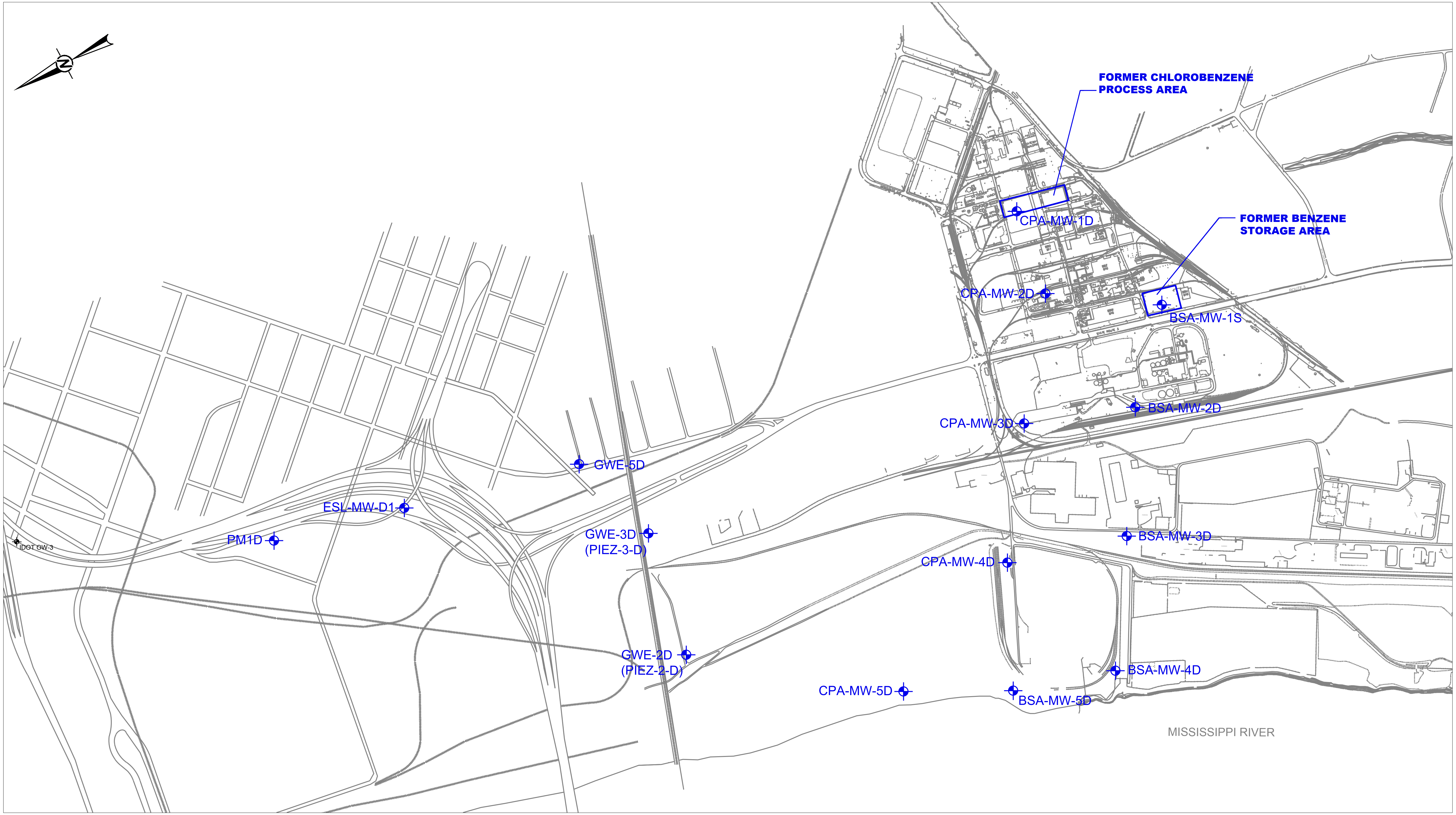


LEGEND

LONG-TERM MONITORING WELL LOCATION

NOTES

1. REFER TO TABLE 1 FOR MONITORING WELL CONSTRUCTION INFORMATION.
2. "D", "M", OR "S" IN THE WELL IDENTIFICATION DESIGNATES DEEP HYDROGEOLOGIC UNIT (DHU), MIDDLE HYDROGEOLOGIC UNIT (MHU), OR SHALLOW HYDROGEOLOGIC UNIT (SHU), RESPECTIVELY.

SCALE 0 500 1000 FEET

CLIENT
SOLUTIA INC.
W.G. KRUMMRICH PLANT
SAUGET, ILLINOIS

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-08
PREPARED	SJD
DESIGN	SJD
REVIEW	TJG
APPROVED	CMR

PROJECT
LONG-TERM MONITORING PROGRAM
4TH QUARTER 2017 DATA REPORT

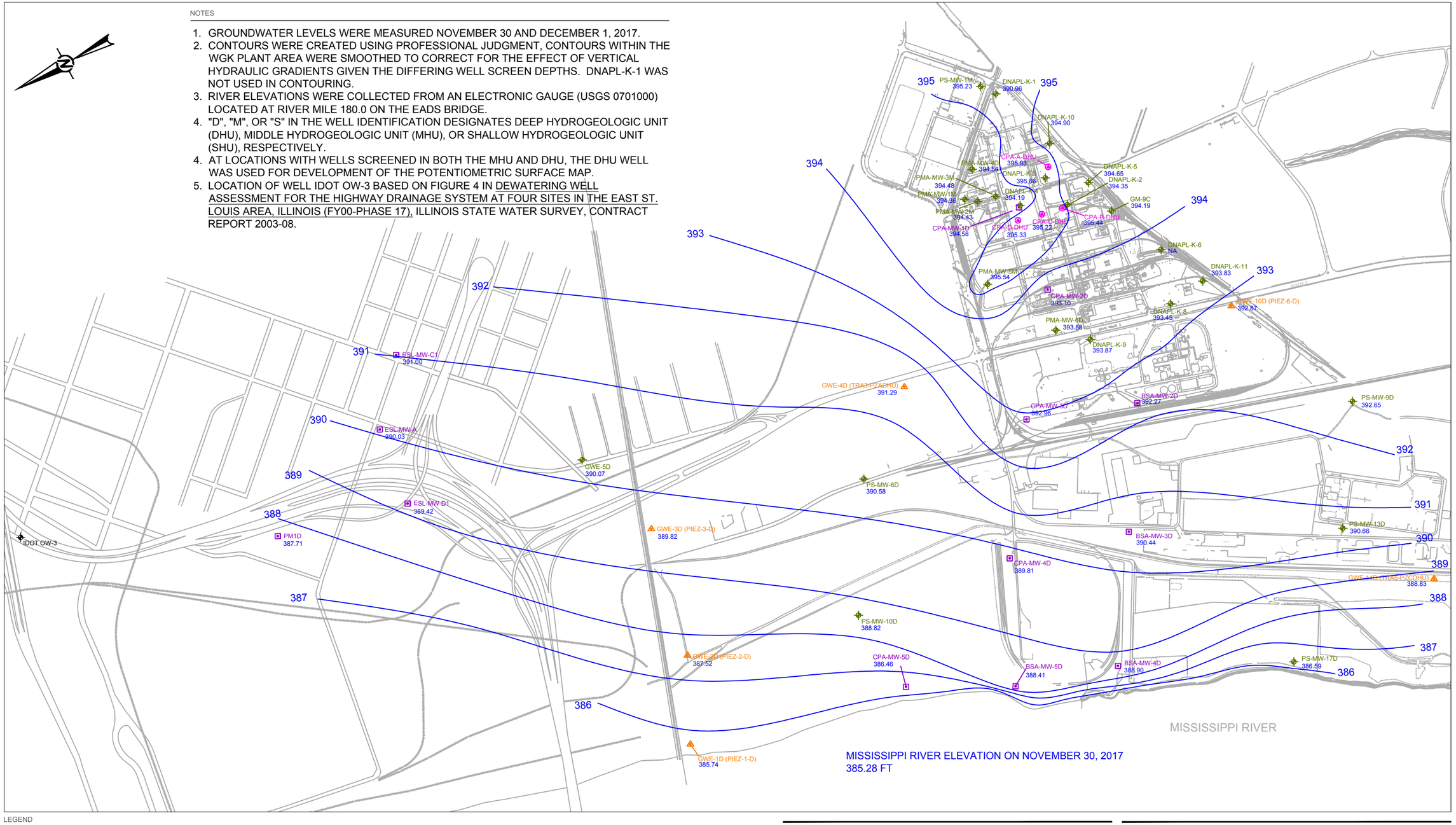
TITLE
LONG-TERM MONITORING PROGRAM WELL LOCATIONS

PROJECT No.	PHASE:	Rev.	FIGURE:
140-3345	0056	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

NOTES

1. GROUNDWATER LEVELS WERE MEASURED NOVEMBER 30 AND DECEMBER 1, 2017.
2. CONTOURS WERE CREATED USING PROFESSIONAL JUDGMENT, CONTOURS WITHIN THE WGK PLANT AREA WERE SMOOTHED TO CORRECT FOR THE EFFECT OF VERTICAL HYDRAULIC GRADIENTS GIVEN THE DIFFERING WELL SCREEN DEPTHS. DNAPL-K-1 WAS NOT USED IN CONTOURING.
3. RIVER ELEVATIONS WERE COLLECTED FROM AN ELECTRONIC GAUGE (USGS 0701000) LOCATED AT RIVER MILE 180.0 ON THE EADS BRIDGE.
4. "D", "M", OR "S" IN THE WELL IDENTIFICATION DESIGNATES DEEP HYDROGEOLOGIC UNIT (DHU), MIDDLE HYDROGEOLOGIC UNIT (MHU), OR SHALLOW HYDROGEOLOGIC UNIT (SHU), RESPECTIVELY.
4. AT LOCATIONS WITH WELLS SCREENED IN BOTH THE MHU AND DHU, THE DHU WELL WAS USED FOR DEVELOPMENT OF THE POTENTIOMETRIC SURFACE MAP.
5. LOCATION OF WELL IDOT OW-3 BASED ON FIGURE 4 IN DEWATERING WELL ASSESSMENT FOR THE HIGHWAY DRAINAGE SYSTEM AT FOUR SITES IN THE EAST ST. LOUIS AREA, ILLINOIS (FY00-PHASE 17), ILLINOIS STATE WATER SURVEY, CONTRACT REPORT 2003-08.



LEGEND

- LONG-TERM MONITORING WELL USED FOR GROUNDWATER CONTOURING
- OTHER MONITORING WELL USED FOR GROUNDWATER CONTOURING
- PIEZOMETER CLUSTER USED FOR GROUNDWATER CONTOURING
- CPA MONITORING WELL USED FOR GROUNDWATER CONTOURING
- IDOT GROUNDWATER WELL
- 390 APPROXIMATE GROUNDWATER ELEVATION CONTOUR (FT NAVD)

SCALE 0 500 1000 FEET

CLIENT
SOLUTIA INC.
W.G. KRUMMRICH PLANT
SAUGET, ILLINOIS

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-01-15
PREPARED	SJD
DESIGN	SJD
REVIEW	TJG
APPROVED	CMR

PROJECT
LONG-TERM MONITORING PROGRAM
4TH QUARTER 2017 DATA REPORT

TITLE
POTENTIOMETRIC SURFACE MAP
MIDDLE/DEEP HYDROGEOLOGIC UNIT

PROJECT No.	PHASE:	Rev.	FIGURE:
140-3345	0056	0	3

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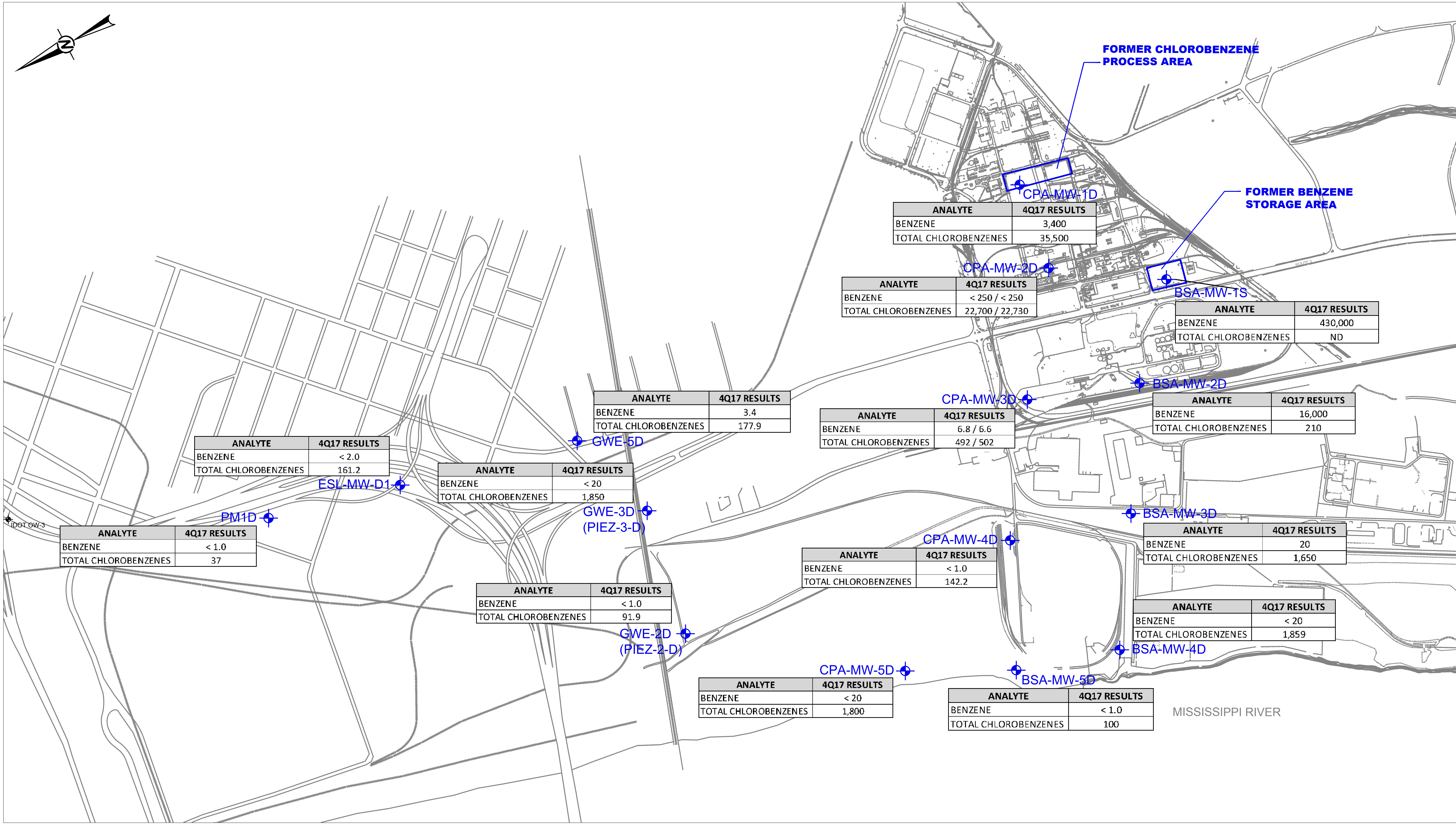

CPA-MW-1D

ANALYTE	4Q17 RESULTS
BENZENE	3,400
TOTAL CHLOROBENZENES	35,500

CPA-MW-2D

ANALYTE	4Q17 RESULTS
BENZENE	< 250 / < 250
TOTAL CHLOROBENZENES	22,700 / 22,730

BSA-MW-1S

ANALYTE	4Q17 RESULTS
BENZENE	430,000
TOTAL CHLOROBENZENES	ND

BSA-MW-2D

ANALYTE	4Q17 RESULTS
BENZENE	16,000
TOTAL CHLOROBENZENES	210

CPA-MW-3D

ANALYTE	4Q17 RESULTS
BENZENE	6.8 / 6.6
TOTAL CHLOROBENZENES	492 / 502

GWE-5D

ANALYTE	4Q17 RESULTS
BENZENE	3.4
TOTAL CHLOROBENZENES	177.9

ESL-MW-D1

ANALYTE	4Q17 RESULTS
BENZENE	< 2.0
TOTAL CHLOROBENZENES	161.2

GWE-3D (PIEZ-3-D)

ANALYTE	4Q17 RESULTS
BENZENE	< 20
TOTAL CHLOROBENZENES	1,850

PM1D

ANALYTE	4Q17 RESULTS
BENZENE	< 1.0
TOTAL CHLOROBENZENES	37

CPA-MW-4D

ANALYTE	4Q17 RESULTS
BENZENE	< 1.0
TOTAL CHLOROBENZENES	142.2

BSA-MW-3D

ANALYTE	4Q17 RESULTS
BENZENE	20
TOTAL CHLOROBENZENES	1,650

BSA-MW-4D

ANALYTE	4Q17 RESULTS
BENZENE	< 20
TOTAL CHLOROBENZENES	1,859

GWE-2D (PIEZ-2-D)

ANALYTE	4Q17 RESULTS
BENZENE	< 1.0
TOTAL CHLOROBENZENES	91.9

CPA-MW-5D

ANALYTE	4Q17 RESULTS
BENZENE	< 20
TOTAL CHLOROBENZENES	1,800

BSA-MW-5D

ANALYTE	4Q17 RESULTS
BENZENE	< 1.0
TOTAL CHLOROBENZENES	100

LEGEND

LONG-TERM MONITORING WELL LOCATION

0 500 1000
SCALE FEET

NOTES

1. TOTAL CHLOROBENZENES RESULTS INCLUDE THE SUM OF CHLOROBENZENE, 1,2-DICHLOROBENZENE, 1,3-DICHLOROBENZENE, AND 1,4-DICHLOROBENZENE.
2. RESULTS SHOWN ARE IN μg/L.
3. ND - NOT DETECTED, NS - NOT SAMPLED
4. MULTIPLE SAMPLE RESULTS INDICATE DUPLICATE SAMPLES.
5. "D", "M", OR "S" IN THE WELL IDENTIFICATION DESIGNATES DEEP HYDROGEOLOGIC UNIT (DHU), MIDDLE HYDROGEOLOGIC UNIT (MHU), OR SHALLOW HYDROGEOLOGIC UNIT (SHU), RESPECTIVELY.

CLIENT
SOLUTIA INC.
W.G. KRUMMRICH PLANT
SAUGET, ILLINOIS

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-08
PREPARED	SJD
DESIGN	SJD
REVIEW	TJG
APPROVED	CMR

PROJECT
LONG-TERM MONITORING PROGRAM
4TH QUARTER 2017 DATA REPORT

TITLE
BENZENE AND TOTAL CHLOROBENZENES RESULTS

PROJECT No.	PHASE:	Rev.	FIGURE:
140-3345	0056	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

Path: \\stlouis\common\Projects\140 Projects\1403345 - Solutia GW Sampling WGK Plant - IL\Figures\4Q17 Figures\ | File Name: 1403345_LTMP 2.dwg

TABLES

Table 1
Monitoring Well Gauging Information
4Q17 Long-Term Monitoring Program
Solutia Inc., W.G. Krummrich Plant
Sauget, Illinois

Well Identification	Monitoring Well Construction Data						4Q17 - November 30 and December 1, 2017			
	Ground Surface Elevation[1] (ft)	Top of Casing Elevation[1] (ft)	Top of Screen Depth (ft bgs)	Bottom of Screen Depth (ft bgs)	Top of Screen Elevation[1] (ft)	Bottom of Screen Elevation[1] (ft)	Water Level (ft btoc)	Depth to NAPL (ft btoc)	Total Depth[2] (ft btoc)	Water Level Elevation[1] (ft)
SHU 395-380 ft NAVD 88										
BSA-MW-1S	409.49	412.31	19.68	24.68	389.81	384.81	18.73	NP	27.34	393.58
GWE-5S	408.47	408.05	17.91	27.91	390.56	380.56	17.75	NP	27.86	390.30
MHU 380-350 ft NAVD 88										
GWE-5M	408.59	408.20	48.10	58.10	360.49	350.49	17.94	NP	58.18	390.26
PMA-MW-1M	410.32	410.08	54.54	59.54	355.78	350.78	15.72	NP	59.63	394.36
PMA-MW-2M	412.26	411.93	56.87	61.87	355.39	350.39	17.50	NP	61.32	394.43
PMA-MW-3M	412.36	412.10	57.07	62.07	355.29	350.29	17.62	NP	61.54	394.48
PMA-MW-5M	411.27	410.97	52.17	57.17	359.10	354.10	15.43	NP	57.02	395.54
PS-MW-1M	409.37	412.59	37.78	42.78	371.59	366.59	17.36	NP	46.01	395.23
PM1M	413.07	412.80	51.64	61.41	361.43	351.66	24.11	NP	30.46	388.69
DHU 350 ft NAVD 88 - Bedrock										
BSA-MW-2D	412.00	415.13	68.92	73.92	343.08	338.08	22.86	NP	76.98	392.27
BSA-MW-3D	412.91	415.74	107.02	112.02	305.89	300.89	25.30	NP	114.74	390.44
BSA-MW-4D	425.00	424.69	118.54	123.54	306.46	301.46	35.79	NP	123.12	388.90
BSA-MW-5D	420.80	420.49	115.85	120.82	304.95	299.95	32.08	NP	120.87	388.41
CPA-A-DHU	413.95	416.24	108.00	113.30	305.95	300.65	20.31	NP	115.24	395.93
CPA-B-DHU	409.12	408.68	101.00	106.50	308.12	302.62	13.24	NP	105.53	395.44
CPA-C-DHU	408.92	408.57	101.00	106.00	307.92	302.92	13.35	NP	105.46	395.22
CPA-D-DHU	409.63	412.20	101.00	105.90	308.63	303.73	16.87	NP	108.25	395.33
CPA-MW-1D	408.62	412.23	66.12	71.12	342.50	337.50	17.65	NP	74.68	394.58
CPA-MW-2D	408.51	408.20	99.96	104.96	308.55	303.55	15.10	NP	104.61	393.10
CPA-MW-3D	410.87	410.67	108.20	113.20	302.67	297.67	17.71	NP	112.72	392.96
CPA-MW-4D	421.57	421.20	116.44	121.44	305.13	300.13	31.39	NP	120.93	389.81
CPA-MW-5D	411.03	413.15	107.63	112.63	303.40	298.40	26.69	NP	114.71	386.46
DNAPL-K-1	413.07	415.56	108.20	123.20	304.87	289.87	24.60	NP	123.03	390.96
DNAPL-K-2	407.94	407.72	97.63	112.63	310.31	295.31	13.37	NP	112.36	394.35
DNAPL-K-3	412.13	415.91	104.80	119.80	307.33	292.33	20.25	NP	123.23	395.66
DNAPL-K-4	409.48	412.53	102.55	117.55	306.93	291.93	18.34	NP	118.27	394.19
DNAPL-K-5	412.27	411.91	102.15	117.15	310.12	295.12	17.26	NP	116.45	394.65
DNAPL-K-6	410.43	410.09	102.47	117.47	307.96	292.96	--	NP	116.84	--
DNAPL-K-8	408.56	411.38	102.65	117.65	305.91	290.91	17.93	NP	117.53	393.45
DNAPL-K-9	406.45	405.97	97.42	112.42	309.03	294.03	12.10	NP	111.12	393.87
DNAPL-K-10	413.50	413.25	105.43	120.43	308.07	293.07	18.35	NP	120.11	394.90
DNAPL-K-11	412.20	411.78	105.46	120.46	306.74	291.74	17.95	NP	120.25	393.83
GM-9C	409.54	411.21	88.00	108.00	321.54	301.54	17.02	NP	108.16	394.19
GWE-1D	412.80	415.60	117.00	127.00	295.80	285.80	29.86	NP	126.95	385.74
GWE-2D	417.45	417.14	127.00	137.00	290.45	280.45	29.62	NP	136.62	387.52
GWE-3D	415.03	417.66	104.60	114.60	313.06	303.06	27.84	NP	114.86	389.82
GWE-4D	406.05	405.74	74.00	80.00	332.05	326.05	14.45	NP	78.74	391.29
GWE-5D	408.79	408.38	100.43	105.43	308.36	303.36	18.31	NP	105.12	390.07
GWE-10D	410.15	412.87	102.50	112.50	307.65	297.65	20.00	NP	114.76	392.87
GWE-14D	420.47	422.90	90.00	96.00	330.47	324.47	34.07	NP	96.98	388.83
ESL-MW-A	412.93	412.59	105.50	110.50	307.43	302.43	22.56	NP	109.87	390.03
ESL-MW-C1	410.09	409.79	104.00	109.00	306.09	301.09	18.79	NP	108.63	391.00
ESL-MW-D1	416.38	416.04	114.00	119.00	302.38	297.38	26.62	NP	119.24	389.42
PMA-MW-4D	411.22	410.88	68.84	73.84	342.38	337.38	16.34	NP	73.28	394.54
PMA-MW-6D	407.63	407.32	96.49	101.49	311.14	306.14	13.44	NP	101.19	393.88
PS-MW-6D	404.11	406.63	102.32	107.32	304.31	299.31	16.05	NP	109.77	390.58
PS-MW-9D	403.92	403.52	100.40	105.40	303.52	298.52	10.87	NP	105.21	392.65
PS-MW-10D	409.63	412.18	103.78	108.78	308.40	303.40	23.36	NP	111.36	388.82
PS-MW-13D	405.80	405.53	106.08	111.08	299.72	294.72	14.87	NP	110.60	390.66
PS-MW-17D	420.22	423.26	121.25	126.25	298.97	293.97	36.67	NP	133.88	386.59
SA2-MW-1D	403.79	406.03	105.01	115.01	301.02	291.02	24.01	NP	102.27	382.02
PM1D	413.41	412.78	101.42	106.45	311.99	306.96	25.07	NP	106.61	387.71

Notes
ft - feet
bgs - below ground surface
btoc - below top of casing
NP - no product observed
SHU - shallow hydrogeologic unit
MHU - middle hydrogeologic unit
DHU - deep hydrogeologic unit
[1] - Elevation based on North American Vertical Datum (NAVD) 88 datum
[2] - Total depths are measured annually during the first quarter of each year

Prepared By: SJD 12/21/2017
Checked By: TJG 12/22/2017
Reviewed By: CMR 02/16/2018

Table 2
Groundwater Analytical Results
4Q17 Long-Term Monitoring Program
Solutia Inc., W.G. Krummrich Plant
Sauget, Illinois

Sample Identification	Sample Date	VOCs (µg/L)				
		Benzene	Chlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene
Benzene Storage Area						
BSA-MW-1S-1217	12/7/2017	**430,000 D**	<5,000	<5,000	<5,000	<5,000
BSA-MW-2D-1217	12/6/2017	**16,000 D**	**210 D**	<100	<100	<100
BSA-MW-3D-1217	12/6/2017	**20 D**	**1,400 D**	<20	<20	**250 D**
BSA-MW-4D-1217	12/6/2017	<20	**1,800 D**	<20	<20	**59 D**
BSA-MW-5D-1217	12/5/2017	<1.0	**100**	<1.0	<1.0	<1.0
Chlorobenzene Process Area						
CPA-MW-1D-1217	12/6/2017	**3,400 D**	**17,000 D**	**9,600 D**	**1,100 D**	**7,800 D**
CPA-MW-2D-1217	12/7/2017	<250	**22,000 D**	<250	<250	**700 D**
CPA-MW-2D-1217-AD	12/7/2017	<250	**22,000 D**	<250	<250	**730 D**
CPA-MW-3D-1217	12/6/2017	**6.8 D**	**480 D**	<5.0	<5.0	**12 D**
CPA-MW-3D-1217-AD	12/6/2017	**6.6 D**	**490 D**	<5.0	<5.0	**12 D**
CPA-MW-4D-1217	12/5/2017	<1.0	**140**	<1.0	<1.0	**2.2**
CPA-MW-5D-1217	12/5/2017	<20	**1,800 D**	<20	<20	<20
North of W.G. Krummrich Facility						
ESL-MW-D1-1217	12/4/2017	<2.0	**140 D**	**2.2 D**	<2.0	**19 D**
GWE-2D-1217	12/5/2017	<1.0	**89**	**1.5**	<1.0	**1.4**
GWE-3D-1217	12/5/2017	<20	**1,700 D**	<20	<20	**150 D**
GWE-5D-1217	12/4/2017	**3.4**	**150**	**3.7**	**1.2**	**23**
PM1D-1217	12/4/2017	<1.0	**37**	<1.0	<1.0	<1.0

Notes
VOCs - volatile organic compounds
µg/L - micrograms per liter
< - result is non-detect, less than the reporting limit
D - compound analyzed at a dilution
AD - analytical duplicate
Bold - indicates concentration greater than reporting limit

Prepared By: SJD 02/08/2018
Checked By: TJG 02/12/2018
Reviewed By: CMR 02/16/2018

Table 3
Monitored Natural Attenuation Results
4Q17 Long-Term Monitoring Program
Solutia Inc., W.G. Krummrich Plant
Sauget, Illinois

Sample Identification	Sample Date	Monitored Natural Attenuation Parameters																
		Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Chloride (mg/L)	Dissolved Oxygen (mg/L)	Ethane (ug/L)	Ethylene (ug/L)	Ferrous Iron (mg/L)	Iron (mg/L)	Iron, Dissolved (mg/L)	Manganese (mg/L)	Manganese, Dissolved (mg/L)	Methane (ug/L)	Nitrogen, Nitrate (mg/L)	Sulfate as SO4 (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)	ORP (mV)
Benzene Storage Area																		
BSA-MW-1S-1217	12/7/2017	1,200 J	440 J	370 D	0.12	<1.1	<1.0	-	25	-	2.2	-	3,600 J	<0.050 J	66 D	12	-	-116.22
BSA-MW-1S-F(0.2)-1217	12/7/2017	-	-	-	-	-	-	0.44	-	26	-	2.3	-	-	-	-	12	-
BSA-MW-2D-1217	12/6/2017	740 J	110 J	200 D	0.12	5.2	<1.0	-	8.2	-	0.94	-	17,000	0.087	<5.0	9.4	-	-103.31
BSA-MW-2D-F(0.2)-1217	12/6/2017	-	-	-	-	-	-	0.0	-	8.1	-	0.94	-	-	-	-	9.6	-
BSA-MW-3D-1217	12/6/2017	610 J	78 J	440 D	0.13	<1.1	<1.0	-	14	-	0.69	-	630	<0.050 J	<5.0	4.0	-	-104.61
BSA-MW-3D-F(0.2)-1217	12/6/2017	-	-	-	-	-	-	0.0	-	14	-	0.71	-	-	-	-	4.2	-
BSA-MW-4D-1217	12/6/2017	550	19	140 D	0.14	<1.1	<1.0	-	7.8	-	0.54	-	120	<0.050 J	140 D	4.3	-	-100.90
BSA-MW-4D-F(0.2)-1217	12/6/2017	-	-	-	-	-	-	0.50	-	7.7	-	0.53	-	-	-	-	4.4	-
BSA-MW-5D-1217	12/5/2017	580 J	67 J	170 D	0.12	9.2	<1.0	-	12	-	0.26	-	5,900	<0.050 J	<5.0	7.8	-	-122.19
BSA-MW-5D-F(0.2)-1217	12/5/2017	-	-	-	-	-	-	1.08	-	12	-	0.26	-	-	-	-	9.5	-
Chlorobenzene Process Area																		
CPA-MW-1D-1217	12/6/2017	790 J	22 J	380 D	0.06	13	<1.0	-	0.30	-	0.20	-	12,000	<0.050	<5.0	7.4	-	-135.33
CPA-MW-1D-F(0.2)-1217	12/6/2017	-	-	-	-	-	-	0.0	-	0.18	-	0.20	-	-	-	-	7.9	-
CPA-MW-2D-1217	12/7/2017	480 J	67 J	49	0.20	<1.1	<1.0	-	7.7	-	0.45	-	990 J	<0.050	47 D	5.9	-	-97.08
CPA-MW-2D-F(0.2)-1217	12/7/2017	-	-	-	-	-	-	1.40	-	7.6	-	0.45	-	-	-	-	5.8	-
CPA-MW-3D-1217	12/6/2017	520 J	48 J	76 D	0.11	6.4	<1.0	-	8.8	-	0.53	-	2,500	<0.050	36 D	6.1	-	-117.01
CPA-MW-3D-F(0.2)-1217	12/6/2017	-	-	-	-	-	-	0.0	-	9.2	-	0.53	-	-	-	-	6.4	-
CPA-MW-4D-1217	12/5/2017	610 J	78 J	210 D	0.13	7.8	<1.0	-	15	-	0.41	-	11,000	<0.050 J	<5.0	7.4	-	-129.31
CPA-MW-4D-F(0.2)-1217	12/5/2017	-	-	-	-	-	-	0.0	-	15	-	0.41	-	-	-	-	7.5	-
CPA-MW-5D-1217	12/5/2017	600 J	110 J	200 D	0.11	<1.1	<1.0	-	17	-	0.66	-	87	<0.050 J	40 D	5.2	-	-89.75
CPA-MW-5D-F(0.2)-1217	12/5/2017	-	-	-	-	-	-	0.0	-	16	-	0.66	-	-	-	-	5.4	-
North of W.G. Krummrich Facility																		
ESL-MW-D1-1217	12/4/2017	270	350	93 D	0.15	<1.1	<1.0	-	12	-	0.38	-	52	<0.050 J	490 D	2.9	-	-110.68
ESL-MW-D1-F(0.2)-1217	12/4/2017	-	-	-	-	-	-	0.43	-	12	-	0.38	-	-	-	-	3.9	-
GWE-2D-1217	12/5/2017	370 J	57 J	640 D	0.24	<1.1	<1.0	-	18	-	0.42	-	12	<0.050 J	730 D	3.7	-	-86.28
GWE-2D-F(0.2)-1217	12/5/2017	-	-	-	-	-	-	0.0	-	18	-	0.44	-	-	-	-	4.2	-
GWE-3D-1217	12/5/2017	450 J	89 J	1,500 D	0.23	<1.1	<1.0	-	28	-	0.86	-	79	<0.050 J	380 D	6.7	-	-107.88
GWE-3D-F(0.2)-1217	12/5/2017	-	-	-	-	-	-	0.0	-	27	-	0.82	-	-	-	-	6.9	-
GWE-5D-1217	12/4/2017	360 J	52 J	81 D	0.14	<1.1	<1.0	-	14	-	0.44	-	72	<0.050 J	460 D	3.2	-	-103.95
GWE-5D-F(0.2)-1217	12/4/2017	-	-	-	-	-	-	0.25	-	14	-	0.43	-	-	-	-	3.3	-
PM1D-1217	12/4/2017	210	3,400	77 D	0.12	<1.1	<1.0	-	14	-	0.51	-	68	<0.050 J	280 D	2.5	-	-142.79
PM1D-F(0.2)-1217	12/4/2017	-	-	-	-	-	-	0.67	-	15	-	0.53	-	-	-	-	2.7	-

Notes

Dissolved Oxygen (DO) and Oxidation Reduction Potential (ORP) values represent the final field measurements prior to sampling (In-Situ - SmartTroll™)
Ferrous Iron was field measured using a 0.2 µm field filtered sample (Hach DR-890 Colorimeter)
F(0.2) - sample was field filtered using a 0.2 µm filter during sample collection
µg/L - micrograms per liter
mg/L - milligrams per liter
mV - millivolts
< - result is non-detect, less than the reporting limit
"-" - not analyzed
D - compound analyzed at a dilution
J - result is an estimated value

Prepared By: SJD 02/08/2018
Checked By: TJG 02/12/2018
Reviewed By: CMR 02/16/2018

APPENDIX A
GROUNDWATER PURGING AND SAMPLING FORMS

(On CD)

In-Situ Inc.

12/7/2017

Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	31.00 ft
		Pump Placement from TOC	25.00 ft

Well Information:		**Pumping Information:**	
Well Id	BSA-MW-1S	Final Pumping Rate	200 mL/min
Well Diameter	2 in	System Volume	363 mL
Well Total Depth	27.34 ft	Calculated Sample Rate	108 sec
Depth to Top of Screen	22.50 ft	Sample Rate	108 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	18.95 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	9:59:15	15.64	7.07	3128.17	6.18	0.18	-94.88
	10:00:26	15.92	7.07	3115.88	5.61	0.16	-102.78
	10:01:37	16.00	7.06	3130.04	5.88	0.15	-108.37
	10:02:48	16.18	7.05	3135.84	5.32	0.13	-112.66
	10:03:59	16.19	7.06	3109.06	4.63	0.12	-116.22
Variance in Last 3 Readings		0.08	-0.01	14.16	0.27	-0.01	7.64
		0.18	-0.01	5.80	-0.56	-0.02	-4.29
		0.01	0.01	-26.78	-0.69	-0.01	-3.56

Notes:

In-Situ Inc.

12/6/2017

Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	80.55 ft
		Pump Placement from TOC	74.55 ft

Well Information:		**Pumping Information:**	
Well Id	BSA-MW-2D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	639 mL
Well Total Depth	76.98 ft	Calculated Sample Rate	127 sec
Depth to Top of Screen	72.05 ft	Sample Rate	127 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	23.14 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	10:34:17	16.02	6.97	1974.59	2.43	0.20	-87.37
	10:36:24	16.32	6.96	1983.54	1.02	0.16	-96.25
	10:38:31	16.58	6.96	1966.05	0.86	0.13	-100.27
	10:40:38	16.59	6.96	1957.71	1.06	0.12	-102.19
	10:42:46	16.48	6.96	1966.72	0.71	0.12	-103.31
Variance in Last 3 Readings		0.26	0.00	-17.49	-0.16	-0.03	-4.02
		0.01	0.00	-8.34	0.2	-0.01	-1.92
		-0.11	0.00	9.01	-0.35	0.00	-1.12

Notes:

In-Situ Inc.

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	118.35 ft
		Pump Placement from TOC	112.35 ft

Well Information:		**Pumping Information:**	
Well Id	BSA-MW-3D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	850 mL
Well Total Depth	114.75 ft	Calculated Sample Rate	169 sec
Depth to Top of Screen	109.85 ft	Sample Rate	169 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	24.61 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	9:32:36	15.15	6.97	2416.61	34.0	0.43	-81.79
	9:35:25	15.64	6.97	2433.45	17.9	0.27	-94.57
	9:38:14	15.96	6.96	2408.49	11.8	0.20	-99.10
	9:41:03	16.09	6.96	2403.69	6.74	0.16	-102.21
	9:43:52	16.19	6.96	2404.90	4.76	0.13	-104.61
Variance in Last 3 Readings		0.32	-0.01	-24.96	-6.10	-0.07	-4.53
		0.13	0.00	-4.80	-5.06	-0.04	-3.11
		0.10	0.00	1.21	-1.98	-0.03	-2.40

Notes:

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	126.73 ft
		Pump Placement from TOC	120.73 ft

Well Information:		**Pumping Information:**	
Well Id	BSA-MW-4D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	897 mL
Well Total Depth	123.13 ft	Calculated Sample Rate	179 sec
Depth to Top of Screen	118.23 ft	Sample Rate	179 sec
Screen Length	5 ft	Stabilized Drawdown	0.01 ft
Depth to Water	36.69 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	8:33:01	15.72	6.91	1571.78	1.96	0.24	-91.21
	8:36:00	15.96	6.93	1562.35	1.57	0.21	-96.69
	8:38:59	16.05	6.94	1561.18	1.19	0.18	-99.47
	8:41:58	16.14	6.94	1547.69	1.08	0.16	-100.07
	8:44:59	16.09	6.95	1560.88	1.08	0.14	-100.90
Variance in Last 3 Readings		0.09	0.01	-1.17	-0.38	-0.03	-2.78
		0.09	0.00	-13.49	-0.11	-0.02	-0.60
		-0.05	0.01	13.19	0.00	-0.02	-0.83

Notes:

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	124.04 ft
		Pump Placement from TOC	118.04 ft

Well Information:		**Pumping Information:**	
Well Id	BSA-MW-5D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	882 mL
Well Total Depth	120.87 ft	Calculated Sample Rate	176 sec
Depth to Top of Screen	115.54 ft	Sample Rate	176 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	31.81 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	13:37:16	16.76	6.94	1615.39	4.07	0.19	-116.57
	13:40:07	16.84	6.95	1655.64	2.42	0.16	-119.02
	13:42:58	16.86	6.94	1695.11	1.29	0.15	-119.63
	13:45:52	16.92	6.95	1722.29	2.21	0.13	-121.17
	13:48:45	16.93	6.96	1727.38	1.07	0.12	-122.19
Variance in Last 3 Readings		0.02	-0.01	39.47	-1.13	-0.01	-0.61
		0.06	0.01	27.18	0.92	-0.02	-1.54
		0.01	0.01	5.09	-1.14	-0.01	-1.02

Notes:

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	73.32 ft
		Pump Placement from TOC	68.32 ft

Well Information:		**Pumping Information:**	
Well Id	CPA-MW-1D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	599 mL
Well Total Depth	74.68 ft	Calculated Sample Rate	119 sec
Depth to Top of Screen	65.82 ft	Sample Rate	119 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	17.76 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	13:50:48	19.60	8.06	2527.03	1.71	0.08	-116.69
	13:52:47	19.51	8.06	2514.78	1.68	0.07	-123.71
	13:54:46	19.35	8.06	2524.86	1.47	0.07	-127.73
	13:56:45	19.66	8.10	2494.98	1.35	0.06	-133.84
	13:58:44	19.73	8.11	2482.78	1.46	0.06	-135.33
Variance in Last 3 Readings		-0.16	0.00	10.08	-0.21	0.00	-4.02
		0.31	0.04	-29.88	-0.12	-0.01	-6.11
		0.07	0.01	-12.20	0.11	0.00	-1.49

Notes:

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	108.15 ft
		Pump Placement from TOC	102.15 ft

Well Information:		**Pumping Information:**	
Well Id	CPA-MW-2D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	793 mL
Well Total Depth	104.61 ft	Calculated Sample Rate	158 sec
Depth to Top of Screen	99.65 ft	Sample Rate	158 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	15.44 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	8:52:11	16.94	6.99	1148.13	12.10	0.24	-88.41
	8:54:49	16.79	7.01	1170.71	8.73	0.21	-93.24
	8:57:27	16.71	6.98	1194.73	7.05	0.20	-93.68
	9:02:43	16.60	7.02	1208.39	4.84	0.19	-97.43
	9:05:21	16.13	7.02	1218.14	4.12	0.20	-97.08
Variance in Last 3 Readings		-0.08	-0.03	24.02	-1.68	-0.01	-0.44
		-0.11	0.04	13.66	-2.21	-0.01	-3.75
		-0.47	0.00	9.75	-0.72	0.01	0.35

Notes:

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	116.50 ft
		Pump Placement from TOC	110.50 ft

Well Information:		**Pumping Information:**	
Well Id	CPA-MW-3D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	840 mL
Well Total Depth	112.72 ft	Calculated Sample Rate	167 sec
Depth to Top of Screen	108.00 ft	Sample Rate	167 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	18.01 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	11:36:02	17.30	7.09	1340.93	2.58	0.21	-103.78
	11:38:49	17.41	7.09	1317.73	2.87	0.17	-110.25
	11:41:36	17.43	7.09	1309.40	0.76	0.14	-113.74
	11:44:23	17.43	7.09	1310.28	0.87	0.12	-115.80
	11:47:10	17.48	7.09	1301.23	0.55	0.11	-117.01
Variance in Last 3 Readings		0.02	0.00	-8.33	-2.11	-0.03	-3.49
		0.00	0.00	0.88	0.11	-0.02	-2.06
		0.05	0.00	-9.05	-0.32	-0.01	-1.21

Notes:

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	124.57 ft
		Pump Placement from TOC	118.57 ft

Well Information:		**Pumping Information:**	
Well Id	CPA-MW-4D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	885 mL
Well Total Depth	120.93 ft	Calculated Sample Rate	176 sec
Depth to Top of Screen	116.07 ft	Sample Rate	176 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	31.80 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	15:14:56	15.73	6.96	1924.67	2.80	0.24	-121.34
	15:17:52	15.96	6.94	1913.47	1.96	0.19	-125.59
	15:20:48	15.96	6.93	1912.24	1.95	0.16	-127.09
	15:23:47	16.00	6.92	1930.13	1.53	0.14	-128.26
	15:26:45	16.02	6.93	1918.24	1.22	0.13	-129.31
Variance in Last 3 Readings		0.00	-0.01	-1.23	-0.01	-0.03	-1.50
		0.04	-0.01	17.89	-0.42	-0.02	-1.17
		0.02	0.01	-11.89	-0.31	-0.01	-1.05

Notes:

In-Situ Inc.

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	118.50 ft
		Pump Placement from TOC	112.25 ft

Well Information:		**Pumping Information:**	
Well Id	CPA-MW-5D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	849 mL
Well Total Depth	114.71 ft	Calculated Sample Rate	169 sec
Depth to Top of Screen	109.75 ft	Sample Rate	169 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	28.42 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	12:10:20	15.08	6.76	1926.60	12.4	0.16	-83.55
	12:13:10	15.28	6.75	1930.70	9.07	0.13	-86.13
	12:16:01	15.60	6.76	1928.77	7.04	0.12	-88.42
	12:18:53	15.63	6.76	1930.21	5.85	0.11	-89.50
	12:21:43	15.56	6.74	1931.98	4.97	0.11	-89.75
Variance in Last 3 Readings		0.32	0.01	-1.93	-2.03	-0.01	-2.29
		0.03	0.00	1.44	-1.19	-0.01	-1.08
		-0.07	-0.02	1.77	-0.88	0.00	-0.25

Notes:

In-Situ Inc.

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	121.78 ft
		Pump Placement from TOC	116.16 ft

Well Information:		**Pumping Information:**	
Well Id	ESL-MW-D1	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	869 mL
Well Total Depth	119.24 ft	Calculated Sample Rate	173 sec
Depth to Top of Screen	113.66 ft	Sample Rate	173 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	26.46 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	13:55:25	17.46	6.87	1687.52	2.65	0.20	-69.06
	13:58:18	17.40	6.92	1712.80	1.18	0.18	-90.36
	14:01:11	17.41	6.95	1733.07	2.86	0.17	-101.36
	14:04:05	17.41	6.96	1749.72	1.74	0.16	-107.29
	14:06:58	17.36	6.97	1758.35	3.04	0.15	-110.68
Variance in Last 3 Readings		0.01	0.03	20.27	1.68	-0.01	-11.00
		0	0.01	16.65	-1.12	-0.01	-5.93
		-0.05	0.01	8.63	1.30	-0.01	-3.39

Notes:

In-Situ Inc.

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	Peristaltic
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.17 in
Site Name	LTM	Tubing Length	138.00 ft
		Pump Placement from TOC	131.69 ft

Well Information:		**Pumping Information:**	
Well Id	GWE-2D	Final Pumping Rate	150 mL/min
Well Diameter	1 in	System Volume	706 mL
Well Total Depth	136.62 ft	Calculated Sample Rate	282 sec
Depth to Top of Screen	126.69 ft	Sample Rate	282 sec
Screen Length	10 ft	Stabilized Drawdown	0.00 ft
Depth to Water	30.35 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	10:41:40	14.43	6.81	3857.22	0.78	0.36	-85.97
	10:46:22	14.49	6.80	3859.22	0.31	0.30	-85.45
	10:51:04	14.65	6.80	3844.48	0.99	0.28	-85.77
	10:55:47	14.66	6.80	3853.75	1.51	0.26	-86.14
	11:00:29	14.57	6.80	3867.95	1.63	0.24	-86.28
Variance in Last 3 Readings		0.16	0.00	-14.74	0.68	-0.02	-0.32
		0.01	0.00	9.27	0.52	-0.02	-0.37
		-0.09	0.00	14.20	0.12	-0.02	-0.14

Notes: Peristaltic pump performing slower than usual due to low water levels.

In-Situ Inc.

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	Peristaltic
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.17 in
Site Name	LTM	Tubing Length	116.00 ft
		Pump Placement from TOC	112.23 ft

Well Information:		**Pumping Information:**	
Well Id	GWE-3D	Final Pumping Rate	200 mL/min
Well Diameter	1 in	System Volume	608 mL
Well Total Depth	114.86 ft	Calculated Sample Rate	182 sec
Depth to Top of Screen	107.23 ft	Sample Rate	182 sec
Screen Length	10 ft	Stabilized Drawdown	0.00 ft
Depth to Water	28.27 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	9:16:09	13.56	6.75	6049.08	0.88	0.36	-102.43
	9:19:11	13.69	6.76	6031.62	0.61	0.28	-104.91
	9:22:14	13.68	6.77	6017.11	0.98	0.26	-106.19
	9:25:16	13.88	6.78	6007.59	0.71	0.24	-107.42
	9:28:20	13.90	6.78	5976.36	0.50	0.23	-107.88
Variance in Last 3 Readings		-0.01	0.01	-14.51	0.37	-0.02	-1.28
		0.20	0.01	-9.52	-0.27	-0.02	-1.23
		0.02	0.00	-31.23	-0.21	-0.01	-0.46

Notes: Peristaltic pump performing slower than usual due to low water levels.

In-Situ Inc.

12/4/2017

Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.17 in
Site Name	LTM	Tubing Length	108.52 ft
		Pump Placement from TOC	102.52 ft

Well Information:		**Pumping Information:**	
Well Id	GWE-5D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	674 mL
Well Total Depth	105.12 ft	Calculated Sample Rate	134 sec
Depth to Top of Screen	100.02 ft	Sample Rate	134 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	18.40 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	15:03:06	16.18	6.87	1712.74	22.6	0.22	-89.05
	15:05:20	16.09	6.87	1714.06	19.8	0.18	-92.50
	15:07:34	16.02	6.87	1716.40	14.1	0.16	-95.15
	15:09:48	16.08	6.89	1715.86	7.92	0.16	-99.09
	15:12:03	16.04	6.91	1720.21	4.97	0.14	-103.95
Variance in Last 3 Readings		-0.07	0.00	2.34	-5.70	-0.02	-2.65
		0.06	0.02	-0.54	-6.18	0.00	-3.94
		-0.04	0.02	4.35	-2.95	-0.02	-4.86

Notes:

In-Situ Inc.

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Low-Flow System
ISI Low-Flow Log

Project Information:		**Pump Information:**	
Operator Name	TJG	Pump Model/Type	SS Monsoon
Company Name	Golder Associates	Tubing Type	LDPE
Project Name	W.G. Krummrich	Tubing Diameter	0.19 in
Site Name	LTM	Tubing Length	112.00 ft
		Pump Placement from TOC	103.29 ft

Well Information:		**Pumping Information:**	
Well Id	PM1D	Final Pumping Rate	300 mL/min
Well Diameter	2 in	System Volume	814 mL
Well Total Depth	106.61 ft	Calculated Sample Rate	162 sec
Depth to Top of Screen	100.79 ft	Sample Rate	162 sec
Screen Length	5 ft	Stabilized Drawdown	0.00 ft
Depth to Water	24.11 ft		

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [µS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.2	+/-0.1 +/-3%	+/-1 +/-10%	+/-0.2 +/-10%	+/-20
Last 5 Readings	12:50:26	16.11	6.88	1479.53	3.44	0.18	-143.83
	12:53:08	16.21	6.91	1473.71	2.24	0.16	-143.26
	12:55:50	16.18	6.93	1476.16	2.04	0.14	-143.06
	12:58:32	16.18	6.94	1479.11	1.05	0.13	-142.83
	13:01:14	16.24	6.95	1476.42	0.85	0.12	-142.79
Variance in Last 3 Readings		-0.03	0.02	2.45	-0.20	-0.02	0.20
		0.00	0.01	2.95	-0.99	-0.01	0.23
		0.06	0.01	-2.69	-0.20	-0.01	0.04

Notes:

APPENDIX B
CHAINS-OF-CUSTODY

(On CD)

TestAmerica Savannah
5102 LaRoche Avenue
Suite C-10
Savannah, GA 31404
Phone: 912.354.7858 Fax:

Chain of Custody Record

220338

681-Atlanta

681-Atlanta

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	
Company Name:	Golder Associates
Address:	820 S Main St #100
City/State/Zip:	St. Charles, MO 63301
Phone:	636-724-9191
Fax:	
Project Name:	4Q17 LTM GW Sampling - 1403345
Site:	Solutia WG Krummrich Facility
PO#	42262863

Project Manager: Amanda Derhake
Tel/Fax: 636-724-9191
Analysis Turnaround Time: ☑ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below: Standard
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact: Sam DiCusso
Lab Contact: Michele Kirby
Date: 12/4/17
Carrier: FedEx

COC No: 1 of 1 COCs
Sampler: SJD
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOCs by 8260	Total Fe/Mn by 6010C	Alk/CO2 by 310.1	Chloride 325.2/Sulfate 375.4	Diss Gases RSK 175	Nitrate 353.2	TOC 415.1	Diss. Fe/Mn 6010C	DOC 415.1	Sample Specific Notes
PMID-1217	12/4/17	1300	G	W	14	N	N	3	1	1	1	3	2	3			
PMID-F(0.2)-1217	|	⊥	|	|	4	Y	|								1	3	
ESL-MW-D1-1217	|	1405	|	|	14	N	|	3	1	1	1	3	2	3			
ESL-MW-D1-F(0.2)-1217	|	⊥	|	|	4	Y	|								1	3	
GWE-5D-1217	|	1515	|	|	14	N	|	3	1	1	1	3	2	3			
GWE-5D-F(0.2)-1217	⊥	⊥	|	|	4	Y	|								1	3	
Trip Blank #1	—	—	|	|	2	N	|	2									
4Q17																	

680-146390 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☑ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments: 2.5(cf-0.5)2.0

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ______ Corr'd: ______ | Therm ID No.: ______

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Tommy J Good [signature]	Golder	12/4/17 1700			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: Jessica Eleazer [signature]	TA	12/6/17 0920

SJD 2/13/18

TestAmerica Savannah

5102 LaRoche Avenue
Suite C-10
Savannah, GA 31404
Phone: 912.354.7858 Fax:

Chain of Custody Record 220339

681-Atlanta

Regulatory Program: ☐ DW ☐ NPDES ☑ RCRA ☐ Other:

681-Atlanta

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Client Contact	Project Manager: Amanda Derbake	Site Contact: Samantha Direnzo	Date: 12/5/17	COC No:
Company Name: Golder Associates	Tel/Fax: 636-724-9191	Lab Contact: Michele Kersey	Carrier: FedEx	1 of 2 COCs
Address: 820 S Main St #100	Analysis Turnaround Time			Sampler: RJF
City/State/Zip: St Charles, MO 63301	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 636-724-9191	TAT if different from Below Standard			Walk-in Client:
Fax:	☑ 2 weeks			Lab Sampling:
Project Name: 4Q17 LTM GW Sampling - MO33X5	☐ 1 week			
Site: Sauget WB Krummrich Facility	☐ 2 days			Job / SDG No.:
PO# 42262863	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOCs 8260	Total Fe/Mn 6010C	Mn/Ca 310.1	Chloride 325.2/SM4500	Diss Gas RSK 175	Nitrate 353.2	TOC 415.1	Diss Fe/Mn 6010C DOC 415.1	Sample Specific Notes:
GWE-3D-1217	12/5/17	0927	G	W	14	N		3	1	1	1	3	2	3		
GWE-3D-F(0.2)-1217		⊥			4	Y									1 3	
GWE-2D-1217		1100			14	N		3	1	1	1	3	2	3		
GWE-2D-F(0.2)-1217		⊥			4	Y									1 3	
CPA-MW-5D-1217		1220			14	N		3	1	1	1	3	2	3		
CPA-MW-~~F(0.2)-1217~~-5D-F(0.2)-1217		⊥			4	Y									1 3	
BSA-MW-5D-1217		1350			14	N		3	1	1	1	3	2	3		
BSA-MW-~~F(0.2)-1217~~-5D-F(0.2)-1217					4	Y									1 3	
BSA-MW-5D-1217-MS					3	N		3	~~1~~	~~1~~	~~1~~	3	2	3		
BSA-MW-5D-1217-MSD					3	N		3								
4Q17 Trip Blank #2		—			2	N		2								
BSA-MW-4D-1217	12/5/17	1525	G	W	14	N		3	1	1	1	3	2	3		

680-146392 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

2.5 (CF-0.5) 2.0

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd.: _____ Corr'd: _____	Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
	Golder	12/5/17 1700			12/6/17 0920

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STD 8/14/18

TestAmerica Savannah 680-146392 **Chain of Custody Record** 220337

681-Atlanta

5102 LaRoche Avenue
Suite C-10
Savannah, GA 31404
Phone: 912.354.7858 Fax:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

681-Atlanta

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact		Project Manager: Amanda Derhake		Site Contact: Samantha Dilorenzo	Date: 12/5/17	COC No:
Company Name: Golder Associates		Tel/Fax: 636-724-9191		Lab Contact: Michele Kersey	Carrier: FedEx	2 of 2 COCs
Address: 820 S Main St #100		Analysis Turnaround Time				Sampler: RJF
City/State/Zip: St Charles, Mo 63301		☑ CALENDAR DAYS ☐ WORKING DAYS				For Lab Use Only:
Phone: 636-724-9191		TAT if different from Below: Standard				Walk-in Client:
Fax: —		☑ 2 weeks				Lab Sampling:
Project Name: 4Q17 CTM GW Sampling-1403375		☐ 1 week				
Site: Sifton WE Kreamich Facility		☐ 2 days				Job / SDG No.:
PO # 42262863		☐ 1 day				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Diss Fe/Mn 6010C	DOC 415.1	Sample Specific Notes:
85A-MW-4D-F(0.2)-1217	12/5/17	1525	G	W	4	Y		1	3	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:
2.5 CCF-0.5 82.0

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ | Therm ID No.: ____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	Golder	12/5/17/1700			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Company: TASA	Date/Time: 12/6/17 0920

SJD 2/14/18

TestAmerica Savannah
5102 LaRoche Avenue

Savannah, GA 31404
phone 912.354.7858 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐DW ☐NPDES ☑RCRA ☐Other:

Client Contact	Project Manager: Amanda Derhake	Site Contact: Samantha DiCenso	Date:	COC No:
Golder Associates Inc.	Tel/Fax: 636-724-9191	Lab Contact: Michele Kersey	Carrier: FedEx	1 of 2 COCs
820 South Main Street	Analysis Turnaround Time			Sampler: JAP
St. Charles, MO 63301	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(636) 724-9191 Phone	TAT if different from Below Standard			Walk-in Client:
(636) 724-9323 FAX	☑ 2 weeks			Lab Sampling:
Project Name: 4Q17 LTM GW Sampling-1403345	☐ 1 week			Job / SDG No.:
Site: Solutia WG Krummrich Plant	☐ 2 days			
P O # 42262863	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOCs by 8260	Total Fe/Mn by 6010C	Alk/CO2 by 310.1	Chloride by 325.2/Sulfate by 375.4	Dissolved Gases by RSK 175	Nitrate by 353.2	TOC by 415.1	Dissolved Fe/Mn by 6010C	DOC by 415.1	Sample Specific Notes:
BSA-MW-4D-1217	12/6/17	0845	G	W	14	N		3	1	1	1	3	2	3			
BSA-MW-4D-F(0.2)-1217		1			4	Y									1	3	
BSA-MW-3D-1217		0945			14	N		3	1	1	1	3	2	3			
BSA-MW-3D-F(0.2)-1217		1			4	Y									1	3	
BSA-MW-3D-1217-EB		1010			3	N		3	Q								
BSA-MW-2D-1217		1040			14	N		3	1	1	1	3	2	3			
BSA-MW-2D-F(0.2)-1217		1			4	Y									1	3	
CPA-MW-3D-1217		1145			14	N		3	1	1	1	3	2	3			
CPA-MW-3D-F(0.2)-1217		1			4	Y									1	3	
CPA-MW-3D-1217-AD		1			3	N		3									
CPA-MW-1D-1217		1400			14	N		3	1	1	1	3	2	3			
CPA-MW-1D-F(0.2)-1217		1			4	N									1	3	
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								2	4	1	1	2	1,3	3	4	3	

680-146443 Chain of Custody

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐Return to Client ☑Disposal by Lab ☐Archive for _____ Months

Special Instructions/QC Requirements & Comments:
VOC headspace upon sampling: Yes/No

1.5 M.O (Cf - 0.5) 1.0 13.5

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd _____ Corr'd: _____		Therm ID No.: _____
Relinquished by: Tammy Ford	Company: Golder	Date/Time: 12/6/17 1530	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time: 12/7/17 0915

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

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SSD 2/13/18

12/28/2017

680-146443

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
phone 912.354.7858 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐DW ☐NPDES ☑RCRA ☐Other:

Client Contact	Project Manager: Amanda Derhake	Site Contact: Samantha DiCenso	Date:	COC No:
Golder Associates Inc.	Tel/Fax: 636-724-9191	Lab Contact: Michele Kersey	Carrier: FedEx	2 of 2 COCs
820 South Main Street	Analysis Turnaround Time			Sampler: JAP
St. Charles, MO 63301	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(636) 724-9191 Phone	TAT if different from Below Standard			Walk-in Client:
(636) 724-9323 FAX	☑ 2 weeks			Lab Sampling:
Project Name: 4Q17 LTM GW Sampling-1403345	☐ 1 week			
Site: Solutia WG Krummrich Plant	☐ 2 days			Job / SDG No.:
P O # 42262863	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	VOCs by 8260	Total Fe/Mn by 6010C	Alk/CO2 by 310.1	Chloride by 325.2/Sulfate by 375.4	Dissolved Gases by RSK 175	Nitrate by 353.2	TOC by 415.1	Dissolved Fe/Mn by 6010C	DOC by 415.1	Sample Specific Notes:
4Q17 Trip Blank #3	—	—	G	W	2	N		2									
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								2	4	1	1	2	1,3	3	4	3	

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:
VOC headspace upon sampling: Yes/No

1.5 14.0 CCF - 0.5 1.0 13.5

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C) Obs'd _____ Corr'd: _____ Therm ID No.: _____			
Relinquished by:	Company: Golder	Date/Time: 12/4/17 1530	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TASA	Date/Time: 12/7/17 0915

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

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5 SD 2/13/18

12/28/2017

TestAmerica Savannah
5102 LaRoche Avenue

Savannah, GA 31404
phone 912.354.7858 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐DW ☐NPDES ☑RCRA ☐Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Amanda Derhake	Site Contact: Samantha DiCenso	Date: 12/7/17	COC No: 1 of 1 COCs
Golder Associates Inc.	Tel/Fax: 636-724-9191	Lab Contact: Michele Kersey	Carrier: FedEx	Sampler: JAP
820 South Main Street	Analysis Turnaround Time			For Lab Use Only:
St. Charles, MO 63301	☑ CALENDAR DAYS ☐ WORKING DAYS			Walk-in Client:
(636) 724-9191 Phone	TAT if different from Below Standard			Lab Sampling:
(636) 724-9323 FAX	☑ 2 weeks			
Project Name: 4Q17 LTM GW Sampling-1403345	☐ 1 week			Job / SDG No.:
Site: Solutia WG Krummrich Plant	☐ 2 days			
P O # 42262863	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOCs by 8260	Total Fe/Mn by 6010C	Alk/CO2 by 310.1	Chloride by 325.2/Sulfate by 375.4	Dissolved Gases by RSK 175	Nitrate by 353.2	TOC by 415.1	Dissolved Fe/Mn by 6010C	DOC by 415.1	Sample Specific Notes:
CPA-MW-2D-1217	12/7/17	0905	G	W	14	N		3	1	1	1	3	2	3			
CPA-MW-2D-F(0.2)-1217	|	|	|	|	4	Y									1	3	
CPA-MW-2D-1217-AD	|	|	|	|	3	N		3									
BSA-MW-1S-1217	|	1005	|	|	14	N		3	1	1	1	3	2	3			
BSA-MW-1S-F(0.2)-1217	|	|	|	|	4	Y									1	3	
BSA-MW-1S-1217-EB	|	1030	|	|	3	N		3									
4Q17 Trip Blank #4	|	—	G	W	2	N		2									

680-146571 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______ | 2 | 4 | 1 | 1 | 2 | 1,3 | 3 | 4 | 3

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐Return to Client ☑Disposal by Lab ☐Archive for ______ Months

Special Instructions/QC Requirements & Comments:
VOC headspace upon sampling: Yes/No

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd ____ Corr'd ____		Therm ID No.:
Relinquished by: Tommy J. Goodall	Company: Golder	Date/Time: 12/7/17 1600	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: MT	Company: TASAV	Date/Time: 12/8/17 940

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

4.1°C (UC) 4.5 3.2°C (UC) 3.7 3.4 / (IR) 4.0

SJD 2/14/18

13

APPENDIX C
QUALITY ASSURANCE REPORT

(On CD)

QUALITY ASSURANCE REPORT

QUALITY ASSURANCE REPORT

4th QUARTER 2017
LONG-TERM MONITORING PROGRAM
SOLUTIA INC. W.G. KRUMMRICH FACILITY
SAUGET, ILLINOIS

Prepared For: Solutia Inc.
575 Maryville Centre Drive
St. Louis, MO 63141 USA

Submitted By: Golder Associates Inc.
820 S. Main Street, Suite 100
St. Charles, MO 63301 USA

February 2018 **140-3345**

A world of capabilities delivered locally

Golder Associates

Table of Contents

1.0 INTRODUCTION

Golder Associates Inc. (Golder) completed a review of analytical data for the groundwater samples collected December 4 through December 7, 2017 at the Solutia Inc. (Solutia) W.G. Krummrich (WGK) Plant (Site) in Sauget, Illinois. Golder collected a total of twenty one (21) samples from groundwater monitoring wells and piezometers as part of the 4th Quarter 2017 (4Q17) Long-Term Monitoring Program (LTMP). Fifteen (15) groundwater samples, four (4) trip blanks, two (2) equipment blanks (EB), two (2) analytical duplicates (AD), and one (1) matrix spike/matrix spike duplicate (MS/MSD) pair were prepared. Groundwater monitoring locations were located at the WGK facility or approximately 1.0 to 1.5 miles north of the Site. The samples were submitted to the TestAmerica Laboratories, Inc. (TestAmerica) facility located in Savannah, Georgia for analysis using United States Environmental Protection Agency (USEPA) methods, standard methods and USEPA SW-846 test methods. Samples submitted to TestAmerica were analyzed for volatile organic compounds (VOCs), total and dissolved metals, dissolved gases, and general chemistry parameters. The analytical results were placed into four (4) sample delivery groups (SDGs) and described in the table below:

Sample Delivery Group (SDG)	Sample Identification
KPS205	PM1D-1217
	ESL-MW-D1-1217
	GWE-5D-1217
	4Q17 LTM Trip Blank #1
KPS206	GWE-2D-1217
	GWE-3D-1217
	BSA-MW-5D-1217
	CPA-MW-4D-1217
	CPA-MW-5D-1217
	4Q17 LTM Trip Blank #2
KPS200	BSA-MW-4D-1217
	BSA-MW-3D-1217
	BSA-MW-3D-1217-EB
	BSA-MW-2D-1217
	CPA-MW-3D-1217
	CPA-MW-3D-1217-AD
	CPA-MW-1D-1217
	4Q17 LTM Trip Blank #3
KPS201	CPA-MW-2D-1217
	CPA-MW-2D-1217-AD
	BSA-MW-1S-1217
	BSA-MW-1S-1217-EB
	4Q17 LTM Trip Blank #4

The samples were collected and analyzed in general accordance with the Revised Long-Term Monitoring Program (LTMP) Work Plan (Work Plan) (Solutia 2009). Groundwater samples were analyzed for VOCs, total and dissolved metals, dissolved gases, and general chemistry parameters. The general chemistry parameters included chloride, nitrate, sulfate, total organic carbon (TOC), alkalinity, carbon dioxide, and dissolved organic carbon (DOC). Four (4) trip blanks, two (2) EBs, two (2) ADs, and one (1) MS/MSD pairs were submitted and analyzed for VOC analysis. The following analytical methods used are from USEPA document SW-846, Test Methods for Evaluating Solid Waste, Revision 6 contained in Final Update III August 2002 and listed below:

- VOCs were analyzed using USEPA SW-846 Method 8260B Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)
- Total and Dissolved Iron and Manganese were analyzed by USEPA SW-846 Method 6010C Inductively Coupled Plasma-Atomic Emission Spectrometry

The following standard methods were used to analyze monitored natural attenuation (MNA) parameters:

- Dissolved Gases analyzed by Method RSK-175
- Alkalinity USEPA Method 310.1 and Method SM 2320B
- Free Carbon Dioxide analyzed by Method SM 4500 CO2C
- Chloride analyzed by USEPA Method 325.2 by Automated Colorimetry
- Nitrogen, Nitrate analyzed by USEPA Method 353.2 by Automated Colorimetry
- Sulfate analyzed by USEPA Method 375.4 by Spectrophotometer
- Total and Dissolved Organic Carbon analyzed by USEPA Method 415.1

Golder completed validation of the analytical data following the general guidelines in Section 4.4 Data Review and Validation of the Work Plan. The most recent versions of the national data validation guidelines were used for data review. The following guidelines were generally used:

- USEPA Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review, EPA-540-R-2017-002, January 2017
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review, EPA 540-R-2017-001, January 2017

These documents are hereafter referred to as the "functional guidelines". If there was a conflict between the functional guidelines and the quality control criteria specified in the analytical method, the method-specific criteria were used. The SDGs were prepared as a Level IV data report package containing quality control information and raw data. Golder completed Level III review of 100% of the analytical data and Level IV review of 10% of the analytical data.

Data that has been qualified by the data validator has been added to the laboratory report. The qualifiers indicate data that did not meet acceptance criteria and corrective actions were not successful or not performed. Laboratory data qualifiers are defined below:

- U – The analyte was analyzed for but not was not detected
- J – The analyte was detected and the result is less than the reporting limit (RL) but greater than or equal to the method detection limit (MDL) and the concentration is an approximate value

Golder data qualifiers are defined below:

- D – The analyte was analyzed at a dilution
- J – The analyte was detected and the result is considered an estimated value
- UJ – Samples were analyzed outside of hold time; analyte was not detected

Sections 2 and 3 summarize the specific instances where quality control criteria in the functional guidelines were not met. As specified in the functional guidelines, if the non-adherence to quality control criteria is slight, professional judgment was used in qualification of the data. However, if the non-adherence is significant, qualification and rejection of the data may be necessary. A summary of qualified data is provided in Section 5.0.

2.0 VOLATILE ORGANIC COMPOUNDS

Samples were collected from fifteen (15) groundwater monitoring locations and analyzed for VOCs. Analytical duplicate samples were collected from two (2) sampling locations, CPA-MW-2D and CPA-MW-3D. Two (2) EBs and four (4) trip blanks were also prepared and shipped for laboratory analysis. The samples were submitted to TestAmerica, placed into four (4) data packages or SDGs (KPS205, KPS206, KPS200, and KPS201) and were prepared and analyzed using SW-846 Method 8260B. Samples were validated in general accordance with the functional guidelines. Results of the validation are summarized below.

2.1 Receipt Condition and Sample Holding Times

The SDG Case Narrative, chain-of-custody, login sample receipt checklist, and analysis dates were reviewed to verify analytical method holding times and proper preservation upon sampling. The samples were received in good condition and data qualification was not required.

2.2 Blanks

Laboratory and field blanks, including trip blanks, method blanks and equipment blanks are prepared and analyzed to determine if contamination occurred as a result of laboratory or field activities.

Four (4) laboratory prepared trip blanks were shipped and analyzed for VOCs during the 4Q17 event to evaluate whether cross contamination occurred during sample shipment. Results for contaminants of concern for the received trip blanks were non-detect.

Laboratory method blanks were performed for each laboratory system as outlined for each analytical method to evaluate whether cross contamination occurred during laboratory analysis activities. Results for the method blanks were non-detect.

Two (2) EBs were collected during the 4Q17 event to assess the effectiveness of the decontamination procedure. Detections were noted in the following EBs:

- BSA-MW-1S-1217-EB (SDG KPS201): benzene at 39 µg/L and chlorobenzene at 1.0 µg/L
- BSA-MW-3D-1217-EB (SDG KPS200): chlorobenzene at 2.5 µg/L

The samples associated with the EBs did not require qualification as the analytes in the associated samples were either not detected, or detected at concentrations significantly greater than the EB detections.

2.3 Surrogate Spike Recoveries

Samples to be analyzed for VOCs were spiked with surrogate compounds: 4-bromofluorobenzene, 1,2-dichloroethane-d4, dibromofluoromethane, and toluene-d8, prior to analysis, to evaluate overall laboratory performance. Surrogate recoveries were within control limits.

2.4 Laboratory Control Sample Recoveries

A laboratory control sample (LCS) is analyzed on each laboratory system to evaluate the analytical method accuracy and laboratory performance. LCS recoveries were within acceptance criteria; therefore, data qualification was not required.

2.5 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

MS/MSD samples are analyzed to determine long term precision and accuracy of the analytical method on various matrices. One (1) MS/MSD pair is sampled for every twenty (20) field samples. One (1) MS/MSD pair was collected during the 4Q17 event associated with sample BSA-MW-5D. MS/MSD accuracy and precision data met criteria; therefore, qualification was not required.

2.6 Analytical Duplicates

One (1) AD is collected for every ten (10) field samples to determine the overall precision of field and laboratory methods. Two (2) ADs were collected during the 4Q17 event associated with samples CPA-MW-2D and CPA-MW-3D. The relative percent difference (RPD) between the samples and the associated ADs did not exceed 25%; therefore, data qualification was not required.

2.7 Internal Standard Responses

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standard area counts did not vary by more than a factor of two (2) from the associated 12 hour calibration standard. Internal standard retention times did not vary more than +/-30 seconds from the retention time of the associated 12 hour calibration standard. Data qualification was not required.

2.8 Results Reported From Dilutions

Several VOC samples required dilutions due to high levels of target analytes. Reporting limits were adjusted to reflect the dilution. Result qualifications are shown in Section 4.0.

3.0 INORGANICS AND GENERAL CHEMISTRY

Samples were collected from fifteen (15) groundwater monitoring locations and analyzed for inorganics and general chemistry. The samples were submitted to TestAmerica, placed into four (4) data packages or SDGs (KPS205, KPS206, KPS200, and KPS201), and were prepared and analyzed using the following methods:

- Total and Dissolved Iron and Manganese analyzed by Method 6010C Inductively Coupled Plasma-Atomic Emission Spectrometry
- Dissolved Gases analyzed by Method RSK-175
- Alkalinity USEPA Method 310.1 and Method SM 2320B
- Free Carbon Dioxide analyzed by Method SM 4500 CO2C
- Chloride analyzed by USEPA Method 325.2 by Automated Colorimetry
- Nitrogen, Nitrate analyzed by USEPA Method 353.2 by Automated Colorimetry
- Sulfate analyzed by USEPA Method 375.4 by Spectrophotometer
- Total and Dissolved Organic Carbon analyzed by USEPA Method 415.1

Samples were validated in general accordance with the functional guidelines. Results of the validation are summarized below.

3.1 Receipt Condition and Sample Holding Times

The SDG Case Narrative, chain-of-custody, login sample receipt checklist, and analysis dates were reviewed to verify analytical method holding times and proper preservation upon sampling. A summary of affected SDGs is provided below.

Samples in KPS205, KPS206, KPS200, and KPS201 were received or analyzed outside of hold times. Significant headspace was present in samples CPA-MW-2D and BSA-MW-1S sample containers. Result qualifications are shown in Section 4.0.

3.2 Blanks

Laboratory method blanks are prepared and analyzed to determine if contamination occurred as a result of laboratory activities.

Laboratory method blanks were performed for each laboratory system as outlined for each analytical method to evaluate whether cross contamination occurred during laboratory analysis activities. Results for the method blanks were non-detect.

3.3 Laboratory Control Sample Recoveries

A LCS is analyzed on each laboratory system to evaluate the analytical method accuracy and laboratory performance. LCS recoveries were within acceptance criteria; therefore, data qualification was not required.

3.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

MS/MSD samples are analyzed to determine long term precision and accuracy of the analytical method on various matrices. Although MS/MSD analysis was not required for inorganic and general chemistry per the Work Plan, the laboratory spiked groundwater samples PM1D, GWE-2D, BSA-MW-1S, BSA-MW-4D, and BSA-MW-5D, for various analytes. Some MS/MSD data for these samples was outside acceptance criteria. Result qualifications are shown in Section 4.0.

3.5 Results Reported From Dilutions

Samples in each SDG required dilutions due to high levels of target analytes. Reporting limits were adjusted to reflect the dilution. Result qualifications are shown in Section 4.0.

4.0 SUMMARY

Golder validated the data collected during the 4Q17 sampling event from the Solutia Inc. WGK facility in general accordance with the Work Plan and USEPA functional guidelines. Although some data required qualifications due to quality control criteria that were not achieved, the data were deemed usable. Where a positive result was qualified as estimated, the analyte should be considered present. Similarly, a result that was qualified as an estimated reporting limit should be considered not present for the purposes of this program, although the limit itself may not be precise. The completeness for the entire data set was 100%.

Qualification Summary Table

Quality Control Issue	Compound(s)	Qualifier	Samples Affected
Compounds analyzed at a dilution	Benzene, Chlorobenzene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Chloride, Sulfate	D	PM1D, ESL-MW-D1, GWE-2D, GWE-3D, GWE-5D, BSA-MW-1S, BSA-MW-2D, BSA-MW-3D, BSA-MW-4D, BSA-MW-5D, CPA-MW-1D, CPA-MW-2D, CPA-MW-2D-AD, CPA-MW-3D, CPA-MW-3D-AD, CPA-MW-4D, CPA-MW-5D
CCAL %D outside QC limits	Methane	J	BSA-MW-1S, CPA-MW-2D
Analyzed outside of hold time	Alkalinity, Carbon Dioxide, Free	J	GWE-2D, GWE-3D, GWE-5D, BSA-MW-1S, BSA-MW-2D, BSA-MW-3D, BSA-MW-5D, CPA-MW-1D, CPA-MW-2D, CPA-MW-3D, CPA-MW-4D, CPA-MW-5D
Analyzed outside of hold time; compound not detected	Nitrate	UJ	PM1D, ESL-MW-D1, GWE-2D, GWE-3D, GWE-5D, BSA-MW-1S, BSA-MW-3D, BSA-MW-4D, BSA-MW-5D, CPA-MW-4D, CPA-MW-5D

5.0 REFERENCES

Solutia Inc., 2009. Revised Long Term Monitoring Program Work Plan, Solutia Inc., W.G. Krummrich Facility, Sauget, Illinois, May 2009.

USEPA, 2017. Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review.

USEPA, 2017. Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review.

APPENDIX D
GROUNDWATER ANALYTICAL RESULTS
(INCLUDING DATA VALIDATION REPORTS)

(On CD)

Level IV Data Validation Summary
Solutia Inc., W.G. Krummrich, Sauget, Illinois
4Q17 Long-Term Monitoring Program

Company Name: Golder Associates
Project Name: WGK-4Q17 LTM
Reviewer: S. DiCenso
Laboratory: TestAmerica
SDG#: KPS205
Matrix: Water

Project Manager: A. Derhake
Project Number: 140-3345
Sample Date: December 2017

Analytical Method: VOC (8260B), Dissolved Gases (RSK-175), Metals (6010C), Alkalinity (SM 2320B), Carbon Dioxide (SM 4500 CO2C), Chloride (325.2), Nitrogen, Nitrate-Nitrite (353.2), Sulfate (375.4), TOC (415.1), and DOC (415.1)

Sample Names: PM1D-1217, PM1D-F(0.2)-1217, ESL-MW-D1-1217, ESL-MW-D1-F(0.2)-1217, GWE-5D-1217, GWE-5D-F(0.2)-1217, 4Q17 LTM Trip Blank #1

Field Information	**YES**	**NO**	**NA**
a) Sampling dates noted?	☒	☐	☐
b) Does the laboratory narrative indicate deficiencies?	☒	☐	☐

Comments:

VOC: Insufficient sample volume to perform MS/MSD associated with batches 505810 and 505815.

Sample ESL-MW-D1 required dilution prior to analysis, reporting limits were adjusted accordingly.

Dissolved Gases: No deficiencies noted.

Metals: No deficiencies noted.

Alkalinity: No deficiencies noted.

Chloride: Samples PM1D, ESL-MW-D1, and GWE-5D required dilution prior to analysis, reporting limits were adjusted accordingly.

Nitrate-Nitrite as Nitrogen: Due to instrument failure, samples PM1D, ESL-MW-D1, and GWE-5D sent to an alternate lab and analyzed outside hold time.

Nitrate exceeded the recovery criteria for the MS and MSD for analytical batch 55640. Sample matrix interference is suspected because associated LCS met acceptance criteria.

Sulfate: Samples PM1D, ESL-MW-D1, and GWE-5D required dilution prior to analysis, reporting limits were adjusted accordingly.

TOC: No deficiencies noted.

DOC: No deficiencies noted.

Free Carbon Dioxide: No deficiencies noted.

Chain-of-Custody (COC)	**YES**	**NO**	**NA**
a) Was the COC signed by both field and laboratory personnel?	☒	☐	☐
b) Were samples received in good condition?	☒	☐	☐

Comments: Samples were received at 2.0°C, within the 0°C to 6°C criteria.

General	YES	NO	NA
a) Were hold times met for sample analysis?	☐	☒	☐
b) Were the correct preservatives used?	☒	☐	☐
c) Was the correct method used?	☐	☒	☐
d) Any sample dilutions noted?	☒	☐	☐

Comments: Due to instrument failure, samples were sent to an alternate lab and were analyzed under a different method for alkalinity (SM 2320B) and free carbon dioxide (SM 4500 CO2C). The instrument failure and sample re-shipment resulted in alkalinity, carbon dioxide, and nitrate analyzed outside of hold time.

Detections in diluted analysis were qualified.

GC/MS Instrument Performance Check (IPC) and Internal Standards (IS)	YES	NO	NA
a) IPC analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
b) Does BFB/DFTPP meet the ion abundance criteria?	☒	☐	☐
c) Internal Standard retention times and areas met appropriate criteria?	☒	☐	☐

Comments: None.

Calibrations	YES	NO	NA
a) Initial calibration analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
b) Continuing calibrations analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
c) Initial calibration verifications and blanks analyzed at the appropriate frequency and met the appropriate standards?	☐	☒	☐
d) Continuing calibration verifications and blanks analyzed at the appropriate frequency and met the appropriate standards?	☐	☒	☐

Comments: Some compounds did not meet calibration requirements; however, calibration criteria were met by analytes of interest. No data qualification was required.

Blanks	YES	NO	NA
a) Were blanks (trip, equipment, method) performed at required frequency?	☒	☐	☐
b) Were analytes detected in any blanks?	☐	☒	☐

Comments: None.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA
a) Was MS/MSD accuracy criteria met?	☐	☒	☐
b) Was MS/MSD precision criteria met?	☒	☐	☐

Comments: Nitrogen exceeded the recovery criteria low for MS of sample PM1D associated with batch 55640. Data was qualified accordingly.

Laboratory Control Sample (LCS)	YES	NO	NA
a) LCS analyzed at the appropriate frequency and met appropriate standards?	☒	☐	☐

Comments: None.

Surrogate (System Monitoring) Compounds	**YES**	**NO**	**NA**
a) Surrogate compounds analyzed at the appropriate frequency and met appropriate standards?	☒	☐	☐

Comments: None.

Duplicates	**YES**	**NO**	**NA**
a) Were field duplicates collected?	☐	☐	☒
b) Was field duplicate precision criteria met?	☐	☐	☒

Comments: None.

Additional Comments: None.

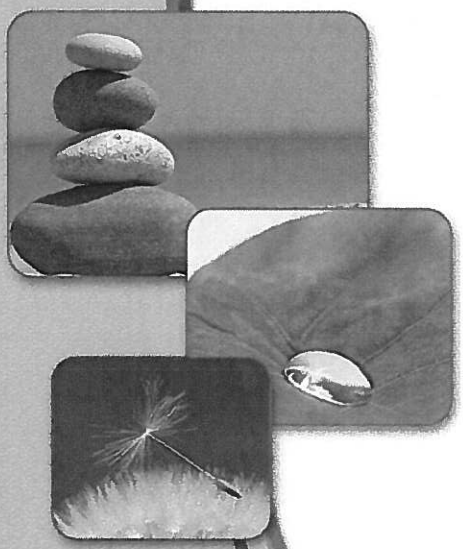
Qualifications:

Quality Control Issue	Compound(s)	Qualifier	Samples Affected
Compounds analyzed at a dilution	Chlorobenzene, 1,2-Dichlorobenzene, 1,4-Dichlorobenzene, Chloride, and Sulfate	D	PM1D, ESL-MW-D1, GWE-5D
Analyzed outside of hold time	Alkalinity and Carbon Dioxide, Free	J	GWE-5D
Analyzed outside of hold time; compound not detected	Nitrate	UJ	PM1D, ESL-MW-D1, GWE-5D

SDG KPS205

Sample Results from:

PM1D
ESL-MW-D1
GWE-5D



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-146390-1
TestAmerica Sample Delivery Group: KPS205
Client Project/Site: 4Q17 LTM GW Sampling - 1403345
Revision: 1

For:
Solutia Inc.
575 Maryville Centre Dr.
Saint Louis, Missouri 63141

Attn: Mr. Jerry Rinaldi

Michele R Kersey

Authorized for release by:
2/20/2018 3:57:46 PM

Michele Kersey, Project Manager II
(912)354-7858
michele.kersey@testamericainc.com

SJD 2/13/18

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SSD 2/13/18

Job ID: 680-146390-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Solutia Inc.

Project: 4Q17 LTM GW Sampling - 1403345

Report Number: 680-146390-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 12/06/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.0 C.

Report revised 02/20/18 to correct SDG to KPS205.

VOLATILE ORGANIC COMPOUNDS (GC-MS)
Samples PM1D-1217 (680-146390-1), ESL-MW-D1-1217 (680-146390-3), GWE-5D-1217 (680-146390-5) and 4Q17Trip Blank #1 (680-146390-7) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 12/10/2017 and 12/11/2017.

Sample ESL-MW-D1-1217 (680-146390-3)[2X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batches 680-505810, and 680-505815.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED GASES
Samples PM1D-1217 (680-146390-1), ESL-MW-D1-1217 (680-146390-3) and GWE-5D-1217 (680-146390-5) were analyzed for dissolved gases in accordance with RSK-175. The samples were analyzed on 12/07/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP) - DISSOLVED
Samples PM1D-F(0.2)-1217 (680-146390-2), ESL-MW-D1-F(0.2)-1217 (680-146390-4) and GWE-5D-F(0.2)-1217 (680-146390-6) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 12/07/2017 and analyzed on 12/12/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP)
Samples PM1D-1217 (680-146390-1), ESL-MW-D1-1217 (680-146390-3) and GWE-5D-1217 (680-146390-5) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 12/07/2017 and analyzed on 12/12/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SSD 2/13/18

Job ID: 680-146390-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

ALKALINITY
Sample GWE-5D-1217 (680-146390-5) was analyzed for alkalinity in accordance with SM 2320B. The samples were analyzed on 12/26/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY
Samples PM1D-1217 (680-146390-1) and ESL-MW-D1-1217 (680-146390-3) were analyzed for alkalinity in accordance with EPA Method 310.1. The samples were analyzed on 12/14/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CHLORIDE
Samples PM1D-1217 (680-146390-1), ESL-MW-D1-1217 (680-146390-3) and GWE-5D-1217 (680-146390-5) were analyzed for Chloride in accordance with EPA Method 325.2. The samples were analyzed on 12/12/2017.

Samples PM1D-1217 (680-146390-1)[2X], ESL-MW-D1-1217 (680-146390-3)[2X] and GWE-5D-1217 (680-146390-5)[2X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

NITRATE-NITRITE AS NITROGEN
Samples PM1D-1217 (680-146390-1), ESL-MW-D1-1217 (680-146390-3) and GWE-5D-1217 (680-146390-5) were analyzed for nitrate-nitrite as nitrogen in accordance with EPA Method 353.2. The samples were analyzed on 12/07/2017.

The following samples were analyzed one day outside of analytical holding time due to an Instrument failure: PM1D-1217 (680-146390-1), ESL-MW-D1-1217 (680-146390-3) and GWE-5D-1217 (680-146390-5).

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 680-505640 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SULFATE
Samples PM1D-1217 (680-146390-1), ESL-MW-D1-1217 (680-146390-3) and GWE-5D-1217 (680-146390-5) were analyzed for sulfate in accordance with EPA Method 375.4. The samples were analyzed on 12/13/2017.

Samples PM1D-1217 (680-146390-1)[20X], ESL-MW-D1-1217 (680-146390-3)[20X] and GWE-5D-1217 (680-146390-5)[50X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON
Samples PM1D-1217 (680-146390-1), ESL-MW-D1-1217 (680-146390-3) and GWE-5D-1217 (680-146390-5) were analyzed for total organic carbon in accordance with EPA Method 415.1. The samples were analyzed on 12/12/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED ORGANIC CARBON (DOC)
Samples PM1D-F(0.2)-1217 (680-146390-2), ESL-MW-D1-F(0.2)-1217 (680-146390-4) and GWE-5D-F(0.2)-1217 (680-146390-6) were analyzed for Dissolved Organic Carbon (DOC) in accordance with EPA Method 415.1. The samples were analyzed on 12/13/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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Job ID: 680-146390-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

FREE CARBON DIOXIDE

Sample GWE-5D-1217 (680-146390-5) was analyzed for free carbon dioxide in accordance with SM 4500 CO2 C. The samples were analyzed on 12/26/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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Sample Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-146390-1	PM1D-1217	Water	12/04/17 13:00	12/06/17 09:20
680-146390-2	PM1D-F(0.2)-1217	Water	12/04/17 13:00	12/06/17 09:20
680-146390-3	ESL-MW-D1-1217	Water	12/04/17 14:05	12/06/17 09:20
680-146390-4	ESL-MW-D1-F(0.2)-1217	Water	12/04/17 14:05	12/06/17 09:20
680-146390-5	GWE-5D-1217	Water	12/04/17 15:15	12/06/17 09:20
680-146390-6	GWE-5D-F(0.2)-1217	Water	12/04/17 15:15	12/06/17 09:20
680-146390-7	4Q17Trip Blank #1	Water	12/04/17 00:00	12/06/17 09:20

SJD 2/13/18

TestAmerica Savannah

Method Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
RSK-175	Dissolved Gases (GC)	RSK	TAL SAV
6010C	Metals (ICP)	SW846	TAL SAV
310.1-1978	Alkalinity	MCAWW	TAL SAV
325.2-1978	Chloride	MCAWW	TAL SAV
353.2-1993 R2.0	Nitrogen, Nitrate-Nitrite	MCAWW	TAL SAV
375.4-1978	Sulfate	MCAWW	TAL SAV
415.1-1974	TOC	MCAWW	TAL SAV
415.1-1974	DOC	MCAWW	TAL SAV
SM 2320B	Alkalinity	SM	TAL CF
SM 4500 CO2 C	Free Carbon Dioxide	SM	TAL CF

Protocol References:

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

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

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 CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

SJD 2/13/16

TestAmerica Savannah

Definitions/Glossary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

GC VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
H	Sample was prepped or analyzed beyond the specified holding time
U	Indicates the analyte was analyzed for but not detected.
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

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	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
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 (Radiochemistry)
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)

SSD 2/13/18

TestAmerica Savannah

Detection Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: PM1D-1217 — Lab Sample ID: 680-146390-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	37		1.0		ug/L	1		8260B	Total/NA
Methane	68		0.58		ug/L	1		RSK-175	Total/NA
Iron	14		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.51		0.010		mg/L	1		6010C	Total Recoverable
Chloride	77	D	2.0		mg/L	2		325.2-1978	Total/NA
Sulfate	280	D	100		mg/L	20		375.4-1978	Total/NA
Total Organic Carbon	2.5		1.0		mg/L	1		415.1-1974	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	210		5.0		mg/L	1		310.1-1978	Total/NA
Carbon Dioxide, Free	3400		5.0		mg/L	1		310.1-1978	Total/NA

Client Sample ID: PM1D-F(0.2)-1217 — Lab Sample ID: 680-146390-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	15		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.53		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	2.7		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: ESL-MW-D1-1217 — Lab Sample ID: 680-146390-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	140	D	2.0		ug/L	2		8260B	Total/NA
1,2-Dichlorobenzene	2.2	D	2.0		ug/L	2		8260B	Total/NA
1,4-Dichlorobenzene	19	D	2.0		ug/L	2		8260B	Total/NA
Methane	52		0.58		ug/L	1		RSK-175	Total/NA
Iron	12		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.38		0.010		mg/L	1		6010C	Total Recoverable
Chloride	93	D	2.0		mg/L	2		325.2-1978	Total/NA
Sulfate	490	D	100		mg/L	20		375.4-1978	Total/NA
Total Organic Carbon	2.9		1.0		mg/L	1		415.1-1974	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	270		5.0		mg/L	1		310.1-1978	Total/NA
Carbon Dioxide, Free	350		5.0		mg/L	1		310.1-1978	Total/NA

Client Sample ID: ESL-MW-D1-F(0.2)-1217 — Lab Sample ID: 680-146390-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	12		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.38		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	3.9		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: GWE-5D-1217 — Lab Sample ID: 680-146390-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	3.4		1.0		ug/L	1		8260B	Total/NA
Chlorobenzene	150		1.0		ug/L	1		8260B	Total/NA
1,2-Dichlorobenzene	3.7		1.0		ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

SSD 2/13/18

TestAmerica Savannah

Detection Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: GWE-5D-1217 (Continued) — Lab Sample ID: 680-146390-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,3-Dichlorobenzene	1.2		1.0		ug/L	1		8260B	Total/NA
1,4-Dichlorobenzene	23		1.0		ug/L	1		8260B	Total/NA
Methane	72		0.58		ug/L	1		RSK-175	Total/NA
Iron	14		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.44		0.010		mg/L	1		6010C	Total Recoverable
Chloride	81	D	2.0		mg/L	2		325.2-1978	Total/NA
Sulfate	460	D	250		mg/L	50		375.4-1978	Total/NA
Total Organic Carbon	3.2		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	360	~~H~~ J	10		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	52	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

Client Sample ID: GWE-5D-F(0.2)-1217 — Lab Sample ID: 680-146390-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	14		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.43		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	3.3		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: 4Q17Trip Blank #1 — Lab Sample ID: 680-146390-7

No Detections.

This Detection Summary does not include radiochemical test results.

SSD 2/13/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: PM1D-1217

Date Collected: 12/04/17 13:00
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/11/17 01:22	1
Chlorobenzene	**37**		1.0		ug/L			12/11/17 01:22	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 01:22	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 01:22	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 01:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*12/11/17 01:22*	*1*
1,2-Dichloroethane-d4 (Surr)	*99*		*73 - 131*		*12/11/17 01:22*	*1*
Dibromofluoromethane (Surr)	*109*		*80 - 122*		*12/11/17 01:22*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*12/11/17 01:22*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/07/17 12:41	1
Ethylene	1.0	U	1.0		ug/L			12/07/17 12:41	1
Methane	**68**		0.58		ug/L			12/07/17 12:41	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**14**		0.050		mg/L		12/07/17 16:48	12/12/17 04:09	1
Manganese	**0.51**		0.010		mg/L		12/07/17 16:48	12/12/17 04:09	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**77**	D	2.0		mg/L			12/12/17 15:39	2
Nitrate as N	0.050	U ~~H PT~~ 3	0.050		mg/L			12/07/17 16:53	1
Sulfate	**280**	D	100		mg/L			12/13/17 08:21	20
Total Organic Carbon	**2.5**		1.0		mg/L			12/12/17 16:40	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**210**		5.0		mg/L			12/14/17 14:51	1
Carbon Dioxide, Free	**3400**		5.0		mg/L			12/14/17 14:51	1

SDD 2/13/18

TestAmerica Savannah

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: PM1D-F(0.2)-1217
Date Collected: 12/04/17 13:00
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-2
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	15		0.050		mg/L		12/07/17 16:48	12/12/17 04:14	1
Manganese, Dissolved	0.53		0.010		mg/L		12/07/17 16:48	12/12/17 04:14	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	2.7		1.0		mg/L			12/13/17 12:48	1

SJD 2/13/18
TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: ESL-MW-D1-1217
Date Collected: 12/04/17 14:05
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2.0	U	2.0		ug/L			12/11/17 01:44	2
Chlorobenzene	**140**	D	2.0		ug/L			12/11/17 01:44	2
1,2-Dichlorobenzene	**2.2**	D	2.0		ug/L			12/11/17 01:44	2
1,3-Dichlorobenzene	2.0	U	2.0		ug/L			12/11/17 01:44	2
1,4-Dichlorobenzene	**19**	D	2.0		ug/L			12/11/17 01:44	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*12/11/17 01:44*	*2*
1,2-Dichloroethane-d4 (Surr)	*101*		*73 - 131*		*12/11/17 01:44*	*2*
Dibromofluoromethane (Surr)	*112*		*80 - 122*		*12/11/17 01:44*	*2*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*12/11/17 01:44*	*2*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/07/17 12:54	1
Ethylene	1.0	U	1.0		ug/L			12/07/17 12:54	1
Methane	**52**		0.58		ug/L			12/07/17 12:54	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**12**		0.050		mg/L		12/07/17 16:48	12/12/17 04:04	1
Manganese	**0.38**		0.010		mg/L		12/07/17 16:48	12/12/17 04:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**93**	D	2.0		mg/L			12/12/17 15:39	2
Nitrate as N	0.050	U H J	0.050		mg/L			12/07/17 17:03	1
Sulfate	**490**	D	100		mg/L			12/13/17 08:20	20
Total Organic Carbon	**2.9**		1.0		mg/L			12/12/17 16:58	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**270**		5.0		mg/L			12/14/17 14:43	1
Carbon Dioxide, Free	**350**		5.0		mg/L			12/14/17 14:43	1

SSD 2/13/18

TestAmerica Savannah

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: ESL-MW-D1-F(0.2)-1217
Date Collected: 12/04/17 14:05
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-4
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	12		0.050		mg/L		12/07/17 16:48	12/12/17 04:32	1
Manganese, Dissolved	0.38		0.010		mg/L		12/07/17 16:48	12/12/17 04:32	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	3.9		1.0		mg/L			12/13/17 13:35	1

SJD 2/13/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: GWE-5D-1217

Date Collected: 12/04/17 15:15
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-5

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	3.4		1.0		ug/L			12/11/17 16:05	1
Chlorobenzene	150		1.0		ug/L			12/11/17 16:05	1
1,2-Dichlorobenzene	3.7		1.0		ug/L			12/11/17 16:05	1
1,3-Dichlorobenzene	1.2		1.0		ug/L			12/11/17 16:05	1
1,4-Dichlorobenzene	23		1.0		ug/L			12/11/17 16:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*96*		*80 - 120*		*12/11/17 16:05*	*1*
1,2-Dichloroethane-d4 (Surr)	*85*		*73 - 131*		*12/11/17 16:05*	*1*
Dibromofluoromethane (Surr)	*92*		*80 - 122*		*12/11/17 16:05*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*12/11/17 16:05*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/07/17 13:07	1
Ethylene	1.0	U	1.0		ug/L			12/07/17 13:07	1
Methane	72		0.58		ug/L			12/07/17 13:07	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	14		0.050		mg/L		12/07/17 16:48	12/12/17 04:18	1
Manganese	0.44		0.010		mg/L		12/07/17 16:48	12/12/17 04:18	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	81	D	2.0		mg/L			12/12/17 15:39	2
Nitrate as N	0.050	U H J	0.050		mg/L			12/07/17 17:04	1
Sulfate	460	D	250		mg/L			12/13/17 08:21	50
Total Organic Carbon	3.2		1.0		mg/L			12/12/17 17:15	1
Alkalinity as CaCO3	360	H J	10		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	52	H J	5.0		mg/L			12/26/17 11:01	1

SJD 2/13/18

TestAmerica Savannah

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: GWE-5D-F(0.2)-1217
Date Collected: 12/04/17 15:15
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-6
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	14		0.050		mg/L		12/07/17 16:48	12/12/17 03:59	1
Manganese, Dissolved	0.43		0.010		mg/L		12/07/17 16:48	12/12/17 03:59	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	3.3		1.0		mg/L			12/13/17 13:51	1

SDD 2/13/18

TestAmerica Savannah

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: 4Q17Trip Blank #1
Date Collected: 12/04/17 00:00
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/10/17 18:52	1
Chlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:52	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:52	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:52	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*80 - 120*		*12/10/17 18:52*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*12/10/17 18:52*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 122*		*12/10/17 18:52*	*1*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*12/10/17 18:52*	*1*

SSD 2/13/18

TestAmerica Savannah

Surrogate Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

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

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-146390-1	PM1D-1217	104	99	109	100
680-146390-3	ESL-MW-D1-1217	105	101	112	100
680-146390-5	GWE-5D-1217	96	85	92	97
680-146390-7	4Q17Trip Blank #1	93	94	98	90
LCS 680-505810/3	Lab Control Sample	95	92	97	89
LCS 680-505815/3	Lab Control Sample	101	104	101	99
LCS 680-505854/4	Lab Control Sample	93	92	97	96
LCSD 680-505810/4	Lab Control Sample Dup	96	93	98	92
LCSD 680-505815/4	Lab Control Sample Dup	101	102	102	100
LCSD 680-505854/5	Lab Control Sample Dup	97	92	98	100
MB 680-505810/9	Method Blank	93	94	100	89
MB 680-505815/9	Method Blank	102	97	108	98
MB 680-505854/9	Method Blank	99	84	91	96

Surrogate Legend

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

SJD 2/13/18

QC Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

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

Lab Sample ID: MB 680-505810/9
Matrix: Water
Analysis Batch: 505810

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/10/17 18:09	1
Chlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:09	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:09	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:09	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:09	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*80 - 120*		*12/10/17 18:09*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*12/10/17 18:09*	*1*
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*12/10/17 18:09*	*1*
4-Bromofluorobenzene (Surr)	*89*		*80 - 120*		*12/10/17 18:09*	*1*

Lab Sample ID: LCS 680-505810/3
Matrix: Water
Analysis Batch: 505810

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	50.0	47.5		ug/L		95	80 - 120
Chlorobenzene	50.0	48.8		ug/L		98	80 - 120
1,2-Dichlorobenzene	50.0	48.4		ug/L		97	80 - 120
1,3-Dichlorobenzene	50.0	47.2		ug/L		94	80 - 120
1,4-Dichlorobenzene	50.0	47.8		ug/L		96	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*95*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*92*		*73 - 131*
Dibromofluoromethane (Surr)	*97*		*80 - 122*
4-Bromofluorobenzene (Surr)	*89*		*80 - 120*

Lab Sample ID: LCSD 680-505810/4
Matrix: Water
Analysis Batch: 505810

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
Benzene	50.0	48.2		ug/L		96	80 - 120	1	20
Chlorobenzene	50.0	49.7		ug/L		99	80 - 120	2	20
1,2-Dichlorobenzene	50.0	49.1		ug/L		98	80 - 120	1	20
1,3-Dichlorobenzene	50.0	47.9		ug/L		96	80 - 120	2	20
1,4-Dichlorobenzene	50.0	48.4		ug/L		97	80 - 120	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*93*		*73 - 131*
Dibromofluoromethane (Surr)	*98*		*80 - 122*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*

SSD 2/13/18

TestAmerica Savannah

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

Lab Sample ID: MB 680-505815/9
Matrix: Water
Analysis Batch: 505815

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/10/17 18:22	1
Chlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:22	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:22	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:22	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/10/17 18:22	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*80 - 120*		*12/10/17 18:22*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*12/10/17 18:22*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*12/10/17 18:22*	*1*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*12/10/17 18:22*	*1*

Lab Sample ID: LCS 680-505815/3
Matrix: Water
Analysis Batch: 505815

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	50.0	51.4		ug/L		103	80 - 120
Chlorobenzene	50.0	50.1		ug/L		100	80 - 120
1,2-Dichlorobenzene	50.0	49.8		ug/L		100	80 - 120
1,3-Dichlorobenzene	50.0	49.2		ug/L		98	80 - 120
1,4-Dichlorobenzene	50.0	49.6		ug/L		99	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*104*		*73 - 131*
Dibromofluoromethane (Surr)	*101*		*80 - 122*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*

Lab Sample ID: LCSD 680-505815/4
Matrix: Water
Analysis Batch: 505815

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
Benzene	50.0	51.4		ug/L		103	80 - 120	0	20
Chlorobenzene	50.0	49.8		ug/L		100	80 - 120	1	20
1,2-Dichlorobenzene	50.0	48.9		ug/L		98	80 - 120	2	20
1,3-Dichlorobenzene	50.0	49.0		ug/L		98	80 - 120	0	20
1,4-Dichlorobenzene	50.0	49.5		ug/L		99	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*102*		*73 - 131*
Dibromofluoromethane (Surr)	*102*		*80 - 122*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*

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

Lab Sample ID: MB 680-505854/9
Matrix: Water
Analysis Batch: 505854

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/11/17 13:37	1
Chlorobenzene	1.0	U	1.0		ug/L			12/11/17 13:37	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 13:37	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 13:37	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 13:37	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*80 - 120*		*12/11/17 13:37*	*1*
1,2-Dichloroethane-d4 (Surr)	*84*		*73 - 131*		*12/11/17 13:37*	*1*
Dibromofluoromethane (Surr)	*91*		*80 - 122*		*12/11/17 13:37*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*12/11/17 13:37*	*1*

Lab Sample ID: LCS 680-505854/4
Matrix: Water
Analysis Batch: 505854

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	50.0	49.1		ug/L		98	80 - 120
Chlorobenzene	50.0	49.3		ug/L		99	80 - 120
1,2-Dichlorobenzene	50.0	48.9		ug/L		98	80 - 120
1,3-Dichlorobenzene	50.0	48.8		ug/L		98	80 - 120
1,4-Dichlorobenzene	50.0	49.0		ug/L		98	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*93*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*92*		*73 - 131*
Dibromofluoromethane (Surr)	*97*		*80 - 122*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*

Lab Sample ID: LCSD 680-505854/5
Matrix: Water
Analysis Batch: 505854

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
Benzene	50.0	50.5		ug/L		101	80 - 120	3	20
Chlorobenzene	50.0	49.8		ug/L		100	80 - 120	1	20
1,2-Dichlorobenzene	50.0	50.2		ug/L		100	80 - 120	3	20
1,3-Dichlorobenzene	50.0	49.3		ug/L		99	80 - 120	1	20
1,4-Dichlorobenzene	50.0	50.1		ug/L		100	80 - 120	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*97*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*92*		*73 - 131*
Dibromofluoromethane (Surr)	*98*		*80 - 122*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*

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Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 680-505384/10
Matrix: Water
Analysis Batch: 505384

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/07/17 10:49	1
Ethylene	1.0	U	1.0		ug/L			12/07/17 10:49	1
Methane	0.58	U	0.58		ug/L			12/07/17 10:49	1

Lab Sample ID: LCS 680-505384/3
Matrix: Water
Analysis Batch: 505384

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethane	288	271		ug/L		94	75 - 125
Ethylene	269	256		ug/L		95	75 - 125

Lab Sample ID: LCSD 680-505384/4
Matrix: Water
Analysis Batch: 505384

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
Ethane	288	266		ug/L		92	75 - 125	2	30
Ethylene	269	247		ug/L		92	75 - 125	4	30

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-505503/1-A
Matrix: Water
Analysis Batch: 506043

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 505503

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.050	U	0.050		mg/L		12/07/17 16:48	12/12/17 02:16	1
Iron, Dissolved	0.050	U	0.050		mg/L		12/07/17 16:48	12/12/17 02:16	1
Manganese	0.010	U	0.010		mg/L		12/07/17 16:48	12/12/17 02:16	1
Manganese, Dissolved	0.010	U	0.010		mg/L		12/07/17 16:48	12/12/17 02:16	1

Lab Sample ID: LCS 680-505503/2-A
Matrix: Water
Analysis Batch: 506043

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 505503

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5.00	5.34		mg/L		107	80 - 120
Iron, Dissolved	5.00	5.34		mg/L		107	80 - 120
Manganese	0.500	0.577		mg/L		115	80 - 120
Manganese, Dissolved	0.500	0.577		mg/L		115	80 - 120

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Method: 310.1-1978 - Alkalinity

Lab Sample ID: MB 680-507266/7
Matrix: Water
Analysis Batch: 507266

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

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	5.0	U	5.0		mg/L			12/14/17 11:57	1
Carbon Dioxide, Free	5.0	U	5.0		mg/L			12/14/17 11:57	1

Lab Sample ID: LCS 680-507266/8
Matrix: Water
Analysis Batch: 507266

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	250	250		mg/L		100	80 - 120

Lab Sample ID: LCSD 680-507266/39
Matrix: Water
Analysis Batch: 507266

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
Alkalinity	250	254		mg/L		102	80 - 120	1	30

Method: 325.2-1978 - Chloride

Lab Sample ID: MB 680-506187/13
Matrix: Water
Analysis Batch: 506187

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.0	U	1.0		mg/L			12/12/17 14:25	1

Lab Sample ID: LCS 680-506187/14
Matrix: Water
Analysis Batch: 506187

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	25.0	26.4		mg/L		106	85 - 115

Lab Sample ID: LCSD 680-506187/18
Matrix: Water
Analysis Batch: 506187

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
Chloride	25.0	27.0		mg/L		108	85 - 115	2	30

Method: 353.2-1993 R2.0 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 680-505640/13
Matrix: Water
Analysis Batch: 505640

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	0.050	U	0.050		mg/L			12/07/17 16:31	1

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Method: 353.2-1993 R2.0 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: LCS 680-505640/16
Matrix: Water
Analysis Batch: 505640

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	0.500	0.513		mg/L		103	75 - 125
Nitrate Nitrite as N	1.00	1.01		mg/L		101	90 - 110
Nitrite as N	0.500	0.497		mg/L		99	90 - 110

Lab Sample ID: 680-146390-1 MS
Matrix: Water
Analysis Batch: 505640

Client Sample ID: PM1D-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	0.050	U H F1	0.500	0.323	F1	mg/L		65	75 - 125
Nitrate Nitrite as N	0.050	U H F1	1.00	0.667	F1	mg/L		67	90 - 110
Nitrite as N	0.050	U H F1	0.500	0.344	F1	mg/L		66	90 - 110

Lab Sample ID: 680-146390-1 MSD
Matrix: Water
Analysis Batch: 505640

Client Sample ID: PM1D-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	0.050	U H F1	0.500	0.329	F1	mg/L		66	75 - 125	2	30
Nitrate Nitrite as N	0.050	U H F1	1.00	0.675	F1	mg/L		67	90 - 110	1	10
Nitrite as N	0.050	U H F1	0.500	0.346	F1	mg/L		66	90 - 110	1	10

Method: 375.4-1978 - Sulfate

Lab Sample ID: MB 680-506186/19
Matrix: Water
Analysis Batch: 506186

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	5.0	U	5.0		mg/L			12/12/17 14:27	1

Lab Sample ID: LCS 680-506186/20
Matrix: Water
Analysis Batch: 506186

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	20.0	20.6		mg/L		103	75 - 125

Lab Sample ID: LCSD 680-506186/22
Matrix: Water
Analysis Batch: 506186

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
Sulfate	20.0	18.4		mg/L		92	75 - 125	11	30

SJD 2/13/18
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Method: 415.1-1974 - DOC

Lab Sample ID: MB 680-506528/2
Matrix: Water
Analysis Batch: 506528

Client Sample ID: Method Blank
Prep Type: Dissolved

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	1.0	U	1.0		mg/L			12/13/17 11:45	1

Lab Sample ID: LCS 680-506528/4
Matrix: Water
Analysis Batch: 506528

Client Sample ID: Lab Control Sample
Prep Type: Dissolved

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	20.0	20.7		mg/L		104	80 - 120

Lab Sample ID: LCSD 680-506528/5
Matrix: Water
Analysis Batch: 506528

Client Sample ID: Lab Control Sample Dup
Prep Type: Dissolved

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	20.0	20.2		mg/L		101	80 - 120	3	20

Lab Sample ID: 680-146390-2 MS
Matrix: Water
Analysis Batch: 506528

Client Sample ID: PM1D-F(0.2)-1217
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	2.7		20.0	22.7		mg/L		100	80 - 120

Lab Sample ID: 680-146390-2 MSD
Matrix: Water
Analysis Batch: 506528

Client Sample ID: PM1D-F(0.2)-1217
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	2.7		20.0	22.5		mg/L		99	80 - 120	1	20

Method: 415.1-1974 - TOC

Lab Sample ID: MB 680-506208/2
Matrix: Water
Analysis Batch: 506208

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.0	U	1.0		mg/L			12/12/17 14:44	1

Lab Sample ID: LCS 680-506208/3
Matrix: Water
Analysis Batch: 506208

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	20.0	18.9		mg/L		95	80 - 120

SJD 2/13/18

Method: 415.1-1974 - TOC (Continued)

Lab Sample ID: LCSD 680-506208/4
Matrix: Water
Analysis Batch: 506208

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
Total Organic Carbon	20.0	19.2		mg/L		96	80 - 120	1	25

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-190007/1
Matrix: Water
Analysis Batch: 190007

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	5.0	U	5.0		mg/L			12/26/17 19:08	1

Lab Sample ID: LCS 310-190007/2
Matrix: Water
Analysis Batch: 190007

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	1060	1010		mg/L		96	90 - 110

SJD 2/13/18

TestAmerica Savannah

QC Association Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

GC/MS VOA

Analysis Batch: 505810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-7	4Q17Trip Blank #1	Total/NA	Water	8260B	
MB 680-505810/9	Method Blank	Total/NA	Water	8260B	
LCS 680-505810/3	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-505810/4	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 505815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-1	PM1D-1217	Total/NA	Water	8260B	
680-146390-3	ESL-MW-D1-1217	Total/NA	Water	8260B	
MB 680-505815/9	Method Blank	Total/NA	Water	8260B	
LCS 680-505815/3	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-505815/4	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 505854

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-5	GWE-5D-1217	Total/NA	Water	8260B	
MB 680-505854/9	Method Blank	Total/NA	Water	8260B	
LCS 680-505854/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-505854/5	Lab Control Sample Dup	Total/NA	Water	8260B	

GC VOA

Analysis Batch: 505384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-1	PM1D-1217	Total/NA	Water	RSK-175	
680-146390-3	ESL-MW-D1-1217	Total/NA	Water	RSK-175	
680-146390-5	GWE-5D-1217	Total/NA	Water	RSK-175	
MB 680-505384/10	Method Blank	Total/NA	Water	RSK-175	
LCS 680-505384/3	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 680-505384/4	Lab Control Sample Dup	Total/NA	Water	RSK-175	

Metals

Prep Batch: 505503

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-1	PM1D-1217	Total Recoverable	Water	3005A	
680-146390-2	PM1D-F(0.2)-1217	Dissolved	Water	3005A	
680-146390-3	ESL-MW-D1-1217	Total Recoverable	Water	3005A	
680-146390-4	ESL-MW-D1-F(0.2)-1217	Dissolved	Water	3005A	
680-146390-5	GWE-5D-1217	Total Recoverable	Water	3005A	
680-146390-6	GWE-5D-F(0.2)-1217	Dissolved	Water	3005A	
MB 680-505503/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-505503/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 506043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-1	PM1D-1217	Total Recoverable	Water	6010C	505503
680-146390-2	PM1D-F(0.2)-1217	Dissolved	Water	6010C	505503
680-146390-3	ESL-MW-D1-1217	Total Recoverable	Water	6010C	505503
680-146390-4	ESL-MW-D1-F(0.2)-1217	Dissolved	Water	6010C	505503

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Metals (Continued)

Analysis Batch: 506043 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-5	GWE-5D-1217	Total Recoverable	Water	6010C	505503
680-146390-6	GWE-5D-F(0.2)-1217	Dissolved	Water	6010C	505503
MB 680-505503/1-A	Method Blank	Total Recoverable	Water	6010C	505503
LCS 680-505503/2-A	Lab Control Sample	Total Recoverable	Water	6010C	505503

General Chemistry

Analysis Batch: 189992

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-5	GWE-5D-1217	Total/NA	Water	SM 4500 CO2 C	

Analysis Batch: 190007

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-5	GWE-5D-1217	Total/NA	Water	SM 2320B	
MB 310-190007/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-190007/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 505640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-1	PM1D-1217	Total/NA	Water	353.2-1993 R2.0	
680-146390-3	ESL-MW-D1-1217	Total/NA	Water	353.2-1993 R2.0	
680-146390-5	GWE-5D-1217	Total/NA	Water	353.2-1993 R2.0	
MB 680-505640/13	Method Blank	Total/NA	Water	353.2-1993 R2.0	
LCS 680-505640/16	Lab Control Sample	Total/NA	Water	353.2-1993 R2.0	
680-146390-1 MS	PM1D-1217	Total/NA	Water	353.2-1993 R2.0	
680-146390-1 MSD	PM1D-1217	Total/NA	Water	353.2-1993 R2.0	

Analysis Batch: 506186

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-1	PM1D-1217	Total/NA	Water	375.4-1978	
680-146390-3	ESL-MW-D1-1217	Total/NA	Water	375.4-1978	
680-146390-5	GWE-5D-1217	Total/NA	Water	375.4-1978	
MB 680-506186/19	Method Blank	Total/NA	Water	375.4-1978	
LCS 680-506186/20	Lab Control Sample	Total/NA	Water	375.4-1978	
LCSD 680-506186/22	Lab Control Sample Dup	Total/NA	Water	375.4-1978	

Analysis Batch: 506187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-1	PM1D-1217	Total/NA	Water	325.2-1978	
680-146390-3	ESL-MW-D1-1217	Total/NA	Water	325.2-1978	
680-146390-5	GWE-5D-1217	Total/NA	Water	325.2-1978	
MB 680-506187/13	Method Blank	Total/NA	Water	325.2-1978	
LCS 680-506187/14	Lab Control Sample	Total/NA	Water	325.2-1978	
LCSD 680-506187/18	Lab Control Sample Dup	Total/NA	Water	325.2-1978	

Analysis Batch: 506208

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-1	PM1D-1217	Total/NA	Water	415.1-1974	
680-146390-3	ESL-MW-D1-1217	Total/NA	Water	415.1-1974	
680-146390-5	GWE-5D-1217	Total/NA	Water	415.1-1974	

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General Chemistry (Continued)

Analysis Batch: 506208 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-506208/2	Method Blank	Total/NA	Water	415.1-1974	
LCS 680-506208/3	Lab Control Sample	Total/NA	Water	415.1-1974	
LCSD 680-506208/4	Lab Control Sample Dup	Total/NA	Water	415.1-1974	

Analysis Batch: 506528

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-2	PM1D-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146390-4	ESL-MW-D1-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146390-6	GWE-5D-F(0.2)-1217	Dissolved	Water	415.1-1974	
MB 680-506528/2	Method Blank	Dissolved	Water	415.1-1974	
LCS 680-506528/4	Lab Control Sample	Dissolved	Water	415.1-1974	
LCSD 680-506528/5	Lab Control Sample Dup	Dissolved	Water	415.1-1974	
680-146390-2 MS	PM1D-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146390-2 MSD	PM1D-F(0.2)-1217	Dissolved	Water	415.1-1974	

Analysis Batch: 507266

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146390-1	PM1D-1217	Total/NA	Water	310.1-1978	
680-146390-3	ESL-MW-D1-1217	Total/NA	Water	310.1-1978	
MB 680-507266/7	Method Blank	Total/NA	Water	310.1-1978	
LCS 680-507266/8	Lab Control Sample	Total/NA	Water	310.1-1978	
LCSD 680-507266/39	Lab Control Sample Dup	Total/NA	Water	310.1-1978	

SSD 2/13/18

TestAmerica Savannah

Lab Chronicle

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: PM1D-1217

Date Collected: 12/04/17 13:00
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	505815	12/11/17 01:22	UI	TAL SAV
Total/NA	Analysis	RSK-175		1	505384	12/07/17 12:41	KAB	TAL SAV
Total Recoverable	Prep	3005A			505503	12/07/17 16:48	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1	506043	12/12/17 04:09	BWR	TAL SAV
Total/NA	Analysis	310.1-1978		1	507266	12/14/17 14:51	KLD	TAL SAV
Total/NA	Analysis	325.2-1978		2	506187	12/12/17 15:39	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	505640	12/07/17 16:53	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		20	506186	12/13/17 08:21	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	506208	12/12/17 16:40	KLD	TAL SAV

Client Sample ID: PM1D-F(0.2)-1217

Date Collected: 12/04/17 13:00
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505503	12/07/17 16:48	AJR	TAL SAV
Dissolved	Analysis	6010C		1	506043	12/12/17 04:14	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 12:48	KLD	TAL SAV

Client Sample ID: ESL-MW-D1-1217

Date Collected: 12/04/17 14:05
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		2	505815	12/11/17 01:44	UI	TAL SAV
Total/NA	Analysis	RSK-175		1	505384	12/07/17 12:54	KAB	TAL SAV
Total Recoverable	Prep	3005A			505503	12/07/17 16:48	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1	506043	12/12/17 04:04	BWR	TAL SAV
Total/NA	Analysis	310.1-1978		1	507266	12/14/17 14:43	KLD	TAL SAV
Total/NA	Analysis	325.2-1978		2	506187	12/12/17 15:39	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	505640	12/07/17 17:03	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		20	506186	12/13/17 08:20	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	506208	12/12/17 16:58	KLD	TAL SAV

Client Sample ID: ESL-MW-D1-F(0.2)-1217

Date Collected: 12/04/17 14:05
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146390-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505503	12/07/17 16:48	AJR	TAL SAV
Dissolved	Analysis	6010C		1	506043	12/12/17 04:32	BWR	TAL SAV

SJD 2/13/18

TestAmerica Savannah

Lab Chronicle

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Client Sample ID: ESL-MW-D1-F(0.2)-1217

Lab Sample ID: 680-146390-4
Matrix: Water
Date Collected: 12/04/17 14:05
Date Received: 12/06/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 13:35	KLD	TAL SAV

Client Sample ID: GWE-5D-1217

Lab Sample ID: 680-146390-5
Matrix: Water
Date Collected: 12/04/17 15:15
Date Received: 12/06/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	505854	12/11/17 16:05	JLK	TAL SAV
Total/NA	Analysis	RSK-175		1	505384	12/07/17 13:07	KAB	TAL SAV
Total Recoverable	Prep	3005A			505503	12/07/17 16:48	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1	506043	12/12/17 04:18	BWR	TAL SAV
Total/NA	Analysis	325.2-1978		2	506187	12/12/17 15:39	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	505640	12/07/17 17:04	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		50	506186	12/13/17 08:21	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	506208	12/12/17 17:15	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 11:01	LBB	TAL CF

Client Sample ID: GWE-5D-F(0.2)-1217

Lab Sample ID: 680-146390-6
Matrix: Water
Date Collected: 12/04/17 15:15
Date Received: 12/06/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505503	12/07/17 16:48	AJR	TAL SAV
Dissolved	Analysis	6010C		1	506043	12/12/17 03:59	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 13:51	KLD	TAL SAV

Client Sample ID: 4Q17Trip Blank #1

Lab Sample ID: 680-146390-7
Matrix: Water
Date Collected: 12/04/17 00:00
Date Received: 12/06/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	505810	12/10/17 18:52	UI	TAL SAV

Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

SJD 2/13/18

TestAmerica Savannah

TestAmerica Savannah
5102 LaRoche Avenue
Suite C-10
Savannah, GA 31404
Phone: 912.354.7858 Fax:

Chain of Custody Record

220338

681-Atlanta

681-Atlanta

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	
Company Name:	Golder Associates
Address:	820 S Main St #100
City/State/Zip:	St. Charles, MO 63301
Phone:	636-724-9191
Fax:	
Project Name:	4Q17 LTM GW Sampling - 1403345
Site:	Solutia WGKrummrich Facility
PO#	42262863

Project Manager: Amanda Derhake
Tel/Fax: 636-724-9191

Analysis Turnaround Time
☑ CALENDAR DAYS ☐ WORKING DAYS
TAT if different from Below: Standard
☑ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact: Sam Dilcuso
Lab Contact: Michele Kirby
Date: 12/4/17
Carrier: FedEx

COC No: 1 of 1 COCs
Sampler: SJD
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOCs 8260	Total Fe/Mn 6010C	Alk/CO2 by 310.1	Chloride 325.2/Sulfate 375.4	Diss Gases RSK 175	Nitrate 353.2	TOC 415.1	Diss. Fe/Mn 6010C	DOC 415.1	Sample Specific Notes
PMID-1217	12/4/17	1300	G	W	14	N	N	3	1	1	1	3	2	3			
PMID-F(0.2)-1217	⏐	⏊	⏐	⏐	4	Y	⏐								1	3	
ESL-MW-D1-1217	⏐	1405	⏐	⏐	14	N	⏐	3	1	1	1	3	2	3			
ESL-MW-D1-F(0.2)-1217	⏐	⏊	⏐	⏐	4	Y	⏐								1	3	
GWE-5D-1217	⏐	1515	⏐	⏐	14	N	⏐	3	1	1	1	3	2	3			
GWE-5D-F(0.2)-1217	⏊	⏊	⏐	⏐	4	Y	⏐								1	3	
Trip Blank #1 4Q17	—	—	⏐	⏐	2	N	⏐	2									

680-146390 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:
2.5(CF -0.5)2.0

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ Therm ID No.: ____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	Golder	12/4/17 1700			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: Jessica Edwards	Company: TA	Date/Time: 12/6/17 0920

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

680-146390 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information				
Client: TA- Savannah				
City/State: CITY: Savannah	STATE: GA	Project:		
Receipt Information				
Date/Time Received: DATE: 12/23/17	TIME: 1005	Received By: MRH		
Delivery Type: ☐ UPS	☒ FedEx Sat Del	☐ FedEx Ground	☐ US Mail	☐ Spee-Dee
☐ TA Courier	☐ TA Field Services	☐ Client Drop-off	☐ Other:	
Condition of Cooler/Containers				
Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:	
Multiple Coolers?	☐ Yes	☒ No	*If yes:* Cooler # ____ of ____	
Cooler Custody Seals Present?	☒ Yes	~~☒ No~~ MRH 12/23/17	*If yes:* Cooler custody seals intact?	☒ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☒ No	*If yes:* Sample custody seals intact?	☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓	
Temperature Record				
Coolant:	☒ Wet ice	☐ Blue ice	☐ Dry ice	☐ Other: ☐ NONE
Thermometer ID:	J		Correction Factor (°C):	+0.1
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature				
Uncorrected Temp (°C):	0.3		Corrected Temp (°C):	0.4
• Sample Container Temperature				
Sample ID(s) & bottle type used:	CONTAINER 1		CONTAINER 2	
Uncorrected Temp (°C):	TEMP 1	TEMP 2	Corrected Temp (°C):	TEMP 1 TEMP 2
Exceptions Noted				
1) If temperature exceeds criteria, was sample(s) received same day of sampling?			☐ Yes	☐ No
a) *If yes:* Is there evidence that the chilling process began?			☐ Yes	☐ No
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles?)			☐ Yes	☐ No
NOTE: If yes, contact PM before proceeding. If no, proceed with login				
Additional Comments				

SJD 2/13/18

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone (912) 354-7858 Fax (912) 352-0165

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Kersey, Michele R	Carrier Tracking No(s):	COC No: 680-502683.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: michele.kersey@testamericainc.com	State of Origin: Illinois	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): NELAP - Illinois		Job #: 680-146390-1
Address: 704 Enterprise Drive,	Due Date Requested: 12/22/2017			
City: Cedar Falls	TAT Requested (days):			
State, Zip: IA, 50613				
Phone: 319-277-2401(Tel) 319-277-2425(Fax)	PO #:			
Email:	WO #:			
Project Name: WGK Long Term Monitoring (LTM)	Project #: 68001754			
Site:	SSOW#:			

Analysis Requested

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2320B/ Alkalinity	SM4500_CO2_C/ (MOD) Copy Analytes	Total Number of containers	Special Instructions/Note:
				Preservation Code:						
GWE-5D-1217 (680-146390-5)	12/4/17	15:15 Central		Water			X	X	1	

Preservation Codes:

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA

M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ______ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) | Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 12/22/17 1800	Company: [signature]	Received by: [signature]	Date/Time: 12/23/17 1005	Company: TA-CF
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 09/20/2016

SJD 2/13/18

Login Sample Receipt Checklist

Client: Solutia Inc.

Job Number: 680-146390-1
SDG Number: KPS205

Login Number: 146390
List Number: 1
Creator: Edwards, Jessica R

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
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 (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.	N/A	
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	

S SD 2/13/18

Login Sample Receipt Checklist

Client: Solutia Inc.

Job Number: 680-146390-1
SDG Number: KPS205

Login Number: 146390
List Number: 2
Creator: Hummel, Matt R

List Source: TestAmerica Cedar Falls
List Creation: 12/23/17 10:40 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
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 (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	

SJD 2/13/18

Accreditation/Certification Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	09-22-19
Arizona	State Program	9	AZ0808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-19
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-18
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-18
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-18 *
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-18
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-18
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-18
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-18
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146390-1
SDG: KPS205

Laboratory: TestAmerica Cedar Falls

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
AIHA-LAP, LLC	IHLAP		101044	11-01-18
Georgia	State Program	4	IA100001 (OR)	09-29-18
Illinois	NELAP	5	200024	11-29-18
Iowa	State Program	7	007	12-01-17 *
Minnesota	NELAP	5	019-999-319	12-31-18
Minnesota (Petrofund)	State Program	1	3349	08-22-18
North Dakota	State Program	8	R-186	09-29-18
Oregon	NELAP	10	IA100001	09-29-18

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

SSD 2/13/18

Level IV Data Validation Summary
Solutia Inc., W.G. Krummrich, Sauget, Illinois
4Q17 Long-Term Monitoring Program

Company Name: Golder Associates
Project Name: WGK-4Q17 LTM
Reviewer: S. DiCenso
Laboratory: TestAmerica
SDG#: KPS206
Matrix: Water

Project Manager: A. Derhake
Project Number: 140-3345
Sample Date: December 2017

Analytical Method: VOC (8260B), Dissolved Gases (RSK-175), Metals (6010C), Alkalinity (SM 2320B), Carbon Dioxide (SM 4500 CO2C), Chloride (325.2), Nitrogen, Nitrate-Nitrite (353.2), Sulfate (375.4), TOC (415.1), and DOC (415.1)

Sample Names: GWE-3D-1217, GWE-3D-F(0.2)-1217, GWE-2D-1217, GWE-2D-F(0.2)-1217, CPA-MW-5D-1217, CPA-MW-5D-F(0.2)-1217, BSA-MW-5D-1217, BSA-MW-5D-F(0.2)-1217, CPA-MW-4D-1217, CPA-MW-4D-F(0.2)-1217, 4Q17 LTM Trip Blank #2

Field Information	**YES**	**NO**	**NA**
a) Sampling dates noted?	☒	☐	☐
b) Does the laboratory narrative indicate deficiencies?	☒	☐	☐

Comments:

VOC: Samples GWE-3D and CPA-MW-5D required dilution prior to analysis, reporting limits were adjusted accordingly.

Dissolved Gases: No deficiencies noted.

Metals: No deficiencies noted.

Alkalinity: No deficiencies noted.

Chloride: Samples GWE-3D, GWE-2D, CPA-MW-5D, and CPA-MW-4D required dilution prior to analysis, reporting limits were adjusted accordingly.

Nitrate-Nitrite as Nitrogen: No deficiencies noted.

Sulfate: Samples GWE-3D, GWE-2D, and CPA-MW-5D required dilution prior to analysis, reporting limits were adjusted accordingly.

TOC: No deficiencies noted.

DOC: No deficiencies noted.

Free Carbon Dioxide: No deficiencies noted.

Chain-of-Custody (COC)	**YES**	**NO**	**NA**
a) Was the COC signed by both field and laboratory personnel?	☒	☐	☐
b) Were samples received in good condition?	☒	☐	☐

Comments: Samples were received at 2.0°C and 4.7°C, within the 0°C to 6°C criteria.

General	YES	NO	NA
a) Were hold times met for sample analysis?	☐	☒	☐
b) Were the correct preservatives used?	☒	☐	☐
c) Was the correct method used?	☐	☒	☐
d) Any sample dilutions noted?	☒	☐	☐

Comments: Due to instrument failure, samples were sent to an alternate lab and were analyzed under a different method for alkalinity (SM 2320B) and free carbon dioxide (SM 4500 CO2C). The instrument failure and sample re-shipment resulted in alkalinity, carbon dioxide, and nitrate analyzed outside of hold time.

Detections in diluted analysis were qualified.

GC/MS Instrument Performance Check (IPC) and Internal Standards (IS)	YES	NO	NA
a) IPC analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
b) Does BFB/DFTPP meet the ion abundance criteria?	☒	☐	☐
c) Internal Standard retention times and areas met appropriate criteria?	☒	☐	☐

Comments: None.

Calibrations	YES	NO	NA
a) Initial calibration analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
b) Continuing calibrations analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
c) Initial calibration verifications and blanks analyzed at the appropriate frequency and met the appropriate standards?	☐	☒	☐
d) Continuing calibration verifications and blanks analyzed at the appropriate frequency and met the appropriate standards?	☐	☒	☐

Comments: Some compounds did not meet calibration requirements; however, calibration criteria were met by analytes of interest. No data qualification was required.

Blanks	YES	NO	NA
a) Were blanks (trip, equipment, method) performed at required frequency?	☒	☐	☐
b) Were analytes detected in any blanks?	☐	☒	☐

Comments: None.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA
a) Was MS/MSD accuracy criteria met?	☒	☐	☐
b) Was MS/MSD precision criteria met?	☒	☐	☐

Comments: None.

Laboratory Control Sample (LCS)	YES	NO	NA
a) LCS analyzed at the appropriate frequency and met appropriate standards?	☒	☐	☐

Comments: None.

Surrogate (System Monitoring) Compounds	YES	NO	NA
a) Surrogate compounds analyzed at the appropriate frequency and met appropriate standards?	☒	☐	☐

Comments: None.

Duplicates	YES	NO	NA
a) Were field duplicates collected?	☐	☐	☒
b) Was field duplicate precision criteria met?	☐	☐	☒

Comments: None.

Additional Comments: None.

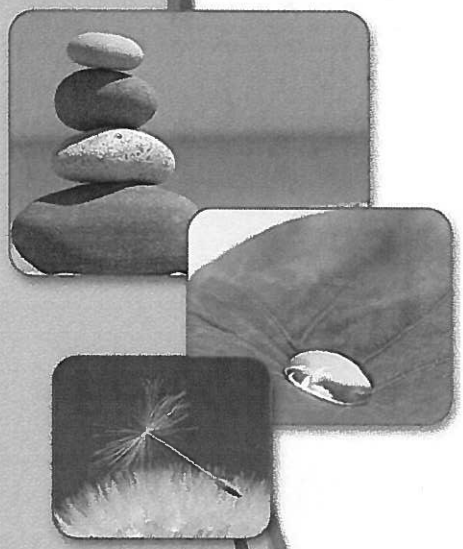
Qualifications:

Quality Control Issue	Compound(s)	Qualifier	Samples Affected
Compounds analyzed at a dilution	Chlorobenzene, 1,4-Dichlorobenzene, Chloride, and Sulfate	D	GWE-2D, GWE-3D, BSA-MW-5D, CPA-MW-4D, CPA-MW-5D
Analyzed outside of hold time	Alkalinity and Carbon Dioxide, Free	J	GWE-2D, GWE-3D, BSA-MW-5D, CPA-MW-4D, CPA-MW-5D
Analyzed outside of hold time; compound not detected	Nitrate	UJ	GWE-2D, GWE-3D, BSA-MW-5D, CPA-MW-4D, CPA-MW-5D

SDG KPS206

Sample Results from:

GWE-2D
GWE-3D
BSA-MW-5D
CPA-MW-4D
CPA-MW-5D



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-146392-1
TestAmerica Sample Delivery Group: KPS206
Client Project/Site: 4Q17 LTM GW Sampling - 1403345
Revision: 4

For:
Solutia Inc.
575 Maryville Centre Dr.
Saint Louis, Missouri 63141

Attn: Mr. Jerry Rinaldi

Michele R Kersey

Authorized for release by:
2/20/2018 3:59:38 PM

Michele Kersey, Project Manager II
(912)354-7858
michele.kersey@testamericainc.com

SSD 2/14/18

Table of Contents

SSD 2/14/18

Job ID: 680-146392-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Solutia Inc.

Project: 4Q17 LTM GW Sampling - 1403345

Report Number: 680-146392-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 12/6/2017 9:20 AM and 12/15/2017 5:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.0° C and 4.7° C.

Report revised 2/8/18 and 2/12/18 to correct sample IDs.
Report revised 2/19/18 to correct narrative.
Report revised 02/20/18 to correct SDG to KPS206.

Receipt Exceptions

The container label for the following samples did not match the information listed on the Chain-of-Custody (COC): GWE-3D-1217 (680-146392-1), GWE-3D-F(0.2)-1217 (680-146392-2), GWE-2D-1217 (680-146392-3), GWE-2D-F(0.2)-1217 (680-146392-4), CPA-MW-5D-1217 (680-146392-5), CPA-MW-5D-F(0.2)-1217 (680-146392-6), BSA-MW-5D-1217 (680-146392-7), BSA-MW-5D-1217 (680-146392-7[MS]), BSA-MW-5D-1217 (680-146392-7[MSD]), BSA-MW-5D-F(0.2)-1217 (680-146392-8), 47Q17 Trip Blank #2 (680-146392-9), CPA-MW-4D-1217 (680-146392-10) and CPA-MW-4D-F(0.2)-1217 (680-146392-11). The container labels list CPA-MW-4D-1217/CPA-MW-4D-F(0.2)-1217, while the COC lists BSA-MW-4D-1217/BSA-MW-4D-F(0.2)-1217. The client was contacted, and the lab was instructed to log in per container labels. The sample times match the containers.

VOLATILE ORGANIC COMPOUNDS (GC-MS)
Samples GWE-3D-1217 (680-146392-1), GWE-2D-1217 (680-146392-3), CPA-MW-5D-1217 (680-146392-5), BSA-MW-5D-1217 (680-146392-7), 47Q17 Trip Blank #2 (680-146392-9) and CPA-MW-4D-1217 (680-146392-10) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 12/11/2017.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 680-505810.

Samples GWE-3D-1217 (680-146972-1)[20X] and CPA-MW-5D-1217 (680-146972-5)[20X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED GASES
Samples GWE-3D-1217 (680-146972-1), GWE-2D-1217 (680-146972-2), CPA-MW-5D-1217 (680-146972-3), CPA-MW-5D-1217 (680-146972-4) and CPA-MW-4D-1217 (680-146972-5) were analyzed for dissolved gases in accordance with RSK-175. The samples were analyzed on 12/19/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SJD 2/14/18
TestAmerica Savannah

Job ID: 680-146392-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

METALS (ICP) - DISSOLVED
Samples GWE-3D-F(0.2)-1217 (680-146392-2), GWE-2D-F(0.2)-1217 (680-146392-4), CPA-MW-5D-F(0.2)-1217 (680-146392-6), BSA-MW-5D-F(0.2)-1217 (680-146392-8) and CPA-MW-4D-F(0.2)-1217 (680-146392-11) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 12/11/2017 and analyzed on 12/12/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP)
Samples GWE-3D-1217 (680-146972-1), GWE-2D-1217 (680-146972-2), CPA-MW-5D-1217 (680-146972-3), CPA-MW-5D-1217 (680-146972-4) and CPA-MW-4D-1217 (680-146972-5) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 12/28/2017 and analyzed on 12/29/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY
Samples GWE-3D-1217 (680-146972-1), GWE-2D-1217 (680-146972-2), CPA-MW-5D-1217 (680-146972-3), CPA-MW-5D-1217 (680-146972-4) and CPA-MW-4D-1217 (680-146972-5) were analyzed for alkalinity in accordance with SM 2320B. The samples were analyzed on 12/26/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CHLORIDE
Samples GWE-3D-1217 (680-146972-1), GWE-2D-1217 (680-146972-2), CPA-MW-5D-1217 (680-146972-3), CPA-MW-5D-1217 (680-146972-4) and CPA-MW-4D-1217 (680-146972-5) were analyzed for Chloride in accordance with EPA Method 325.2. The samples were analyzed on 12/21/2017.

Samples GWE-3D-1217 (680-146972-1)[50X], GWE-2D-1217 (680-146972-2)[20X], CPA-MW-5D-1217 (680-146972-3)[5X], CPA-MW-5D-1217 (680-146972-4)[5X] and CPA-MW-4D-1217 (680-146972-5)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

NITRATE-NITRITE AS NITROGEN
Samples GWE-3D-1217 (680-146972-1), GWE-2D-1217 (680-146972-2), CPA-MW-5D-1217 (680-146972-3), CPA-MW-5D-1217 (680-146972-4) and CPA-MW-4D-1217 (680-146972-5) were analyzed for nitrate-nitrite as nitrogen in accordance with EPA Method 353.2. The samples were analyzed on 12/19/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SULFATE
Samples GWE-3D-1217 (680-146972-1), GWE-2D-1217 (680-146972-2), CPA-MW-5D-1217 (680-146972-3), CPA-MW-5D-1217 (680-146972-4) and CPA-MW-4D-1217 (680-146972-5) were analyzed for sulfate in accordance with EPA Method 375.4. The samples were analyzed on 12/21/2017.

Samples GWE-3D-1217 (680-146972-1)[20X], GWE-2D-1217 (680-146972-2)[50X] and CPA-MW-5D-1217 (680-146972-3)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON
Samples GWE-3D-1217 (680-146972-1), GWE-2D-1217 (680-146972-2), CPA-MW-5D-1217 (680-146972-3), CPA-MW-5D-1217 (680-146972-4) and CPA-MW-4D-1217 (680-146972-5) were analyzed for total organic carbon in accordance with EPA Method 415.1. The samples were analyzed on 12/20/2017.

SJD 2/14/18

Job ID: 680-146392-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED ORGANIC CARBON (DOC)

Samples GWE-3D-F(0.2)-1217 (680-146392-2), GWE-2D-F(0.2)-1217 (680-146392-4), CPA-MW-5D-F(0.2)-1217 (680-146392-6), BSA-MW-5D-F(0.2)-1217 (680-146392-8) and CPA-MW-4D-F(0.2)-1217 (680-146392-11) were analyzed for Dissolved Organic Carbon (DOC) in accordance with EPA Method 415.1. The samples were analyzed on 12/13/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

FREE CARBON DIOXIDE

Samples GWE-3D-1217 (680-146972-1), GWE-2D-1217 (680-146972-2), CPA-MW-5D-1217 (680-146972-3), CPA-MW-5D-1217 (680-146972-4) and CPA-MW-4D-1217 (680-146972-5) were analyzed for free carbon dioxide in accordance with SM 4500 CO2 C. The samples were analyzed on 12/26/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SJD 2/14/18

Sample Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-146392-1	GWE-3D-1217	Water	12/05/17 09:27	12/06/17 09:20
680-146392-2	GWE-3D-F(0.2)-1217	Water	12/05/17 09:27	12/06/17 09:20
680-146392-3	GWE-2D-1217	Water	12/05/17 11:00	12/06/17 09:20
680-146392-4	GWE-2D-F(0.2)-1217	Water	12/05/17 11:00	12/06/17 09:20
680-146392-5	CPA-MW-5D-1217	Water	12/05/17 12:20	12/06/17 09:20
680-146392-6	CPA-MW-5D-F(0.2)-1217	Water	12/05/17 12:20	12/06/17 09:20
680-146392-7	BSA-MW-5D-1217	Water	12/05/17 13:50	12/06/17 09:20
680-146392-8	BSA-MW-5D-F(0.2)-1217	Water	12/05/17 13:50	12/06/17 09:20
680-146392-9	47Q17 Trip Blank #2	Water	12/05/17 00:00	12/06/17 09:20
680-146392-10	CPA-MW-4D-1217	Water	12/05/17 15:25	12/06/17 09:20
680-146392-11	CPA-MW-4D-F(0.2)-1217	Water	12/05/17 15:25	12/06/17 09:20
680-146972-1	GWE-3D-1217	Water	12/05/17 09:27	12/15/17 17:10
680-146972-2	GWE-2D-1217	Water	12/05/17 11:00	12/15/17 17:10
680-146972-3	CPA-MW-5D-1217	Water	12/05/17 12:20	12/15/17 17:10
680-146972-4	CPA-MW-5D-1217	Water	12/05/17 13:50	12/15/17 17:10
680-146972-5	CPA-MW-4D-1217	Water	12/05/17 15:25	12/15/17 17:10

SJD 2/14/18
TestAmerica Savannah

Method Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
RSK-175	Dissolved Gases (GC)	RSK	TAL SAV
6010C	Metals (ICP)	SW846	TAL SAV
325.2-1978	Chloride	MCAWW	TAL SAV
353.2-1993 R2.0	Nitrogen, Nitrate-Nitrite	MCAWW	TAL SAV
375.4-1978	Sulfate	MCAWW	TAL SAV
415.1-1974	DOC	MCAWW	TAL SAV
415.1-1974	TOC	MCAWW	TAL SAV
SM 2320B	Alkalinity	SM	TAL CF
SM 4500 CO2 C	Free Carbon Dioxide	SM	TAL CF

Protocol References:

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

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

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 CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

SJD 2/14/18

TestAmerica Savannah

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

GC VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
H	Sample was prepped or analyzed beyond the specified holding time
U	Indicates the analyte was analyzed for but not detected.

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	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
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 (Radiochemistry)
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)

SJD 2/14/18

Detection Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: GWE-3D-1217 — Lab Sample ID: 680-146392-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	1700	D	20		ug/L	20		8260B	Total/NA
1,4-Dichlorobenzene	150	D	20		ug/L	20		8260B	Total/NA

Client Sample ID: GWE-3D-F(0.2)-1217 — Lab Sample ID: 680-146392-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	27		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.82		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	6.9		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: GWE-2D-1217 — Lab Sample ID: 680-146392-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	89		1.0		ug/L	1		8260B	Total/NA
1,2-Dichlorobenzene	1.5		1.0		ug/L	1		8260B	Total/NA
1,4-Dichlorobenzene	1.4		1.0		ug/L	1		8260B	Total/NA

Client Sample ID: GWE-2D-F(0.2)-1217 — Lab Sample ID: 680-146392-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	18		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.44		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	4.2		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: CPA-MW-5D-1217 — Lab Sample ID: 680-146392-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	1800	D	20		ug/L	20		8260B	Total/NA

Client Sample ID: CPA-MW-5D-F(0.2)-1217 — Lab Sample ID: 680-146392-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	16		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.66		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	5.4		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: BSA-MW-5D-1217 — Lab Sample ID: 680-146392-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	100		1.0		ug/L	1		8260B	Total/NA

Client Sample ID: BSA-MW-5D-F(0.2)-1217 — Lab Sample ID: 680-146392-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	12		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.26		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	9.5		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: 47Q17 Trip Blank #2 — Lab Sample ID: 680-146392-9

No Detections.

This Detection Summary does not include radiochemical test results.

SJD 2/14/18
TestAmerica Savannah

Detection Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: CPA-MW-4D-1217 — Lab Sample ID: 680-146392-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	140		1.0		ug/L	1		8260B	Total/NA
1,4-Dichlorobenzene	2.2		1.0		ug/L	1		8260B	Total/NA

Client Sample ID: CPA-MW-4D-F(0.2)-1217 — Lab Sample ID: 680-146392-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	15		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.41		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	7.5		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: GWE-3D-1217 — Lab Sample ID: 680-146972-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methane	79		0.58		ug/L	1		RSK-175	Total/NA
Iron	28		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.86		0.010		mg/L	1		6010C	Total Recoverable
Chloride	1500	P	50		mg/L	50		325.2-1978	Total/NA
Sulfate	380	P	100		mg/L	20		375.4-1978	Total/NA
Total Organic Carbon	6.7		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	450	~~H~~ J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	89	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

Client Sample ID: GWE-2D-1217 — Lab Sample ID: 680-146972-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methane	12		0.58		ug/L	1		RSK-175	Total/NA
Iron	18		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.42		0.010		mg/L	1		6010C	Total Recoverable
Chloride	640	D	20		mg/L	20		325.2-1978	Total/NA
Sulfate	730	D	250		mg/L	50		375.4-1978	Total/NA
Total Organic Carbon	3.7		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	370	~~H~~ J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	57	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

Client Sample ID: CPA-MW-5D-1217 — Lab Sample ID: 680-146972-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methane	87		0.58		ug/L	1		RSK-175	Total/NA
Iron	17		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.66		0.010		mg/L	1		6010C	Total Recoverable
Chloride	200	P	5.0		mg/L	5		325.2-1978	Total/NA
Sulfate	40	D	25		mg/L	5		375.4-1978	Total/NA
Total Organic Carbon	5.2		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	600	~~H~~ J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	110	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

This Detection Summary does not include radiochemical test results.

SJD 2/14/18
TestAmerica Savannah

Detection Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: CPA-MW-5D-1217 — Lab Sample ID: 680-146972-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethane	9.2		1.1		ug/L	1		RSK-175	Total/NA
Methane (TCD)	5900		390		ug/L	1		RSK-175	Total/NA
Iron	12		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.26		0.010		mg/L	1		6010C	Total Recoverable
Chloride	170	D	5.0		mg/L	5		325.2-1978	Total/NA
Total Organic Carbon	7.8		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	580	~~H~~ J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	67	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

Client Sample ID: CPA-MW-4D-1217 — Lab Sample ID: 680-146972-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethane	7.8		1.1		ug/L	1		RSK-175	Total/NA
Methane (TCD)	11000		390		ug/L	1		RSK-175	Total/NA
Iron	15		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.41		0.010		mg/L	1		6010C	Total Recoverable
Chloride	210	D	5.0		mg/L	5		325.2-1978	Total/NA
Total Organic Carbon	7.4		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	610	~~H~~ J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	78	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

This Detection Summary does not include radiochemical test results.

SSD 2/14/18
TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: GWE-3D-1217
Date Collected: 12/05/17 09:27
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	20	U	20		ug/L			12/11/17 19:46	20
Chlorobenzene	**1700**	D	20		ug/L			12/11/17 19:46	20
1,2-Dichlorobenzene	20	U	20		ug/L			12/11/17 19:46	20
1,3-Dichlorobenzene	20	U	20		ug/L			12/11/17 19:46	20
1,4-Dichlorobenzene	**150**	D	20		ug/L			12/11/17 19:46	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*80 - 120*		*12/11/17 19:46*	*20*
1,2-Dichloroethane-d4 (Surr)	*90*		*73 - 131*		*12/11/17 19:46*	*20*
Dibromofluoromethane (Surr)	*97*		*80 - 122*		*12/11/17 19:46*	*20*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*12/11/17 19:46*	*20*

SSD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: GWE-3D-F(0.2)-1217
Date Collected: 12/05/17 09:27
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-2
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	27		0.050		mg/L		12/11/17 17:28	12/12/17 18:59	1
Manganese, Dissolved	0.82		0.010		mg/L		12/11/17 17:28	12/12/17 18:59	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	6.9		1.0		mg/L			12/13/17 14:08	1

SJD 2/14/18
TestAmerica Savannah

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: GWE-2D-1217
Date Collected: 12/05/17 11:00
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/11/17 20:11	1
Chlorobenzene	**89**		1.0		ug/L			12/11/17 20:11	1
1,2-Dichlorobenzene	**1.5**		1.0		ug/L			12/11/17 20:11	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 20:11	1
1,4-Dichlorobenzene	**1.4**		1.0		ug/L			12/11/17 20:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*80 - 120*		*12/11/17 20:11*	*1*
1,2-Dichloroethane-d4 (Surr)	*81*		*73 - 131*		*12/11/17 20:11*	*1*
Dibromofluoromethane (Surr)	*93*		*80 - 122*		*12/11/17 20:11*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*12/11/17 20:11*	*1*

SJD 2/14/18

TestAmerica Savannah

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: GWE-2D-F(0.2)-1217
Date Collected: 12/05/17 11:00
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-4
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	18		0.050		mg/L		12/11/17 17:28	12/12/17 18:23	1
Manganese, Dissolved	0.44		0.010		mg/L		12/11/17 17:28	12/12/17 18:23	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	4.2		1.0		mg/L			12/13/17 14:24	1

SJD 2/14/18
TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: CPA-MW-5D-1217
Date Collected: 12/05/17 12:20
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	20	U	20		ug/L			12/11/17 20:36	20
Chlorobenzene	**1800**	D	20		ug/L			12/11/17 20:36	20
1,2-Dichlorobenzene	20	U	20		ug/L			12/11/17 20:36	20
1,3-Dichlorobenzene	20	U	20		ug/L			12/11/17 20:36	20
1,4-Dichlorobenzene	20	U	20		ug/L			12/11/17 20:36	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*97*		*80 - 120*		*12/11/17 20:36*	*20*
1,2-Dichloroethane-d4 (Surr)	*91*		*73 - 131*		*12/11/17 20:36*	*20*
Dibromofluoromethane (Surr)	*96*		*80 - 122*		*12/11/17 20:36*	*20*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*12/11/17 20:36*	*20*

SJD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: CPA-MW-5D-F(0.2)-1217
Date Collected: 12/05/17 12:20
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-6
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	16		0.050		mg/L		12/11/17 17:28	12/12/17 18:54	1
Manganese, Dissolved	0.66		0.010		mg/L		12/11/17 17:28	12/12/17 18:54	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	5.4		1.0		mg/L			12/13/17 14:41	1

SJD 2/14/18

TestAmerica Savannah

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: BSA-MW-5D-1217
Date Collected: 12/05/17 13:50
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/11/17 21:00	1
Chlorobenzene	**100**		1.0		ug/L			12/11/17 21:00	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 21:00	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 21:00	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 21:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*80 - 120*		*12/11/17 21:00*	*1*
1,2-Dichloroethane-d4 (Surr)	*89*		*73 - 131*		*12/11/17 21:00*	*1*
Dibromofluoromethane (Surr)	*93*		*80 - 122*		*12/11/17 21:00*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*12/11/17 21:00*	*1*

SJD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: BSA-MW-5D-F(0.2)-1217
Date Collected: 12/05/17 13:50
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-8
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	12		0.050		mg/L		12/11/17 17:28	12/12/17 18:38	1
Manganese, Dissolved	0.26		0.010		mg/L		12/11/17 17:28	12/12/17 18:38	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	9.5		1.0		mg/L			12/13/17 14:57	1

SJD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: 47Q17 Trip Blank #2
Date Collected: 12/05/17 00:00
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/11/17 16:29	1
Chlorobenzene	1.0	U	1.0		ug/L			12/11/17 16:29	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 16:29	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 16:29	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 16:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*97*		*80 - 120*		*12/11/17 16:29*	*1*
1,2-Dichloroethane-d4 (Surr)	*83*		*73 - 131*		*12/11/17 16:29*	*1*
Dibromofluoromethane (Surr)	*93*		*80 - 122*		*12/11/17 16:29*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*12/11/17 16:29*	*1*

SJD 2/14/18
TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: CPA-MW-4D-1217

Date Collected: 12/05/17 15:25
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-10

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/11/17 16:54	1
Chlorobenzene	**140**		1.0		ug/L			12/11/17 16:54	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 16:54	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 16:54	1
1,4-Dichlorobenzene	**2.2**		1.0		ug/L			12/11/17 16:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*80 - 120*		*12/11/17 16:54*	*1*
1,2-Dichloroethane-d4 (Surr)	*85*		*73 - 131*		*12/11/17 16:54*	*1*
Dibromofluoromethane (Surr)	*93*		*80 - 122*		*12/11/17 16:54*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*12/11/17 16:54*	*1*

SJD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: CPA-MW-4D-F(0.2)-1217
Date Collected: 12/05/17 15:25
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-11
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	15		0.050		mg/L		12/11/17 17:28	12/12/17 18:13	1
Manganese, Dissolved	0.41		0.010		mg/L		12/11/17 17:28	12/12/17 18:13	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	7.5		1.0		mg/L			12/13/17 15:14	1

SJD 2/14/18
TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: GWE-3D-1217

Date Collected: 12/05/17 09:27
Date Received: 12/15/17 17:10

Lab Sample ID: 680-146972-1

Matrix: Water

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/19/17 10:58	1
Ethylene	1.0	U	1.0		ug/L			12/19/17 10:58	1
Methane	**79**		0.58		ug/L			12/19/17 10:58	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**28**		0.050		mg/L		12/28/17 10:43	12/29/17 02:57	1
Manganese	**0.86**		0.010		mg/L		12/28/17 10:43	12/29/17 02:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**1500**	D	50		mg/L			12/21/17 11:06	50
Nitrate as N	0.050	U ~~H~~ J	0.050		mg/L			12/19/17 13:20	1
Sulfate	**380**	D	100		mg/L			12/21/17 10:35	20
Total Organic Carbon	**6.7**		1.0		mg/L			12/20/17 18:10	1
Alkalinity as CaCO3	**450**	~~H~~ J	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	**89**	~~HF~~ J	5.0		mg/L			12/26/17 11:04	1

SSD 2/14/18
TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: GWE-2D-1217

Date Collected: 12/05/17 11:00
Date Received: 12/15/17 17:10

Lab Sample ID: 680-146972-2

Matrix: Water

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/19/17 11:11	1
Ethylene	1.0	U	1.0		ug/L			12/19/17 11:11	1
Methane	**12**		0.58		ug/L			12/19/17 11:11	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**18**		0.050		mg/L		12/28/17 10:43	12/29/17 03:01	1
Manganese	**0.42**		0.010		mg/L		12/28/17 10:43	12/29/17 03:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**640**	D	20		mg/L			12/21/17 11:06	20
Nitrate as N	0.050	U H J	0.050		mg/L			12/19/17 13:21	1
Sulfate	**730**	D	250		mg/L			12/21/17 10:35	50
Total Organic Carbon	**3.7**		1.0		mg/L			12/20/17 19:23	1
Alkalinity as CaCO3	**370**	~~H~~ J	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	**57**	~~HF~~ J	5.0		mg/L			12/26/17 11:10	1

SDD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: CPA-MW-5D-1217

Lab Sample ID: 680-146972-3

Date Collected: 12/05/17 12:20
Date Received: 12/15/17 17:10

Matrix: Water

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/19/17 11:24	1
Ethylene	1.0	U	1.0		ug/L			12/19/17 11:24	1
Methane	**87**		0.58		ug/L			12/19/17 11:24	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**17**		0.050		mg/L		12/28/17 10:43	12/29/17 02:44	1
Manganese	**0.66**		0.010		mg/L		12/28/17 10:43	12/29/17 02:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**200**	D	5.0		mg/L			12/21/17 11:06	5
Nitrate as N	0.050	U ~~H~~ J	0.050		mg/L			12/19/17 13:23	1
Sulfate	**40**	D	25		mg/L			12/21/17 10:24	5
Total Organic Carbon	**5.2**		1.0		mg/L			12/20/17 20:08	1
Alkalinity as CaCO3	**600**	~~H~~ J	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	**110**	~~HF~~ J	5.0		mg/L			12/26/17 11:14	1

SJD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: CPA-MW-5D-1217

Lab Sample ID: 680-146972-4

Date Collected: 12/05/17 13:50
Date Received: 12/15/17 17:10

Matrix: Water

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	9.2		1.1		ug/L			12/19/17 11:36	1
Ethylene	1.0	U	1.0		ug/L			12/19/17 11:36	1
Methane (TCD)	5900		390		ug/L			12/19/17 11:36	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	12		0.050		mg/L		12/28/17 10:43	12/29/17 02:49	1
Manganese	0.26		0.010		mg/L		12/28/17 10:43	12/29/17 02:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	170	P	5.0		mg/L			12/21/17 11:06	5
Nitrate as N	0.050	U H3	0.050		mg/L			12/19/17 13:26	1
Sulfate	5.0	U	5.0		mg/L			12/21/17 10:00	1
Total Organic Carbon	7.8		1.0		mg/L			12/20/17 20:24	1
Alkalinity as CaCO3	580	~~H~~ 3	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	67	~~HF~~ 3	5.0		mg/L			12/26/17 11:17	1

SSD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: CPA-MW-4D-1217

Date Collected: 12/05/17 15:25
Date Received: 12/15/17 17:10

Lab Sample ID: 680-146972-5

Matrix: Water

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	**7.8**		1.1		ug/L			12/19/17 11:49	1
Ethylene	1.0	U	1.0		ug/L			12/19/17 11:49	1
Methane (TCD)	**11000**		390		ug/L			12/19/17 11:49	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**15**		0.050		mg/L		12/28/17 10:43	12/29/17 02:53	1
Manganese	**0.41**		0.010		mg/L		12/28/17 10:43	12/29/17 02:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**210**	D	5.0		mg/L			12/21/17 11:06	5
Nitrate as N	0.050	U H 3	0.050		mg/L			12/19/17 13:27	1
Sulfate	5.0	U	5.0		mg/L			12/21/17 10:21	1
Total Organic Carbon	**7.4**		1.0		mg/L			12/20/17 20:41	1
Alkalinity as CaCO3	**610**	H 3	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	**78**	H 3	5.0		mg/L			12/26/17 11:18	1

SJD 2/14/18

TestAmerica Savannah

Surrogate Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

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

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-146392-1	GWE-3D-1217	98	90	97	97
680-146392-3	GWE-2D-1217	100	81	93	99
680-146392-5	CPA-MW-5D-1217	97	91	96	97
680-146392-7	BSA-MW-5D-1217	98	89	93	99
680-146392-7 MS	BSA-MW-5D-1217	96	86	94	95
680-146392-7 MSD	BSA-MW-5D-1217	100	91	97	99
680-146392-9	47Q17 Trip Blank #2	97	83	93	101
680-146392-10	CPA-MW-4D-1217	99	85	93	100
LCS 680-505854/4	Lab Control Sample	93	92	97	96
LCSD 680-505854/5	Lab Control Sample Dup	97	92	98	100
MB 680-505854/9	Method Blank	99	84	91	96

Surrogate Legend

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

SJD 2/14/18

TestAmerica Savannah

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

Lab Sample ID: MB 680-505854/9
Matrix: Water
Analysis Batch: 505854

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/11/17 13:37	1
Chlorobenzene	1.0	U	1.0		ug/L			12/11/17 13:37	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 13:37	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 13:37	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/11/17 13:37	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*80 - 120*		*12/11/17 13:37*	*1*
1,2-Dichloroethane-d4 (Surr)	*84*		*73 - 131*		*12/11/17 13:37*	*1*
Dibromofluoromethane (Surr)	*91*		*80 - 122*		*12/11/17 13:37*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*12/11/17 13:37*	*1*

Lab Sample ID: LCS 680-505854/4
Matrix: Water
Analysis Batch: 505854

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	50.0	49.1		ug/L		98	80 - 120
Chlorobenzene	50.0	49.3		ug/L		99	80 - 120
1,2-Dichlorobenzene	50.0	48.9		ug/L		98	80 - 120
1,3-Dichlorobenzene	50.0	48.8		ug/L		98	80 - 120
1,4-Dichlorobenzene	50.0	49.0		ug/L		98	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*93*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*92*		*73 - 131*
Dibromofluoromethane (Surr)	*97*		*80 - 122*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*

Lab Sample ID: LCSD 680-505854/5
Matrix: Water
Analysis Batch: 505854

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
Benzene	50.0	50.5		ug/L		101	80 - 120	3	20
Chlorobenzene	50.0	49.8		ug/L		100	80 - 120	1	20
1,2-Dichlorobenzene	50.0	50.2		ug/L		100	80 - 120	3	20
1,3-Dichlorobenzene	50.0	49.3		ug/L		99	80 - 120	1	20
1,4-Dichlorobenzene	50.0	50.1		ug/L		100	80 - 120	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*97*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*92*		*73 - 131*
Dibromofluoromethane (Surr)	*98*		*80 - 122*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*

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

Lab Sample ID: 680-146392-7 MS
Matrix: Water
Analysis Batch: 505854

Client Sample ID: BSA-MW-5D-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	1.0	U	50.0	47.8		ug/L		96	80 - 120
Chlorobenzene	100		50.0	145		ug/L		87	80 - 120
1,2-Dichlorobenzene	1.0	U	50.0	46.9		ug/L		94	80 - 120
1,3-Dichlorobenzene	1.0	U	50.0	46.9		ug/L		94	80 - 120
1,4-Dichlorobenzene	1.0	U	50.0	46.5		ug/L		92	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*86*		*73 - 131*
Dibromofluoromethane (Surr)	*94*		*80 - 122*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*

Lab Sample ID: 680-146392-7 MSD
Matrix: Water
Analysis Batch: 505854

Client Sample ID: BSA-MW-5D-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	1.0	U	50.0	49.5		ug/L		99	80 - 120	3	20
Chlorobenzene	100		50.0	150		ug/L		98	80 - 120	4	20
1,2-Dichlorobenzene	1.0	U	50.0	49.4		ug/L		99	80 - 120	5	20
1,3-Dichlorobenzene	1.0	U	50.0	49.2		ug/L		98	80 - 120	5	20
1,4-Dichlorobenzene	1.0	U	50.0	50.3		ug/L		99	80 - 120	8	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*91*		*73 - 131*
Dibromofluoromethane (Surr)	*97*		*80 - 122*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 680-506930/10
Matrix: Water
Analysis Batch: 506930

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/19/17 10:36	1
Ethylene	1.0	U	1.0		ug/L			12/19/17 10:36	1
Methane	0.58	U	0.58		ug/L			12/19/17 10:36	1
Methane (TCD)	390	U	390		ug/L			12/19/17 10:36	1

Lab Sample ID: LCS 680-506930/3
Matrix: Water
Analysis Batch: 506930

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane (TCD)	1920	1700		ug/L		88	75 - 125

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Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCS 680-506930/7
Matrix: Water
Analysis Batch: 506930

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethane	288	274		ug/L		95	75 - 125
Ethylene	269	256		ug/L		95	75 - 125

Lab Sample ID: LCSD 680-506930/4
Matrix: Water
Analysis Batch: 506930

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
Methane (TCD)	1920	1730		ug/L		90	75 - 125	2	30

Lab Sample ID: LCSD 680-506930/8
Matrix: Water
Analysis Batch: 506930

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
Ethane	288	287		ug/L		99	75 - 125	5	30
Ethylene	269	268		ug/L		99	75 - 125	5	30

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-505935/1-A
Matrix: Water
Analysis Batch: 506233

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 505935

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	0.050	U	0.050		mg/L		12/11/17 13:55	12/12/17 19:41	1
Manganese, Dissolved	0.010	U	0.010		mg/L		12/11/17 13:55	12/12/17 19:41	1

Lab Sample ID: LCS 680-505935/2-A
Matrix: Water
Analysis Batch: 506233

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 505935

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron, Dissolved	10.0	10.1		mg/L		101	80 - 120
Manganese, Dissolved	1.00	1.06		mg/L		106	80 - 120

Lab Sample ID: MB 680-505982/1-A
Matrix: Water
Analysis Batch: 506233

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 505982

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	0.050	U	0.050		mg/L		12/11/17 17:28	12/12/17 17:36	1
Manganese, Dissolved	0.010	U	0.010		mg/L		12/11/17 17:28	12/12/17 17:36	1

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Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 680-505982/2-A
Matrix: Water
Analysis Batch: 506233

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 505982

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron, Dissolved	5.00	5.20		mg/L		104	80 - 120
Manganese, Dissolved	0.500	0.543		mg/L		109	80 - 120

Lab Sample ID: MB 680-507971/1-A
Matrix: Water
Analysis Batch: 508112

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 507971

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.050	U	0.050		mg/L		12/28/17 10:43	12/29/17 02:06	1
Manganese	0.010	U	0.010		mg/L		12/28/17 10:43	12/29/17 02:06	1

Lab Sample ID: LCS 680-507971/2-A
Matrix: Water
Analysis Batch: 508112

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 507971

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5.00	5.39		mg/L		108	80 - 120
Manganese	0.500	0.562		mg/L		112	80 - 120

Method: 325.2-1978 - Chloride

Lab Sample ID: MB 680-507401/4
Matrix: Water
Analysis Batch: 507401

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.0	U	1.0		mg/L			12/21/17 10:15	1

Lab Sample ID: LCS 680-507401/5
Matrix: Water
Analysis Batch: 507401

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	25.0	26.5		mg/L		106	85 - 115

Lab Sample ID: LCSD 680-507401/7
Matrix: Water
Analysis Batch: 507401

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
Chloride	25.0	26.7		mg/L		107	85 - 115	1	30

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Method: 353.2-1993 R2.0 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 680-507036/13
Matrix: Water
Analysis Batch: 507036

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	0.050	U	0.050		mg/L			12/19/17 13:12	1

Lab Sample ID: LCS 680-507036/16
Matrix: Water
Analysis Batch: 507036

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	0.500	0.508		mg/L		102	75 - 125
Nitrate Nitrite as N	1.00	1.01		mg/L		101	90 - 110
Nitrite as N	0.500	0.502		mg/L		100	90 - 110

Method: 375.4-1978 - Sulfate

Lab Sample ID: MB 680-507400/4
Matrix: Water
Analysis Batch: 507400

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	5.0	U	5.0		mg/L			12/21/17 10:17	1

Lab Sample ID: LCS 680-507400/5
Matrix: Water
Analysis Batch: 507400

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	20.0	18.1		mg/L		90	75 - 125

Lab Sample ID: LCSD 680-507400/7
Matrix: Water
Analysis Batch: 507400

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
Sulfate	20.0	19.5		mg/L		98	75 - 125	8	30

Method: 415.1-1974 - DOC

Lab Sample ID: MB 680-506528/2
Matrix: Water
Analysis Batch: 506528

Client Sample ID: Method Blank
Prep Type: Dissolved

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	1.0	U	1.0		mg/L			12/13/17 11:45	1

Lab Sample ID: LCS 680-506528/4
Matrix: Water
Analysis Batch: 506528

Client Sample ID: Lab Control Sample
Prep Type: Dissolved

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	20.0	20.7		mg/L		104	80 - 120

Lab Sample ID: LCSD 680-506528/5
Matrix: Water
Analysis Batch: 506528

Client Sample ID: Lab Control Sample Dup
Prep Type: Dissolved

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	20.0	20.2		mg/L		101	80 - 120	3	20

Method: 415.1-1974 - TOC

Lab Sample ID: MB 680-507316/2
Matrix: Water
Analysis Batch: 507316

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.0	U	1.0		mg/L			12/20/17 18:41	1

Lab Sample ID: LCS 680-507316/3
Matrix: Water
Analysis Batch: 507316

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	20.0	18.8		mg/L		94	80 - 120

Lab Sample ID: LCSD 680-507316/4
Matrix: Water
Analysis Batch: 507316

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
Total Organic Carbon	20.0	18.8		mg/L		94	80 - 120	0	25

Lab Sample ID: 680-146972-2 MS
Matrix: Water
Analysis Batch: 507316

Client Sample ID: GWE-2D-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	3.7		20.0	22.9		mg/L		96	80 - 120

Lab Sample ID: 680-146972-2 MSD
Matrix: Water
Analysis Batch: 507316

Client Sample ID: GWE-2D-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	3.7		20.0	23.3		mg/L		98	80 - 120	2	25

Lab Sample ID: MB 680-507320/2
Matrix: Water
Analysis Batch: 507320

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.0	U	1.0		mg/L			12/20/17 12:42	1

Lab Sample ID: LCS 680-507320/3
Matrix: Water
Analysis Batch: 507320

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	20.0	18.9		mg/L		94	80 - 120

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Lab Sample ID: LCSD 680-507320/4
Matrix: Water
Analysis Batch: 507320

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
Total Organic Carbon			20.0	18.8		mg/L		94	80 - 120	0	25

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-190007/1
Matrix: Water
Analysis Batch: 190007

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	5.0	U	5.0		mg/L			12/26/17 19:08	1

Lab Sample ID: LCS 310-190007/2
Matrix: Water
Analysis Batch: 190007

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Alkalinity as CaCO3			1060	1010		mg/L		96	90 - 110		

Method: SM 4500 CO2 C - Free Carbon Dioxide

Lab Sample ID: 680-146972-1 DU
Matrix: Water
Analysis Batch: 189992

Client Sample ID: GWE-3D-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Carbon Dioxide, Free	89	HF		85.0		mg/L				4	23

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TestAmerica Savannah

QC Association Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

GC/MS VOA

Analysis Batch: 505854

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146392-1	GWE-3D-1217	Total/NA	Water	8260B	
680-146392-3	GWE-2D-1217	Total/NA	Water	8260B	
680-146392-5	CPA-MW-5D-1217	Total/NA	Water	8260B	
680-146392-7	BSA-MW-5D-1217	Total/NA	Water	8260B	
680-146392-9	47Q17 Trip Blank #2	Total/NA	Water	8260B	
680-146392-10	CPA-MW-4D-1217	Total/NA	Water	8260B	
MB 680-505854/9	Method Blank	Total/NA	Water	8260B	
LCS 680-505854/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-505854/5	Lab Control Sample Dup	Total/NA	Water	8260B	
680-146392-7 MS	BSA-MW-5D-1217	Total/NA	Water	8260B	
680-146392-7 MSD	BSA-MW-5D-1217	Total/NA	Water	8260B	

GC VOA

Analysis Batch: 506930

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-1	GWE-3D-1217	Total/NA	Water	RSK-175	
680-146972-2	GWE-2D-1217	Total/NA	Water	RSK-175	
680-146972-3	CPA-MW-5D-1217	Total/NA	Water	RSK-175	
680-146972-4	CPA-MW-5D-1217	Total/NA	Water	RSK-175	
680-146972-5	CPA-MW-4D-1217	Total/NA	Water	RSK-175	
MB 680-506930/10	Method Blank	Total/NA	Water	RSK-175	
LCS 680-506930/3	Lab Control Sample	Total/NA	Water	RSK-175	
LCS 680-506930/7	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 680-506930/4	Lab Control Sample Dup	Total/NA	Water	RSK-175	
LCSD 680-506930/8	Lab Control Sample Dup	Total/NA	Water	RSK-175	

Metals

Prep Batch: 505935

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-505935/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-505935/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 505982

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146392-2	GWE-3D-F(0.2)-1217	Dissolved	Water	3005A	
680-146392-4	GWE-2D-F(0.2)-1217	Dissolved	Water	3005A	
680-146392-6	CPA-MW-5D-F(0.2)-1217	Dissolved	Water	3005A	
680-146392-8	BSA-MW-5D-F(0.2)-1217	Dissolved	Water	3005A	
680-146392-11	CPA-MW-4D-F(0.2)-1217	Dissolved	Water	3005A	
MB 680-505982/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-505982/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 506233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146392-2	GWE-3D-F(0.2)-1217	Dissolved	Water	6010C	505982
680-146392-4	GWE-2D-F(0.2)-1217	Dissolved	Water	6010C	505982
680-146392-6	CPA-MW-5D-F(0.2)-1217	Dissolved	Water	6010C	505982
680-146392-8	BSA-MW-5D-F(0.2)-1217	Dissolved	Water	6010C	505982

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Metals (Continued)

Analysis Batch: 506233 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146392-11	CPA-MW-4D-F(0.2)-1217	Dissolved	Water	6010C	505982
MB 680-505935/1-A	Method Blank	Total Recoverable	Water	6010C	505935
MB 680-505982/1-A	Method Blank	Total Recoverable	Water	6010C	505982
LCS 680-505935/2-A	Lab Control Sample	Total Recoverable	Water	6010C	505935
LCS 680-505982/2-A	Lab Control Sample	Total Recoverable	Water	6010C	505982

Prep Batch: 507971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-1	GWE-3D-1217	Total Recoverable	Water	3005A	
680-146972-2	GWE-2D-1217	Total Recoverable	Water	3005A	
680-146972-3	CPA-MW-5D-1217	Total Recoverable	Water	3005A	
680-146972-4	CPA-MW-5D-1217	Total Recoverable	Water	3005A	
680-146972-5	CPA-MW-4D-1217	Total Recoverable	Water	3005A	
MB 680-507971/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-507971/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 508112

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-1	GWE-3D-1217	Total Recoverable	Water	6010C	507971
680-146972-2	GWE-2D-1217	Total Recoverable	Water	6010C	507971
680-146972-3	CPA-MW-5D-1217	Total Recoverable	Water	6010C	507971
680-146972-4	CPA-MW-5D-1217	Total Recoverable	Water	6010C	507971
680-146972-5	CPA-MW-4D-1217	Total Recoverable	Water	6010C	507971
MB 680-507971/1-A	Method Blank	Total Recoverable	Water	6010C	507971
LCS 680-507971/2-A	Lab Control Sample	Total Recoverable	Water	6010C	507971

General Chemistry

Analysis Batch: 189992

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-1	GWE-3D-1217	Total/NA	Water	SM 4500 CO2 C	
680-146972-2	GWE-2D-1217	Total/NA	Water	SM 4500 CO2 C	
680-146972-3	CPA-MW-5D-1217	Total/NA	Water	SM 4500 CO2 C	
680-146972-4	CPA-MW-5D-1217	Total/NA	Water	SM 4500 CO2 C	
680-146972-5	CPA-MW-4D-1217	Total/NA	Water	SM 4500 CO2 C	
680-146972-1 DU	GWE-3D-1217	Total/NA	Water	SM 4500 CO2 C	

Analysis Batch: 190007

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-1	GWE-3D-1217	Total/NA	Water	SM 2320B	
680-146972-2	GWE-2D-1217	Total/NA	Water	SM 2320B	
680-146972-3	CPA-MW-5D-1217	Total/NA	Water	SM 2320B	
680-146972-4	CPA-MW-5D-1217	Total/NA	Water	SM 2320B	
680-146972-5	CPA-MW-4D-1217	Total/NA	Water	SM 2320B	
MB 310-190007/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-190007/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 506528

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146392-2	GWE-3D-F(0.2)-1217	Dissolved	Water	415.1-1974	

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General Chemistry (Continued)

Analysis Batch: 506528 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146392-4	GWE-2D-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146392-6	CPA-MW-5D-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146392-8	BSA-MW-5D-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146392-11	CPA-MW-4D-F(0.2)-1217	Dissolved	Water	415.1-1974	
MB 680-506528/2	Method Blank	Dissolved	Water	415.1-1974	
LCS 680-506528/4	Lab Control Sample	Dissolved	Water	415.1-1974	
LCSD 680-506528/5	Lab Control Sample Dup	Dissolved	Water	415.1-1974	

Analysis Batch: 507036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-1	GWE-3D-1217	Total/NA	Water	353.2-1993 R2.0	
680-146972-2	GWE-2D-1217	Total/NA	Water	353.2-1993 R2.0	
680-146972-3	CPA-MW-5D-1217	Total/NA	Water	353.2-1993 R2.0	
680-146972-4	CPA-MW-5D-1217	Total/NA	Water	353.2-1993 R2.0	
680-146972-5	CPA-MW-4D-1217	Total/NA	Water	353.2-1993 R2.0	
MB 680-507036/13	Method Blank	Total/NA	Water	353.2-1993 R2.0	
LCS 680-507036/16	Lab Control Sample	Total/NA	Water	353.2-1993 R2.0	

Analysis Batch: 507316

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-2	GWE-2D-1217	Total/NA	Water	415.1-1974	
680-146972-3	CPA-MW-5D-1217	Total/NA	Water	415.1-1974	
680-146972-4	CPA-MW-5D-1217	Total/NA	Water	415.1-1974	
680-146972-5	CPA-MW-4D-1217	Total/NA	Water	415.1-1974	
MB 680-507316/2	Method Blank	Total/NA	Water	415.1-1974	
LCS 680-507316/3	Lab Control Sample	Total/NA	Water	415.1-1974	
LCSD 680-507316/4	Lab Control Sample Dup	Total/NA	Water	415.1-1974	
680-146972-2 MS	GWE-2D-1217	Total/NA	Water	415.1-1974	
680-146972-2 MSD	GWE-2D-1217	Total/NA	Water	415.1-1974	

Analysis Batch: 507320

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-1	GWE-3D-1217	Total/NA	Water	415.1-1974	
MB 680-507320/2	Method Blank	Total/NA	Water	415.1-1974	
LCS 680-507320/3	Lab Control Sample	Total/NA	Water	415.1-1974	
LCSD 680-507320/4	Lab Control Sample Dup	Total/NA	Water	415.1-1974	

Analysis Batch: 507400

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-1	GWE-3D-1217	Total/NA	Water	375.4-1978	
680-146972-2	GWE-2D-1217	Total/NA	Water	375.4-1978	
680-146972-3	CPA-MW-5D-1217	Total/NA	Water	375.4-1978	
680-146972-4	CPA-MW-5D-1217	Total/NA	Water	375.4-1978	
680-146972-5	CPA-MW-4D-1217	Total/NA	Water	375.4-1978	
MB 680-507400/4	Method Blank	Total/NA	Water	375.4-1978	
LCS 680-507400/5	Lab Control Sample	Total/NA	Water	375.4-1978	
LCSD 680-507400/7	Lab Control Sample Dup	Total/NA	Water	375.4-1978	

Analysis Batch: 507401

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-1	GWE-3D-1217	Total/NA	Water	325.2-1978	

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General Chemistry (Continued)

Analysis Batch: 507401 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146972-2	GWE-2D-1217	Total/NA	Water	325.2-1978	
680-146972-3	CPA-MW-5D-1217	Total/NA	Water	325.2-1978	
680-146972-4	CPA-MW-5D-1217	Total/NA	Water	325.2-1978	
680-146972-5	CPA-MW-4D-1217	Total/NA	Water	325.2-1978	
MB 680-507401/4	Method Blank	Total/NA	Water	325.2-1978	
LCS 680-507401/5	Lab Control Sample	Total/NA	Water	325.2-1978	
LCSD 680-507401/7	Lab Control Sample Dup	Total/NA	Water	325.2-1978	

SJD 2/14/16

Lab Chronicle

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: GWE-3D-1217

Lab Sample ID: 680-146392-1
Matrix: Water
Date Collected: 12/05/17 09:27
Date Received: 12/06/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	505854	12/11/17 19:46	JLK	TAL SAV

Client Sample ID: GWE-3D-F(0.2)-1217

Lab Sample ID: 680-146392-2
Matrix: Water
Date Collected: 12/05/17 09:27
Date Received: 12/06/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505982	12/11/17 17:28	BCB	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/12/17 18:59	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 14:08	KLD	TAL SAV

Client Sample ID: GWE-2D-1217

Lab Sample ID: 680-146392-3
Matrix: Water
Date Collected: 12/05/17 11:00
Date Received: 12/06/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	505854	12/11/17 20:11	JLK	TAL SAV

Client Sample ID: GWE-2D-F(0.2)-1217

Lab Sample ID: 680-146392-4
Matrix: Water
Date Collected: 12/05/17 11:00
Date Received: 12/06/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505982	12/11/17 17:28	BCB	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/12/17 18:23	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 14:24	KLD	TAL SAV

Client Sample ID: CPA-MW-5D-1217

Lab Sample ID: 680-146392-5
Matrix: Water
Date Collected: 12/05/17 12:20
Date Received: 12/06/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	505854	12/11/17 20:36	JLK	TAL SAV

Client Sample ID: CPA-MW-5D-F(0.2)-1217

Lab Sample ID: 680-146392-6
Matrix: Water
Date Collected: 12/05/17 12:20
Date Received: 12/06/17 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505982	12/11/17 17:28	BCB	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/12/17 18:54	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 14:41	KLD	TAL SAV

SJD 2/14/18

TestAmerica Savannah

Lab Chronicle

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: BSA-MW-5D-1217
Date Collected: 12/05/17 13:50
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	505854	12/11/17 21:00	JLK	TAL SAV

Client Sample ID: BSA-MW-5D-F(0.2)-1217
Date Collected: 12/05/17 13:50
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505982	12/11/17 17:28	BCB	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/12/17 18:38	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 14:57	KLD	TAL SAV

Client Sample ID: 47Q17 Trip Blank #2
Date Collected: 12/05/17 00:00
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	505854	12/11/17 16:29	JLK	TAL SAV

Client Sample ID: CPA-MW-4D-1217
Date Collected: 12/05/17 15:25
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	505854	12/11/17 16:54	JLK	TAL SAV

Client Sample ID: CPA-MW-4D-F(0.2)-1217
Date Collected: 12/05/17 15:25
Date Received: 12/06/17 09:20

Lab Sample ID: 680-146392-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505982	12/11/17 17:28	BCB	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/12/17 18:13	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 15:14	KLD	TAL SAV

Client Sample ID: GWE-3D-1217
Date Collected: 12/05/17 09:27
Date Received: 12/15/17 17:10

Lab Sample ID: 680-146972-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	506930	12/19/17 10:58	KAB	TAL SAV
Total Recoverable	Prep	3005A			507971	12/28/17 10:43	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1	508112	12/29/17 02:57	BCB	TAL SAV

SDD 2/14/18
TestAmerica Savannah

Lab Chronicle

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: GWE-3D-1217

Lab Sample ID: 680-146972-1

Date Collected: 12/05/17 09:27
Matrix: Water
Date Received: 12/15/17 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	325.2-1978		50	507401	12/21/17 11:06	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	507036	12/19/17 13:20	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		20	507400	12/21/17 10:35	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	507320	12/20/17 18:10	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 11:04	LBB	TAL CF

Client Sample ID: GWE-2D-1217

Lab Sample ID: 680-146972-2

Date Collected: 12/05/17 11:00
Matrix: Water
Date Received: 12/15/17 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	506930	12/19/17 11:11	KAB	TAL SAV
Total Recoverable	Prep	3005A			507971	12/28/17 10:43	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1	508112	12/29/17 03:01	BCB	TAL SAV
Total/NA	Analysis	325.2-1978		20	507401	12/21/17 11:06	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	507036	12/19/17 13:21	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		50	507400	12/21/17 10:35	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	507316	12/20/17 19:23	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 11:10	LBB	TAL CF

Client Sample ID: CPA-MW-5D-1217

Lab Sample ID: 680-146972-3

Date Collected: 12/05/17 12:20
Matrix: Water
Date Received: 12/15/17 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	506930	12/19/17 11:24	KAB	TAL SAV
Total Recoverable	Prep	3005A			507971	12/28/17 10:43	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1	508112	12/29/17 02:44	BCB	TAL SAV
Total/NA	Analysis	325.2-1978		5	507401	12/21/17 11:06	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	507036	12/19/17 13:23	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		5	507400	12/21/17 10:24	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	507316	12/20/17 20:08	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 11:14	LBB	TAL CF

SJD 2/14/18
TestAmerica Savannah

Lab Chronicle

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Client Sample ID: CPA-MW-5D-1217

Date Collected: 12/05/17 13:50
Date Received: 12/15/17 17:10

Lab Sample ID: 680-146972-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	506930	12/19/17 11:36	KAB	TAL SAV
Total Recoverable	Prep	3005A			507971	12/28/17 10:43	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1	508112	12/29/17 02:49	BCB	TAL SAV
Total/NA	Analysis	325.2-1978		5	507401	12/21/17 11:06	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	507036	12/19/17 13:26	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		1	507400	12/21/17 10:00	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	507316	12/20/17 20:24	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 11:17	LBB	TAL CF

Client Sample ID: CPA-MW-4D-1217

Date Collected: 12/05/17 15:25
Date Received: 12/15/17 17:10

Lab Sample ID: 680-146972-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	506930	12/19/17 11:49	KAB	TAL SAV
Total Recoverable	Prep	3005A			507971	12/28/17 10:43	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1	508112	12/29/17 02:53	BCB	TAL SAV
Total/NA	Analysis	325.2-1978		5	507401	12/21/17 11:06	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	507036	12/19/17 13:27	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		1	507400	12/21/17 10:21	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	507316	12/20/17 20:41	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 11:18	LBB	TAL CF

Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401
TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

SJD 2/14/18
TestAmerica Savannah

TestAmerica Savannah

5102 LaRoche Avenue
Suite C-10
Savannah, GA 31404
Phone: 912.354.7858 Fax:

Chain of Custody Record 220339

681-Atlanta

Regulatory Program: ☐ DW ☐ NPDES ☑ RCRA ☐ Other:

681-Atlanta

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Client Contact	Project Manager: Amanda Derbake	Site Contact: Samantha Direnzo	Date: 12/5/17	COC No:
Company Name: Golder Associates	Tel/Fax: 636-724-9191	Lab Contact: Michele Kersey	Carrier: FedEx	1 of 2 COCs
Address: 820 S Main St #100	Analysis Turnaround Time			Sampler: RJF
City/State/Zip: St Charles, MO 63301	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 636-724-9191	TAT if different from Below Standard			Walk-in Client:
Fax:	☑ 2 weeks			Lab Sampling:
Project Name: 4Q17 LTM GW Sampling - MO33X5	☐ 1 week			
Site: Sauget WB Krummrich Facility	☐ 2 days			Job / SDG No.:
PO# 42262863	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOCs 8260	Total Fe/Mn 6010C	Mn/Ca 310.1	Chloride 325.2/SM4500	Diss Gas RSK 175	Nitrate 353.2	TOC 415.1	Diss Fe/Mn 6010C DOC 415.1	Sample Specific Notes:
GWE-3D-1217	12/5/17	0927	G	W	14	N		3	1	1	1	3	2	3		
GWE-3D-F(0.2)-1217		⊥			4	Y									1 3	
GWE-2D-1217		1100			14	N		3	1	1	1	3	2	3		
GWE-2D-F(0.2)-1217		⊥			4	Y									1 3	
CPA-MW-5D-1217		1220			14	N		3	1	1	1	3	2	3		
CPA-MW-~~F(0.2)-1217~~-5D-F(0.2)-1217		⊥			4	Y									1 3	
BSA-MW-5D-1217		1350			14	N		3	1	1	1	3	2	3		
BSA-MW-~~F(0.2)-1217~~-5D-F(0.2)-1217					4	Y									1 3	
BSA-MW-5D-1217-MS					3	N		3	~~1~~	~~1~~	~~1~~	3	2	3		
BSA-MW-5D-1217-MSD					3	N		3								
4Q17 Trip Blank #2		—			2	N		2								
BSA-MW-4D-1217	12/5/17	1525	G	W	14	N		3	1	1	1	3	2	3		

680-146392 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

2.5 (CF-0.5) 2.0

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd.: _____ Corr'd: _____	Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
	Golder	12/5/17 1700			12/6/17 0920

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TestAmerica Savannah 680-146392 **Chain of Custody Record** 220337

5102 LaRoche Avenue
Suite C-10
Savannah, GA 31404
Phone: 912.354.7858 Fax:

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact		Project Manager: Amanda Derhake		Site Contact: Samantha Dilanzo	Date: 12/5/17	COC No:
Company Name:	Golder Associates	Tel/Fax:	636-724-7191	Lab Contact: Michele Kersey	Carrier: FedEx	2 of 2 COCs
Address:	820 S Main St #100	Analysis Turnaround Time				Sampler: RJF
City/State/Zip:	St Charles, MO 63301	☑ CALENDAR DAYS	☐ WORKING DAYS			For Lab Use Only:
Phone:	636-724-7191	TAT if different from Below	Standard			Walk-in Client:
Fax:	—	☑ 2 weeks				Lab Sampling:
Project Name:	4Q17 LTM GW Sampling-1403345	☐ 1 week				
Site:	Solutia WG Krummrich Facility	☐ 2 days				Job / SDG No.:
P O #	42262863	☐ 1 day				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Diss Fe/Mn 6010C	DOC 415.1	Sample Specific Notes:
85A-MW-4D-F(0.2)-1217	12/5/17	1525	G	W	4	Y		1	3	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☑ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments: 2.5 CF-0.5 2.0

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ______ Corr'd: ______ Therm ID No.: ______

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Tommy Goodwin [signature]	Golder	12/5/17/1700			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Company: TA-SAV	Date/Time: 12/6/17 0920

SJD 2/14/18

TestAmerica Savannah
5102 LaRoche Avenue
Suite C-10
Savannah, GA 31404
Phone: 912.354.7858 Fax:

Chain of Custody Record 220339

681-Atlanta 681-Atlanta

TestAmerica THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: DW NPDES ✓RCRA Other

Client Contact	Project Manager: Amanda Derhake	Site Contact: Samantha DiLeone	Date: 12/5/17
Company Name: Golder Associates	Tel/Fax: 636 724-9191	Lab Contact: Michele Kersey	Carrier: FedEx
Address: 820 S Main St #100	Analysis Turnaround Time		
City/State/Zip: St Charles, MO 63301	✓ CALENDAR DAYS / WORKING DAYS		
Phone: 636-724-9191	TAT if different from Below: Standard		
Fax:	2 weeks / 1 week / 2 days / 1 day		
Project Name: 4Q17 LTM GW Sampling - M03375			
Site: Solutia WG Krummrich Facility			
PO# 42262863			

COC No: 1 of 2 COCs
Sampler: RJF
For Lab Use Only:
Walk-in Client
Lab Sampling
Job / SDG No

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	VOCs 8260	Total Fe/Mn 6010C	Alk/CO2 310.1	Chloride 325.2/Sulfate	Diss Gas RSK 175	Nitrate 353.2	TOC 415.1	Diss Fe/Mn 6010C	DOC 415.1	Sample Specific Notes
GWE-3D-1217	12/5/17	0927	G	W	14	N		3	1	1	1	3	2	3			
GWE-3D-F(0.2)-1217	↓	↓	↓	↓	4	Y									1	3	
GWE-2D-1217	↓	1100	↓	↓	14	N		3	1	1	1	3	2	3			
GWE-2D-F(0.2)-1217	↓	↓	↓	↓	4	Y									1	3	
CPA-MW-5D-1217	↓	1220	↓	↓	14	N		3	1	1	1	3	2	3			
CPA-MW-~~F(0.2)-1217~~-5D-F(0.2)-1217	↓	↓	↓	↓	4	Y									1	3	
BSA-MW-5D-1217	↓	1350	↓	↓	14	N		3	1	1	1	3	2	3			
BSA-MW-~~F(0.2)-1217~~-5D-F(0.2)-1217	↓	↓	↓	↓	4	Y									1	3	
BSA-MW-5D-1217-MS	↓	↓	↓	↓	8	N		3	~~1~~	~~1~~	~~1~~	~~3~~	~~2~~	~~3~~			
BSA-MW-5D-1217-MSD	↓	↓	↓	↓	8	N		3									
4Q17 Trip Blank #2	↓	—	↓	↓	2	N		2									
BSA-MW-4D-1217	12/5/17	1525	G	W	14	N		3	1	1	1	3	2	3			

680-146972 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
✓ Non-Hazard Flammable Skin Irritant Poison B Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Return to Client ✓ Disposal by Lab Archive for ____ Months

Special Instructions/QC Requirements & Comments: 2.5 (CF -0.5) 2.0 4.3(4.7)

Custody Seals Intact: Yes No | Custody Seal No | Cooler Temp (°C) Obs'd ____ Corr'd ____ | Therm ID No ____

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
[signature]	Golder	12/5/17 1720			
Relinquished by	Company	Date/Time	Received by: [signature]	TA	12/5/17 1710
Relinquished by	Company	Date/Time	Received in Laboratory by: [signature]	TA SAV	12/6/17 0520

SJD 2/14/18

13

TestAmerica Savannah 680-146392

5102 LaRoche Avenue
Suite C-10
Savannah, GA 31404
Phone: 912.354.7858 Fax:

Chain of Custody Record

220337

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: DW NPDES RCRA Other:

Client Contact		
Company Name: Golder Associates	Project Manager: Amanda Derhake	Site Contact: Samantha Dilario
Address: 820 S Main St #100	Tel/Fax: 636-724-9191	Lab Contact: Michele Kersey
City/State/Zip: St Charles, MO 63301	Analysis Turnaround Time: ✓ CALENDAR DAYS / WORKING DAYS	Date: 12/5/17
Phone: 636-724-9191	TAT if different from Below: Standard	Carrier: FedEx
Fax: —	2 weeks / 1 week / 2 days / 1 day	COC No: 2 of 2 COCs
Project Name: 4Q17 LTM GW Sampling-1403395		Sampler: RJF
Site: Sioux WG Krommich Facility		For Lab Use Only: Walk-in Client / Lab Sampling
PO# 42262863		Job / SDG No.

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Diss Fe/Mn 6010C	Diss 415.1	Sample Specific Notes
BSA-MW-4D-F(0.2)-1217	12/5/17	1525	G	W	4	Y		1	3	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
✓ Non-Hazard Flammable Skin Irritant Poison B Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Return to Client ✓ Disposal by Lab Archive for ____ Months

Special Instructions/QC Requirements & Comments: 2.5 CCF-0582.0

Custody Seals Intact: Yes No | Custody Seal No. | Cooler Temp. (°C) Obs'd ____ Corr'd ____ | Therm ID No. ____

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
[signature]	Golder	12/5/17/1700			
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received in Laboratory by: [signature]	TASA	12/6/17 0920

SJD 2/14/18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

680-146972 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: TA- Savannah

City/State: CITY: Savannah STATE: GA | Project:

Receipt Information

Date/Time Received: DATE: 12/23/17 TIME: 1005 | Received By: MRH

Delivery Type: ☐ UPS ☒ FedEx Sat Del ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☐ TA Courier ☐ TA Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☐ Yes ☒ No *If yes:* Cooler # _____ of _____

Cooler Custody Seals Present? ☒ Yes ~~☒ No~~ MRH 12/23/17 *If yes:* Cooler custody seals intact? ☒ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: J | Correction Factor (°C): +0.1

• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 0.3 | Corrected Temp (°C): 0.4

• Sample Container Temperature

Sample ID(s) & bottle type used: CONTAINER 1 | CONTAINER 2

Uncorrected Temp (°C): TEMP 1 | TEMP 2 | Corrected Temp (°C): TEMP 1 | TEMP 2

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

SJD 2/14/18

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone (912) 354-7858 Fax (912) 352-0165

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Kersey, Michele R	Carrier Tracking No(s):	COC No: 680-502683.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: michele.kersey@testamericainc.com	State of Origin: Illinois	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): NELAP - Illinois		Job #: 680-146972-1
Address: 704 Enterprise Drive,	Due Date Requested: 12/26/2017			
City: Cedar Falls	TAT Requested (days):			
State, Zip: IA, 50613				
Phone: 319-277-2401(Tel) 319-277-2425(Fax)	PO #:			
Email:	WO #:			
Project Name: WGK Long Term Monitoring (LTM)	Project #: 68001754			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2O3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - pH 4-5; Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2320B/ Alkalinity	SM4500_CO2_C/ (MOD) Copy Analytes	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X			X	
GWE-3D-1217 (680-146972-1)	12/5/17	09:27 Central		Water			X	X	1	
GWD-2D-1217 (680-146972-2)	12/5/17	11:00 Central		Water			X	X	1	
CPA-MW-5D-1217 (680-146972-3)	12/5/17	12:20 Central		Water			X	X	1	
BSA-MW-5D-1217 (680-146972-4)	12/5/17	13:50 Central		Water			X	X	1	
BSA-MW-4D-1217 (680-146972-5)	12/5/17	15:25 Central		Water			X	X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	12/22/17 1800	TAL	[signature]	12/23/17 1005	TA-CF
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 09/20/2016

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SDD 2/14/18

Login Sample Receipt Checklist

Client: Solutia Inc.

Job Number: 680-146392-1
SDG Number: KPS206

Login Number: 146392
List Number: 1
Creator: Edwards, Jessica R

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
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.	False	Missing cooler containing MNA parameters
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.	N/A	
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	

SJD 2/14/18

Login Sample Receipt Checklist

Client: Solutia Inc.

Job Number: 680-146392-1
SDG Number: KPS206

Login Number: 146972
List Number: 1
Creator: Chamberlain, Kim A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
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.	False	IDs on containers do not match the COC. Logged in per COC.
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.	N/A	
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	

SJD 2/14/18

Login Sample Receipt Checklist

Client: Solutia Inc.

Job Number: 680-146392-1
SDG Number: KPS206

Login Number: 146972
List Number: 2
Creator: Hummel, Matt R

List Source: TestAmerica Cedar Falls
List Creation: 12/23/17 10:40 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
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 (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	

SSD 2/14/18

Accreditation/Certification Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	09-22-19
Arizona	State Program	9	AZ0808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-19
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-18
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-18
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-18 *
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-18
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-18
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-18
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-18
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

SJD 2/14/18

Accreditation/Certification Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146392-1
SDG: KPS206

Laboratory: TestAmerica Cedar Falls

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
AIHA-LAP, LLC	IHLAP		101044	11-01-18
Georgia	State Program	4	IA100001 (OR)	09-29-18
Illinois	NELAP	5	200024	11-29-18
Iowa	State Program	7	007	12-01-17 *
Minnesota	NELAP	5	019-999-319	12-31-18
Minnesota (Petrofund)	State Program	1	3349	08-22-18
North Dakota	State Program	8	R-186	09-29-18
Oregon	NELAP	10	IA100001	09-29-18

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah

SJD 2/14/18

Level IV Data Validation Summary
Solutia Inc., W.G. Krummrich, Sauget, Illinois
4Q17 Long-Term Monitoring Program

Company Name: Golder Associates
Project Name: WGK-4Q17 LTM
Reviewer: S. DiCenso
Laboratory: TestAmerica
SDG#: KPS200
Matrix: Water

Project Manager: A. Derhake
Project Number: 140-3345
Sample Date: December 2017

Analytical Method: VOC (8260B), Dissolved Gases (RSK-175), Metals (6010C), Alkalinity (310.1 and SM 2320B), Carbon Dioxide (SM 4500 CO2C), Chloride (325.2), Nitrogen, Nitrate-Nitrite (353.2), Sulfate (375.4), TOC (415.1), and DOC (415.1)

Sample Names: BSA-MW-4D-1217, BSA-MW-4D-F(0.2)-1217, BSA-MW-3D-1217, BSA-MW-3D-F(0.2)-1217, BSA-MW-3D-1217-EB, BSA-MW-2D-1217, BSA-MW-2D-F(0.2)-1217, CPA-MW-3D-1217, CPA-MW-3D-F(0.2)-1217, CPA-MW-3D-1217-AD, CPA-MW-1D-1217, CPA-MW-1D-F(0.2)-1217, 4Q17 LTM Trip Blank #3

Field Information	**YES**	**NO**	**NA**
a) Sampling dates noted?	☒	☐	☐
b) Does the laboratory narrative indicate deficiencies?	☒	☐	☐

Comments:

VOC: Insufficient sample volume to perform MS/MSD associated with batches 506145, 506162, and 506378.

Samples BSA-MW-4D, BSA-MW-3D, BSA-MW-2D, CPA-MW-3D, CPA-MW-3D-AD, and CPA-MW-1D required dilution prior to analysis, reporting limits were adjusted accordingly.

Dissolved Gases: No deficiencies noted.

Metals: No deficiencies noted.

Alkalinity: Due to instrument failure, samples BSA-MW-3D, BSA-MW-2D, CPA-MW-3D, and CPA-MW-1D sent to an alternate lab and analyzed outside of hold time.

Chloride: Samples BSA-MW-4D, BSA-MW-3D, BSA-MW-2D, CPA-MW-3D, and CPA-MW-1D required dilution prior to analysis, reporting limits were adjusted accordingly.

Nitrate-Nitrite as Nitrogen: Due to instrument failure, samples BSA-MW-4D and BSA-MW-3D analyzed outside of hold time.

Sulfate: Samples BSA-MW-4D and CPA-MW-3D required dilution prior to analysis, reporting limits were adjusted accordingly.

TOC: No deficiencies noted.

DOC: No deficiencies noted.

Free Carbon Dioxide: No deficiencies noted.

Chain-of-Custody (COC)	**YES**	**NO**	**NA**
a) Was the COC signed by both field and laboratory personnel?	☒	☐	☐
b) Were samples received in good condition?	☒	☐	☐

Comments: Samples were received at 1.0°C and 3.5°C, within the 0°C to 6°C criteria.

General	YES	NO	NA
a) Were hold times met for sample analysis?	☐	☒	☐
b) Were the correct preservatives used?	☒	☐	☐
c) Was the correct method used?	☐	☒	☐
d) Any sample dilutions noted?	☒	☐	☐

Comments: Due to instrument failure, samples were sent to an alternate lab and were analyzed under a different method for alkalinity (SM 2320B) and free carbon dioxide (SM 4500 CO2C). The instrument failure and sample re-shipment resulted in alkalinity, carbon dioxide, and nitrate analyzed outside of hold time.

Detections in diluted analysis were qualified.

GC/MS Instrument Performance Check (IPC) and Internal Standards (IS)	YES	NO	NA
a) IPC analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
b) Does BFB/DFTPP meet the ion abundance criteria?	☒	☐	☐
c) Internal Standard retention times and areas met appropriate criteria?	☒	☐	☐

Comments: None.

Calibrations	YES	NO	NA
a) Initial calibration analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
b) Continuing calibrations analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
c) Initial calibration verifications and blanks analyzed at the appropriate frequency and met the appropriate standards?	☐	☒	☐
d) Continuing calibration verifications and blanks analyzed at the appropriate frequency and met the appropriate standards?	☐	☒	☐

Comments: Some compounds did not meet calibration requirements; however, calibration criteria were met by analytes of interest. No data qualification was required.

Blanks	YES	NO	NA
a) Were blanks (trip, equipment, method) performed at required frequency?	☒	☐	☐
b) Were analytes detected in any blanks?	☒	☐	☐

Comments: Equipment blank for BSA-MW-3D was submitted with SDG KPS200.

Comments: Chlorobenzene was detected in the EB. No qualification was required due to analytes either not detected in associated sample, or detected at concentrations significantly greater than the EB detections.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA
a) Was MS/MSD accuracy criteria met?	☒	☐	☐
b) Was MS/MSD precision criteria met?	☒	☐	☐

Comments: None.

Laboratory Control Sample (LCS)	YES	NO	NA
a) LCS analyzed at the appropriate frequency and met appropriate standards?	☒	☐	☐

Comments: None.

Surrogate (System Monitoring) Compounds	**YES**	**NO**	**NA**
a) Surrogate compounds analyzed at the appropriate frequency and met appropriate standards?	☒	☐	☐

Comments: None.

Duplicates	**YES**	**NO**	**NA**
a) Were field duplicates collected?	☒	☐	☐
b) Was field duplicate precision criteria met?	☒	☐	☐

Comments: Duplicate sample CPA-MW-3D-1217-AD was submitted with SDG KPS200.

Additional Comments: None.

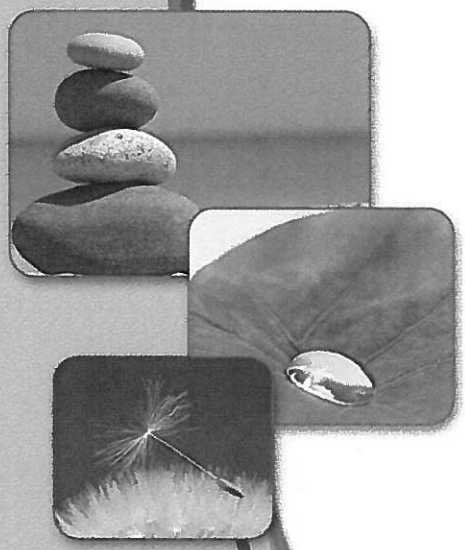
Qualifications:

Quality Control Issue	Compound(s)	Qualifier	Samples Affected
Compounds analyzed at a dilution	Benzene, Chlorobenzene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Chloride, and Sulfate	D	BSA-MW-2D, BSA-MW-3D, BSA-MW-4D, CPA-MW-1D, CPA-MW-3D, CPA-MW-3D-AD
Analyzed outside of hold time	Alkalinity and Carbon Dioxide, Free	J	BSA-MW-2D, BSA-MW-3D, CPA-MW-1D, CPA-MW-3D
Analyzed outside of hold time; compound not detected	Nitrate	UJ	BSA-MW-3D, BSA-MW-4D

SDG KPS200

Sample Results from:

BSA-MW-4D
BSA-MW-3D
BSA-MW-3D-EB
BSA-MW-2D
CPA-MW-3D
CPA-MW-3D-AD
CPA-MW-1D



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-146443-1
TestAmerica Sample Delivery Group: KPS200
Client Project/Site: 4Q17 LTM GW Sampling - 1403345

For:
Solutia Inc.
575 Maryville Centre Dr.
Saint Louis, Missouri 63141

Attn: Mr. Jerry Rinaldi

Jerry Lanier

Authorized for release by:
12/28/2017 3:53:33 PM
Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Designee for

Michele Kersey, Project Manager II
(912)354-7858
michele.kersey@testamericainc.com

SSD 2/13/18

Table of Contents

SSD 2/13/18

Job ID: 680-146443-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Solutia Inc.

Project: 4Q17 LTM GW Sampling - 1403345

Report Number: 680-146443-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 12/07/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was1.0° C and 3.5° C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples BSA-MW-4D-1217 (680-146443-1), BSA-MW-3D-1217 (680-146443-3), BSA-MW-3D-1217-EB (680-146443-5), BSA-MW-2D-1217 (680-146443-6), CPA-MW-3D-1217 (680-146443-8), CPA-MW-3D-1217-AD (680-146443-10), CPA-MW-1D-1217 (680-146443-11), 4Q17 Trip Blank #3 (680-146443-13) and 4Q17 Trip Blank #4 (680-146443-14) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 12/13/2017 and 12/14/2017.

Samples BSA-MW-4D-1217 (680-146443-1)[20X], BSA-MW-3D-1217 (680-146443-3)[20X], BSA-MW-2D-1217 (680-146443-6)[100X], CPA-MW-3D-1217 (680-146443-8)[5X], CPA-MW-3D-1217-AD (680-146443-10)[5X] and CPA-MW-1D-1217 (680-146443-11)[250X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batches 680-506145, 680-506162, and 680-506378.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED GASES

Samples BSA-MW-4D-1217 (680-146443-1), BSA-MW-3D-1217 (680-146443-3), BSA-MW-2D-1217 (680-146443-6), CPA-MW-3D-1217 (680-146443-8) and CPA-MW-1D-1217 (680-146443-11) were analyzed for dissolved gases in accordance with RSK-175. The samples were analyzed on 12/08/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP) - DISSOLVED

Samples BSA-MW-4D-F(0.2)-1217 (680-146443-2), BSA-MW-3D-F(0.2)-1217 (680-146443-4), BSA-MW-2D-F(0.2)-1217 (680-146443-7), CPA-MW-3D-F(0.2)-1217 (680-146443-9) and CPA-MW-1D-F(0.2)-1217 (680-146443-12) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 12/11/2017 and analyzed on 12/13/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP)

Samples BSA-MW-4D-1217 (680-146443-1), BSA-MW-3D-1217 (680-146443-3), BSA-MW-2D-1217 (680-146443-6), CPA-MW-3D-1217 (680-146443-8) and CPA-MW-1D-1217 (680-146443-11) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C.

SJD 2/13/18

Job ID: 680-146443-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

The samples were prepared on 12/11/2017 and analyzed on 12/13/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY
Samples BSA-MW-3D-1217 (680-146443-3), BSA-MW-2D-1217 (680-146443-6), CPA-MW-3D-1217 (680-146443-8) and CPA-MW-1D-1217 (680-146443-11) were analyzed for alkalinity in accordance with SM 2320B. The samples were analyzed on 12/26/2017.

Due to a significant instrument issue, the following samples were analyzed outside of hold time: BSA-MW-3D-1217 (680-146443-3), BSA-MW-2D-1217 (680-146443-6), CPA-MW-3D-1217 (680-146443-8) and CPA-MW-1D-1217 (680-146443-11). The samples were diverted to TA Cedar Falls for analysis to minimize the hold time exceedance.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY
Sample BSA-MW-4D-1217 (680-146443-1) was analyzed for alkalinity in accordance with EPA Method 310.1. The samples were analyzed on 12/14/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CHLORIDE
Samples BSA-MW-4D-1217 (680-146443-1), BSA-MW-3D-1217 (680-146443-3), BSA-MW-2D-1217 (680-146443-6), CPA-MW-3D-1217 (680-146443-8) and CPA-MW-1D-1217 (680-146443-11) were analyzed for Chloride in accordance with EPA Method 325.2. The samples were analyzed on 12/12/2017 and 12/13/2017.

Samples BSA-MW-4D-1217 (680-146443-1)[5X], BSA-MW-3D-1217 (680-146443-3)[10X], BSA-MW-2D-1217 (680-146443-6)[5X], CPA-MW-3D-1217 (680-146443-8)[2X] and CPA-MW-1D-1217 (680-146443-11)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

NITRATE-NITRITE AS NITROGEN
Samples BSA-MW-4D-1217 (680-146443-1), BSA-MW-3D-1217 (680-146443-3), BSA-MW-2D-1217 (680-146443-6), CPA-MW-3D-1217 (680-146443-8) and CPA-MW-1D-1217 (680-146443-11) were analyzed for nitrate-nitrite as nitrogen in accordance with EPA Method 353.2. The samples were analyzed on 12/08/2017.

The following samples was analyzed outside of analytical holding time due to an instrument failure: BSA-MW-4D-1217 (680-146443-1) and BSA-MW-3D-1217 (680-146443-3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SULFATE
Samples BSA-MW-4D-1217 (680-146443-1), BSA-MW-3D-1217 (680-146443-3), BSA-MW-2D-1217 (680-146443-6), CPA-MW-3D-1217 (680-146443-8) and CPA-MW-1D-1217 (680-146443-11) were analyzed for sulfate in accordance with EPA Method 375.4. The samples were analyzed on 12/12/2017 and 12/13/2017.

Samples BSA-MW-4D-1217 (680-146443-1)[5X] and CPA-MW-3D-1217 (680-146443-8)[2X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON
Samples BSA-MW-4D-1217 (680-146443-1), BSA-MW-3D-1217 (680-146443-3), BSA-MW-2D-1217 (680-146443-6), CPA-MW-3D-1217 (680-146443-8) and CPA-MW-1D-1217 (680-146443-11) were analyzed for total organic carbon in accordance with EPA Method 415.1.

SDD 2/13/18

Job ID: 680-146443-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

The samples were analyzed on 12/14/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED ORGANIC CARBON (DOC)

Samples BSA-MW-4D-F(0.2)-1217 (680-146443-2), BSA-MW-3D-F(0.2)-1217 (680-146443-4), BSA-MW-2D-F(0.2)-1217 (680-146443-7), CPA-MW-3D-F(0.2)-1217 (680-146443-9) and CPA-MW-1D-F(0.2)-1217 (680-146443-12) were analyzed for Dissolved Organic Carbon (DOC) in accordance with EPA Method 415.1. The samples were analyzed on 12/13/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

FREE CARBON DIOXIDE

Samples BSA-MW-3D-1217 (680-146443-3), BSA-MW-2D-1217 (680-146443-6), CPA-MW-3D-1217 (680-146443-8) and CPA-MW-1D-1217 (680-146443-11) were analyzed for free carbon dioxide in accordance with SM 4500 CO2 C. The samples were analyzed on 12/26/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SSD 2/13/18

Sample Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-146443-1	BSA-MW-4D-1217	Water	12/06/17 08:45	12/07/17 09:15
680-146443-2	BSA-MW-4D-F(0.2)-1217	Water	12/06/17 08:45	12/07/17 09:15
680-146443-3	BSA-MW-3D-1217	Water	12/06/17 09:45	12/07/17 09:15
680-146443-4	BSA-MW-3D-F(0.2)-1217	Water	12/06/17 09:45	12/07/17 09:15
680-146443-5	BSA-MW-3D-1217-EB	Water	12/06/17 10:10	12/07/17 09:15
680-146443-6	BSA-MW-2D-1217	Water	12/06/17 10:40	12/07/17 09:15
680-146443-7	BSA-MW-2D-F(0.2)-1217	Water	12/06/17 10:40	12/07/17 09:15
680-146443-8	CPA-MW-3D-1217	Water	12/06/17 11:45	12/07/17 09:15
680-146443-9	CPA-MW-3D-F(0.2)-1217	Water	12/06/17 11:45	12/07/17 09:15
680-146443-10	CPA-MW-3D-1217-AD	Water	12/06/17 11:45	12/07/17 09:15
680-146443-11	CPA-MW-1D-1217	Water	12/06/17 14:00	12/07/17 09:15
680-146443-12	CPA-MW-1D-F(0.2)-1217	Water	12/06/17 14:00	12/07/17 09:15
680-146443-13	4Q17 Trip Blank #3	Water	12/06/17 00:00	12/07/17 09:15
680-146443-14	4Q17 Trip Blank #4	Water	12/06/17 00:00	12/07/17 09:15

Method Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
RSK-175	Dissolved Gases (GC)	RSK	TAL SAV
6010C	Metals (ICP)	SW846	TAL SAV
310.1-1978	Alkalinity	MCAWW	TAL SAV
325.2-1978	Chloride	MCAWW	TAL SAV
353.2-1993 R2.0	Nitrogen, Nitrate-Nitrite	MCAWW	TAL SAV
375.4-1978	Sulfate	MCAWW	TAL SAV
415.1-1974	TOC	MCAWW	TAL SAV
415.1-1974	DOC	MCAWW	TAL SAV
SM 2320B	Alkalinity	SM	TAL CF
SM 4500 CO2 C	Free Carbon Dioxide	SM	TAL CF

Protocol References:

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

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

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 CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

GC VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
U	Indicates the analyte was analyzed for but not detected.
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

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	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
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 (Radiochemistry)
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)

Detection Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: BSA-MW-4D-1217 — Lab Sample ID: 680-146443-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	1800	D	20		ug/L	20		8260B	Total/NA
1,4-Dichlorobenzene	59	D	20		ug/L	20		8260B	Total/NA
Methane	120		0.58		ug/L	1		RSK-175	Total/NA
Iron	7.8		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.54		0.010		mg/L	1		6010C	Total Recoverable
Chloride	140	D	5.0		mg/L	5		325.2-1978	Total/NA
Sulfate	140	D	25		mg/L	5		375.4-1978	Total/NA
Total Organic Carbon	4.3		1.0		mg/L	1		415.1-1974	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	550		5.0		mg/L	1		310.1-1978	Total/NA
Carbon Dioxide, Free	19		5.0		mg/L	1		310.1-1978	Total/NA

Client Sample ID: BSA-MW-4D-F(0.2)-1217 — Lab Sample ID: 680-146443-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	7.7		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.53		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	4.4		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: BSA-MW-3D-1217 — Lab Sample ID: 680-146443-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	20	D	20		ug/L	20		8260B	Total/NA
Chlorobenzene	1400	D	20		ug/L	20		8260B	Total/NA
1,4-Dichlorobenzene	250	D	20		ug/L	20		8260B	Total/NA
Methane (TCD)	630		390		ug/L	1		RSK-175	Total/NA
Iron	14		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.69		0.010		mg/L	1		6010C	Total Recoverable
Chloride	440	D	10		mg/L	10		325.2-1978	Total/NA
Total Organic Carbon	4.0		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	610	HF J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	78	HF J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

Client Sample ID: BSA-MW-3D-F(0.2)-1217 — Lab Sample ID: 680-146443-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	14		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.71		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	4.2		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: BSA-MW-3D-1217-EB — Lab Sample ID: 680-146443-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	2.5		1.0		ug/L	1		8260B	Total/NA

Client Sample ID: BSA-MW-2D-1217 — Lab Sample ID: 680-146443-6

This Detection Summary does not include radiochemical test results.

Client Sample ID: BSA-MW-2D-1217 (Continued) — Lab Sample ID: 680-146443-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	16000	D	100		ug/L	100		8260B	Total/NA
Chlorobenzene	210	D	100		ug/L	100		8260B	Total/NA
Ethane	5.2		1.1		ug/L	1		RSK-175	Total/NA
Methane (TCD)	17000		390		ug/L	1		RSK-175	Total/NA
Iron	8.2		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.94		0.010		mg/L	1		6010C	Total Recoverable
Chloride	200	D	5.0		mg/L	5		325.2-1978	Total/NA
Nitrate as N	0.087		0.050		mg/L	1		353.2-1993 R2.0	Total/NA
Total Organic Carbon	9.4		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	740	~~H~~ J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	110	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

Client Sample ID: BSA-MW-2D-F(0.2)-1217 — Lab Sample ID: 680-146443-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	8.1		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.94		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	9.6		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: CPA-MW-3D-1217 — Lab Sample ID: 680-146443-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	6.8	D	5.0		ug/L	5		8260B	Total/NA
Chlorobenzene	480	D	5.0		ug/L	5		8260B	Total/NA
1,4-Dichlorobenzene	12	D	5.0		ug/L	5		8260B	Total/NA
Ethane	6.4		1.1		ug/L	1		RSK-175	Total/NA
Methane (TCD)	2500		390		ug/L	1		RSK-175	Total/NA
Iron	8.8		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.53		0.010		mg/L	1		6010C	Total Recoverable
Chloride	76	D	2.0		mg/L	2		325.2-1978	Total/NA
Sulfate	36	D	10		mg/L	2		375.4-1978	Total/NA
Total Organic Carbon	6.1		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	520	~~H~~ J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	48	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

Client Sample ID: CPA-MW-3D-F(0.2)-1217 — Lab Sample ID: 680-146443-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	9.2		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.53		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	6.4		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: CPA-MW-3D-1217-AD — Lab Sample ID: 680-146443-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	6.6	D	5.0		ug/L	5		8260B	Total/NA
Chlorobenzene	490	D	5.0		ug/L	5		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: CPA-MW-3D-1217-AD (Continued) — Lab Sample ID: 680-146443-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dichlorobenzene	12	D	5.0		ug/L	5		8260B	Total/NA

Client Sample ID: CPA-MW-1D-1217 — Lab Sample ID: 680-146443-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	3400	D	250		ug/L	250		8260B	Total/NA
Chlorobenzene	17000	D	250		ug/L	250		8260B	Total/NA
1,2-Dichlorobenzene	9600	D	250		ug/L	250		8260B	Total/NA
1,3-Dichlorobenzene	1100	D	250		ug/L	250		8260B	Total/NA
1,4-Dichlorobenzene	7800	D	250		ug/L	250		8260B	Total/NA
Ethane	13		1.1		ug/L	1		RSK-175	Total/NA
Methane (TCD)	12000		390		ug/L	1		RSK-175	Total/NA
Iron	0.30		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.20		0.010		mg/L	1		6010C	Total Recoverable
Chloride	380	D	10		mg/L	10		325.2-1978	Total/NA
Total Organic Carbon	7.4		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	790	~~H~~ J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	22	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

Client Sample ID: CPA-MW-1D-F(0.2)-1217 — Lab Sample ID: 680-146443-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	0.18		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.20		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	7.9		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: 4Q17 Trip Blank #3 — Lab Sample ID: 680-146443-13

No Detections.

Client Sample ID: 4Q17 Trip Blank #4 — Lab Sample ID: 680-146443-14

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: BSA-MW-4D-1217
Date Collected: 12/06/17 08:45
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	20	U	20		ug/L			12/13/17 03:20	20
Chlorobenzene	**1800**	D	20		ug/L			12/13/17 03:20	20
1,2-Dichlorobenzene	20	U	20		ug/L			12/13/17 03:20	20
1,3-Dichlorobenzene	20	U	20		ug/L			12/13/17 03:20	20
1,4-Dichlorobenzene	**59**	D	20		ug/L			12/13/17 03:20	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*80 - 120*		*12/13/17 03:20*	*20*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*12/13/17 03:20*	*20*
Dibromofluoromethane (Surr)	*101*		*80 - 122*		*12/13/17 03:20*	*20*
4-Bromofluorobenzene (Surr)	*87*		*80 - 120*		*12/13/17 03:20*	*20*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/08/17 11:34	1
Ethylene	1.0	U	1.0		ug/L			12/08/17 11:34	1
Methane	**120**		0.58		ug/L			12/08/17 11:34	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**7.8**		0.050		mg/L		12/11/17 18:01	12/13/17 02:26	1
Manganese	**0.54**		0.010		mg/L		12/11/17 18:01	12/13/17 02:26	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**140**	D	5.0		mg/L			12/13/17 08:52	5
Nitrate as N	0.050	U ~~H~~ J	0.050		mg/L			12/08/17 11:30	1
Sulfate	**140**	D	25		mg/L			12/13/17 08:21	5
Total Organic Carbon	**4.3**		1.0		mg/L			12/14/17 10:01	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**550**		5.0		mg/L			12/14/17 19:11	1
Carbon Dioxide, Free	**19**		5.0		mg/L			12/14/17 19:11	1

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: BSA-MW-4D-F(0.2)-1217
Date Collected: 12/06/17 08:45
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-2
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	7.7		0.050		mg/L		12/11/17 18:01	12/13/17 03:23	1
Manganese, Dissolved	0.53		0.010		mg/L		12/11/17 18:01	12/13/17 03:23	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	4.4		1.0		mg/L			12/13/17 15:59	1

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: BSA-MW-3D-1217
Date Collected: 12/06/17 09:45
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	20	D	20		ug/L			12/13/17 03:42	20
Chlorobenzene	1400	D	20		ug/L			12/13/17 03:42	20
1,2-Dichlorobenzene	20	U	20		ug/L			12/13/17 03:42	20
1,3-Dichlorobenzene	20	U	20		ug/L			12/13/17 03:42	20
1,4-Dichlorobenzene	250	D	20		ug/L			12/13/17 03:42	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*80 - 120*		*12/13/17 03:42*	*20*
1,2-Dichloroethane-d4 (Surr)	*100*		*73 - 131*		*12/13/17 03:42*	*20*
Dibromofluoromethane (Surr)	*102*		*80 - 122*		*12/13/17 03:42*	*20*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*12/13/17 03:42*	*20*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/08/17 11:46	1
Ethylene	1.0	U	1.0		ug/L			12/08/17 11:46	1
Methane (TCD)	630		390		ug/L			12/08/17 11:46	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	14		0.050		mg/L		12/11/17 18:01	12/13/17 03:02	1
Manganese	0.69		0.010		mg/L		12/11/17 18:01	12/13/17 03:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	440	D	10		mg/L			12/13/17 08:52	10
Nitrate as N	0.050	U H 3	0.050		mg/L			12/08/17 11:31	1
Sulfate	5.0	U	5.0		mg/L			12/12/17 15:30	1
Total Organic Carbon	4.0		1.0		mg/L			12/14/17 10:45	1
Alkalinity as CaCO3	610	H 3	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	78	H 3	5.0		mg/L			12/26/17 10:06	1

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: BSA-MW-3D-F(0.2)-1217
Date Collected: 12/06/17 09:45
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-4
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	14		0.050		mg/L		12/11/17 18:01	12/13/17 03:44	1
Manganese, Dissolved	0.71		0.010		mg/L		12/11/17 18:01	12/13/17 03:44	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	4.2		1.0		mg/L			12/13/17 16:16	1

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: BSA-MW-3D-1217-EB
Date Collected: 12/06/17 10:10
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/13/17 04:04	1
Chlorobenzene	**2.5**		1.0		ug/L			12/13/17 04:04	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 04:04	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 04:04	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 04:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*80 - 120*		*12/13/17 04:04*	*1*
1,2-Dichloroethane-d4 (Surr)	*93*		*73 - 131*		*12/13/17 04:04*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*12/13/17 04:04*	*1*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*12/13/17 04:04*	*1*

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: BSA-MW-2D-1217
Date Collected: 12/06/17 10:40
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	16000	D	100		ug/L			12/14/17 20:08	100
Chlorobenzene	210	D	100		ug/L			12/14/17 20:08	100
1,2-Dichlorobenzene	100	U	100		ug/L			12/14/17 20:08	100
1,3-Dichlorobenzene	100	U	100		ug/L			12/14/17 20:08	100
1,4-Dichlorobenzene	100	U	100		ug/L			12/14/17 20:08	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*80 - 120*		*12/14/17 20:08*	*100*
1,2-Dichloroethane-d4 (Surr)	*92*		*73 - 131*		*12/14/17 20:08*	*100*
Dibromofluoromethane (Surr)	*107*		*80 - 122*		*12/14/17 20:08*	*100*
4-Bromofluorobenzene (Surr)	*88*		*80 - 120*		*12/14/17 20:08*	*100*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	5.2		1.1		ug/L			12/08/17 11:59	1
Ethylene	1.0	U	1.0		ug/L			12/08/17 11:59	1
Methane (TCD)	17000		390		ug/L			12/08/17 11:59	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	8.2		0.050		mg/L		12/11/17 18:01	12/13/17 03:07	1
Manganese	0.94		0.010		mg/L		12/11/17 18:01	12/13/17 03:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	200	D	5.0		mg/L			12/12/17 15:45	5
Nitrate as N	0.087		0.050		mg/L			12/08/17 11:35	1
Sulfate	5.0	U	5.0		mg/L			12/12/17 15:30	1
Total Organic Carbon	9.4		1.0		mg/L			12/14/17 11:02	1
Alkalinity as CaCO3	740	~~HF~~ S	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	110	~~HF~~ S	5.0		mg/L			12/26/17 10:09	1

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: BSA-MW-2D-F(0.2)-1217
Date Collected: 12/06/17 10:40
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-7
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	8.1		0.050		mg/L		12/11/17 18:01	12/13/17 03:39	1
Manganese, Dissolved	0.94		0.010		mg/L		12/11/17 18:01	12/13/17 03:39	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	9.6		1.0		mg/L			12/13/17 16:36	1

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: CPA-MW-3D-1217
Date Collected: 12/06/17 11:45
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	6.8	D	5.0		ug/L			12/13/17 16:48	5
Chlorobenzene	480	D	5.0		ug/L			12/13/17 16:48	5
1,2-Dichlorobenzene	5.0	U	5.0		ug/L			12/13/17 16:48	5
1,3-Dichlorobenzene	5.0	U	5.0		ug/L			12/13/17 16:48	5
1,4-Dichlorobenzene	12	D	5.0		ug/L			12/13/17 16:48	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*80 - 120*		*12/13/17 16:48*	*5*
1,2-Dichloroethane-d4 (Surr)	*96*		*73 - 131*		*12/13/17 16:48*	*5*
Dibromofluoromethane (Surr)	*102*		*80 - 122*		*12/13/17 16:48*	*5*
4-Bromofluorobenzene (Surr)	*88*		*80 - 120*		*12/13/17 16:48*	*5*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	6.4		1.1		ug/L			12/08/17 12:12	1
Ethylene	1.0	U	1.0		ug/L			12/08/17 12:12	1
Methane (TCD)	2500		390		ug/L			12/08/17 12:12	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	8.8		0.050		mg/L		12/11/17 18:01	12/13/17 03:13	1
Manganese	0.53		0.010		mg/L		12/11/17 18:01	12/13/17 03:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	76	D	2.0		mg/L			12/12/17 15:45	2
Nitrate as N	0.050	U	0.050		mg/L			12/08/17 11:36	1
Sulfate	36	D	10		mg/L			12/13/17 08:30	2
Total Organic Carbon	6.1		1.0		mg/L			12/14/17 11:19	1
Alkalinity as CaCO3	520	HF 3	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	48	HF 3	5.0		mg/L			12/26/17 10:12	1

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: CPA-MW-3D-F(0.2)-1217
Date Collected: 12/06/17 11:45
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-9
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	9.2		0.050		mg/L		12/11/17 18:01	12/13/17 03:33	1
Manganese, Dissolved	0.53		0.010		mg/L		12/11/17 18:01	12/13/17 03:33	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	6.4		1.0		mg/L			12/13/17 16:53	1

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: CPA-MW-3D-1217-AD
Date Collected: 12/06/17 11:45
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**6.6**	D	5.0		ug/L			12/13/17 17:10	5
Chlorobenzene	**490**	D	5.0		ug/L			12/13/17 17:10	5
1,2-Dichlorobenzene	5.0	U	5.0		ug/L			12/13/17 17:10	5
1,3-Dichlorobenzene	5.0	U	5.0		ug/L			12/13/17 17:10	5
1,4-Dichlorobenzene	**12**	D	5.0		ug/L			12/13/17 17:10	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*80 - 120*		*12/13/17 17:10*	*5*
1,2-Dichloroethane-d4 (Surr)	*96*		*73 - 131*		*12/13/17 17:10*	*5*
Dibromofluoromethane (Surr)	*101*		*80 - 122*		*12/13/17 17:10*	*5*
4-Bromofluorobenzene (Surr)	*89*		*80 - 120*		*12/13/17 17:10*	*5*

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: CPA-MW-1D-1217
Date Collected: 12/06/17 14:00
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	3400	D	250		ug/L			12/13/17 17:31	250
Chlorobenzene	17000	D	250		ug/L			12/13/17 17:31	250
1,2-Dichlorobenzene	9600	D	250		ug/L			12/13/17 17:31	250
1,3-Dichlorobenzene	1100	D	250		ug/L			12/13/17 17:31	250
1,4-Dichlorobenzene	7800	D	250		ug/L			12/13/17 17:31	250

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*80 - 120*		*12/13/17 17:31*	*250*
1,2-Dichloroethane-d4 (Surr)	*98*		*73 - 131*		*12/13/17 17:31*	*250*
Dibromofluoromethane (Surr)	*105*		*80 - 122*		*12/13/17 17:31*	*250*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*12/13/17 17:31*	*250*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	13		1.1		ug/L			12/08/17 12:25	1
Ethylene	1.0	U	1.0		ug/L			12/08/17 12:25	1
Methane (TCD)	12000		390		ug/L			12/08/17 12:25	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.30		0.050		mg/L		12/11/17 18:01	12/13/17 03:18	1
Manganese	0.20		0.010		mg/L		12/11/17 18:01	12/13/17 03:18	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	380	D	10		mg/L			12/13/17 08:52	10
Nitrate as N	0.050	U	0.050		mg/L			12/08/17 11:37	1
Sulfate	5.0	U	5.0		mg/L			12/13/17 08:18	1
Total Organic Carbon	7.4		1.0		mg/L			12/14/17 12:06	1
Alkalinity as CaCO3	790	HF J	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	22	HF J	5.0		mg/L			12/26/17 10:59	1

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: CPA-MW-1D-F(0.2)-1217
Date Collected: 12/06/17 14:00
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-12
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	0.18		0.050		mg/L		12/11/17 18:01	12/13/17 03:28	1
Manganese, Dissolved	0.20		0.010		mg/L		12/11/17 18:01	12/13/17 03:28	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	7.9		1.0		mg/L			12/13/17 17:10	1

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: 4Q17 Trip Blank #3
Date Collected: 12/06/17 00:00
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-13
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/13/17 14:38	1
Chlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:38	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:38	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:38	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*80 - 120*		*12/13/17 14:38*	*1*
1,2-Dichloroethane-d4 (Surr)	*93*		*73 - 131*		*12/13/17 14:38*	*1*
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*12/13/17 14:38*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*12/13/17 14:38*	*1*

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: 4Q17 Trip Blank #4
Date Collected: 12/06/17 00:00
Date Received: 12/07/17 09:15

Lab Sample ID: 680-146443-14
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/13/17 14:59	1
Chlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:59	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:59	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:59	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*80 - 120*		*12/13/17 14:59*	*1*
1,2-Dichloroethane-d4 (Surr)	*95*		*73 - 131*		*12/13/17 14:59*	*1*
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*12/13/17 14:59*	*1*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*12/13/17 14:59*	*1*

Surrogate Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

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

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

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-146443-1	BSA-MW-4D-1217	94	97	101	87
680-146443-3	BSA-MW-3D-1217	93	100	102	90
680-146443-5	BSA-MW-3D-1217-EB	93	93	99	90
680-146443-6	BSA-MW-2D-1217	98	92	107	88
680-146443-8	CPA-MW-3D-1217	95	96	102	88
680-146443-10	CPA-MW-3D-1217-AD	95	96	101	89
680-146443-11	CPA-MW-1D-1217	95	98	105	90
680-146443-13	4Q17 Trip Blank #3	93	93	100	91
680-146443-14	4Q17 Trip Blank #4	95	95	100	92
LCS 680-506145/3	Lab Control Sample	95	90	95	91
LCS 680-506162/4	Lab Control Sample	96	92	97	94
LCS 680-506378/4	Lab Control Sample	94	90	96	87
LCSD 680-506145/4	Lab Control Sample Dup	96	91	97	93
LCSD 680-506162/5	Lab Control Sample Dup	88	85	88	86
LCSD 680-506378/5	Lab Control Sample Dup	98	94	99	93
MB 680-506145/9	Method Blank	95	94	99	92
MB 680-506162/9	Method Blank	94	93	99	87
MB 680-506378/8	Method Blank	94	94	99	89

Surrogate Legend

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

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

Lab Sample ID: MB 680-506145/9
Matrix: Water
Analysis Batch: 506145

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/12/17 20:50	1
Chlorobenzene	1.0	U	1.0		ug/L			12/12/17 20:50	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/12/17 20:50	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/12/17 20:50	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/12/17 20:50	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*80 - 120*		*12/12/17 20:50*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*12/12/17 20:50*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*12/12/17 20:50*	*1*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*12/12/17 20:50*	*1*

Lab Sample ID: LCS 680-506145/3
Matrix: Water
Analysis Batch: 506145

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	50.0	46.5		ug/L		93	80 - 120
Chlorobenzene	50.0	49.2		ug/L		98	80 - 120
1,2-Dichlorobenzene	50.0	48.3		ug/L		97	80 - 120
1,3-Dichlorobenzene	50.0	47.4		ug/L		95	80 - 120
1,4-Dichlorobenzene	50.0	48.1		ug/L		96	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*95*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*90*		*73 - 131*
Dibromofluoromethane (Surr)	*95*		*80 - 122*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*

Lab Sample ID: LCSD 680-506145/4
Matrix: Water
Analysis Batch: 506145

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
Benzene	50.0	47.7		ug/L		95	80 - 120	3	20
Chlorobenzene	50.0	50.5		ug/L		101	80 - 120	3	20
1,2-Dichlorobenzene	50.0	48.9		ug/L		98	80 - 120	1	20
1,3-Dichlorobenzene	50.0	48.3		ug/L		97	80 - 120	2	20
1,4-Dichlorobenzene	50.0	49.2		ug/L		98	80 - 120	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*91*		*73 - 131*
Dibromofluoromethane (Surr)	*97*		*80 - 122*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*

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

Lab Sample ID: MB 680-506162/9
Matrix: Water
Analysis Batch: 506162

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/13/17 10:35	1
Chlorobenzene	1.0	U	1.0		ug/L			12/13/17 10:35	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 10:35	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 10:35	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 10:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*80 - 120*		*12/13/17 10:35*	*1*
1,2-Dichloroethane-d4 (Surr)	*93*		*73 - 131*		*12/13/17 10:35*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*12/13/17 10:35*	*1*
4-Bromofluorobenzene (Surr)	*87*		*80 - 120*		*12/13/17 10:35*	*1*

Lab Sample ID: LCS 680-506162/4
Matrix: Water
Analysis Batch: 506162

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	50.0	48.6		ug/L		97	80 - 120
Chlorobenzene	50.0	50.6		ug/L		101	80 - 120
1,2-Dichlorobenzene	50.0	50.6		ug/L		101	80 - 120
1,3-Dichlorobenzene	50.0	49.0		ug/L		98	80 - 120
1,4-Dichlorobenzene	50.0	50.6		ug/L		101	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*92*		*73 - 131*
Dibromofluoromethane (Surr)	*97*		*80 - 122*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*

Lab Sample ID: LCSD 680-506162/5
Matrix: Water
Analysis Batch: 506162

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
Benzene	50.0	44.6		ug/L		89	80 - 120	9	20
Chlorobenzene	50.0	46.6		ug/L		93	80 - 120	8	20
1,2-Dichlorobenzene	50.0	46.4		ug/L		93	80 - 120	9	20
1,3-Dichlorobenzene	50.0	44.8		ug/L		90	80 - 120	9	20
1,4-Dichlorobenzene	50.0	46.1		ug/L		92	80 - 120	9	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*88*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*85*		*73 - 131*
Dibromofluoromethane (Surr)	*88*		*80 - 122*
4-Bromofluorobenzene (Surr)	*86*		*80 - 120*

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

Lab Sample ID: MB 680-506378/8
Matrix: Water
Analysis Batch: 506378

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/14/17 12:32	1
Chlorobenzene	1.0	U	1.0		ug/L			12/14/17 12:32	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/14/17 12:32	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/14/17 12:32	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/14/17 12:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*80 - 120*		*12/14/17 12:32*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*		*12/14/17 12:32*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 122*		*12/14/17 12:32*	*1*
4-Bromofluorobenzene (Surr)	*89*		*80 - 120*		*12/14/17 12:32*	*1*

Lab Sample ID: LCS 680-506378/4
Matrix: Water
Analysis Batch: 506378

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	50.0	46.1		ug/L		92	80 - 120
Chlorobenzene	50.0	48.5		ug/L		97	80 - 120
1,2-Dichlorobenzene	50.0	46.7		ug/L		93	80 - 120
1,3-Dichlorobenzene	50.0	45.9		ug/L		92	80 - 120
1,4-Dichlorobenzene	50.0	46.4		ug/L		93	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*94*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*90*		*73 - 131*
Dibromofluoromethane (Surr)	*96*		*80 - 122*
4-Bromofluorobenzene (Surr)	*87*		*80 - 120*

Lab Sample ID: LCSD 680-506378/5
Matrix: Water
Analysis Batch: 506378

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
Benzene	50.0	47.7		ug/L		95	80 - 120	3	20
Chlorobenzene	50.0	52.1		ug/L		104	80 - 120	7	20
1,2-Dichlorobenzene	50.0	50.1		ug/L		100	80 - 120	7	20
1,3-Dichlorobenzene	50.0	49.2		ug/L		98	80 - 120	7	20
1,4-Dichlorobenzene	50.0	49.6		ug/L		99	80 - 120	7	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*98*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*94*		*73 - 131*
Dibromofluoromethane (Surr)	*99*		*80 - 122*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 680-505591/10
Matrix: Water
Analysis Batch: 505591

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/08/17 11:09	1
Ethylene	1.0	U	1.0		ug/L			12/08/17 11:09	1
Methane	0.58	U	0.58		ug/L			12/08/17 11:09	1
Methane (TCD)	390	U	390		ug/L			12/08/17 11:09	1

Lab Sample ID: LCS 680-505591/3
Matrix: Water
Analysis Batch: 505591

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethane	288	272		ug/L		94	75 - 125
Ethylene	269	255		ug/L		95	75 - 125

Lab Sample ID: LCS 680-505591/7
Matrix: Water
Analysis Batch: 505591

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane (TCD)	1920	1840		ug/L		96	75 - 125

Lab Sample ID: LCSD 680-505591/4
Matrix: Water
Analysis Batch: 505591

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
Ethane	288	236		ug/L		82	75 - 125	14	30
Ethylene	269	223		ug/L		83	75 - 125	13	30

Lab Sample ID: LCSD 680-505591/8
Matrix: Water
Analysis Batch: 505591

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
Methane (TCD)	1920	1730		ug/L		90	75 - 125	6	30

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-505987/1-A
Matrix: Water
Analysis Batch: 506233

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 505987

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.050	U	0.050		mg/L		12/11/17 18:01	12/13/17 02:15	1
Iron, Dissolved	0.050	U	0.050		mg/L		12/11/17 18:01	12/13/17 02:15	1
Manganese	0.010	U	0.010		mg/L		12/11/17 18:01	12/13/17 02:15	1
Manganese, Dissolved	0.010	U	0.010		mg/L		12/11/17 18:01	12/13/17 02:15	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 680-505987/2-A
Matrix: Water
Analysis Batch: 506233

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 505987

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5.00	5.14		mg/L		103	80 - 120
Iron, Dissolved	5.00	5.14		mg/L		103	80 - 120
Manganese	0.500	0.536		mg/L		107	80 - 120
Manganese, Dissolved	0.500	0.536		mg/L		107	80 - 120

Lab Sample ID: 680-146443-1 MS
Matrix: Water
Analysis Batch: 506233

Client Sample ID: BSA-MW-4D-1217
Prep Type: Total Recoverable
Prep Batch: 505987

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	7.8		5.00	12.7		mg/L		98	75 - 125
Iron, Dissolved	7.8		5.00	12.7		mg/L		98	75 - 125
Manganese	0.54		0.500	1.06		mg/L		104	75 - 125
Manganese, Dissolved	0.54		0.500	1.06		mg/L		104	75 - 125

Lab Sample ID: 680-146443-1 MSD
Matrix: Water
Analysis Batch: 506233

Client Sample ID: BSA-MW-4D-1217
Prep Type: Total Recoverable
Prep Batch: 505987

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	7.8		5.00	13.0		mg/L		104	75 - 125	2	20
Iron, Dissolved	7.8		5.00	13.0		mg/L		104	75 - 125	2	20
Manganese	0.54		0.500	1.08		mg/L		108	75 - 125	2	20
Manganese, Dissolved	0.54		0.500	1.08		mg/L		108	75 - 125	2	20

Method: 310.1-1978 - Alkalinity

Lab Sample ID: MB 680-507269/1
Matrix: Water
Analysis Batch: 507269

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

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	5.0	U	5.0		mg/L			12/14/17 18:28	1
Carbon Dioxide, Free	5.0	U	5.0		mg/L			12/14/17 18:28	1

Lab Sample ID: LCS 680-507269/5
Matrix: Water
Analysis Batch: 507269

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	250	262		mg/L		105	80 - 120

Lab Sample ID: LCSD 680-507269/13
Matrix: Water
Analysis Batch: 507269

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
Alkalinity	250	253		mg/L		101	80 - 120	4	30

Method: 325.2-1978 - Chloride

Lab Sample ID: MB 680-506187/13
Matrix: Water
Analysis Batch: 506187

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.0	U	1.0		mg/L			12/12/17 14:25	1

Lab Sample ID: LCS 680-506187/14
Matrix: Water
Analysis Batch: 506187

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	25.0	26.4		mg/L		106	85 - 115

Lab Sample ID: LCSD 680-506187/18
Matrix: Water
Analysis Batch: 506187

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
Chloride	25.0	27.0		mg/L		108	85 - 115	2	30

Method: 353.2-1993 R2.0 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 680-505672/13
Matrix: Water
Analysis Batch: 505672

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	0.050	U	0.050		mg/L			12/08/17 11:20	1

Lab Sample ID: LCS 680-505672/16
Matrix: Water
Analysis Batch: 505672

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	0.500	0.514		mg/L		103	75 - 125
Nitrate Nitrite as N	1.00	1.01		mg/L		101	90 - 110
Nitrite as N	0.500	0.496		mg/L		99	90 - 110

Method: 375.4-1978 - Sulfate

Lab Sample ID: MB 680-506186/19
Matrix: Water
Analysis Batch: 506186

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	5.0	U	5.0		mg/L			12/12/17 14:27	1

Lab Sample ID: LCS 680-506186/20
Matrix: Water
Analysis Batch: 506186

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	20.0	20.6		mg/L		103	75 - 125

Lab Sample ID: LCSD 680-506186/22
Matrix: Water
Analysis Batch: 506186

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
Sulfate	20.0	18.4		mg/L		92	75 - 125	11	30

Method: 415.1-1974 - DOC

Lab Sample ID: MB 680-506528/2
Matrix: Water
Analysis Batch: 506528

Client Sample ID: Method Blank
Prep Type: Dissolved

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	1.0	U	1.0		mg/L			12/13/17 11:45	1

Lab Sample ID: LCS 680-506528/4
Matrix: Water
Analysis Batch: 506528

Client Sample ID: Lab Control Sample
Prep Type: Dissolved

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	20.0	20.7		mg/L		104	80 - 120

Lab Sample ID: LCSD 680-506528/5
Matrix: Water
Analysis Batch: 506528

Client Sample ID: Lab Control Sample Dup
Prep Type: Dissolved

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	20.0	20.2		mg/L		101	80 - 120	3	20

Method: 415.1-1974 - TOC

Lab Sample ID: MB 680-506527/2
Matrix: Water
Analysis Batch: 506527

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.0	U	1.0		mg/L			12/14/17 08:20	1

Lab Sample ID: LCS 680-506527/3
Matrix: Water
Analysis Batch: 506527

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	20.0	18.7		mg/L		94	80 - 120

Lab Sample ID: LCSD 680-506527/4
Matrix: Water
Analysis Batch: 506527

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
Total Organic Carbon	20.0	18.6		mg/L		93	80 - 120	0	25

Method: 415.1-1974 - TOC (Continued)

Lab Sample ID: 680-146443-1 MS
Matrix: Water
Analysis Batch: 506527

Client Sample ID: BSA-MW-4D-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	4.3		20.0	23.8		mg/L		97	80 - 120

Lab Sample ID: 680-146443-1 MSD
Matrix: Water
Analysis Batch: 506527

Client Sample ID: BSA-MW-4D-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon	4.3		20.0	23.7		mg/L		97	80 - 120	0	25

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-190007/1
Matrix: Water
Analysis Batch: 190007

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	5.0	U	5.0		mg/L			12/26/17 19:08	1

Lab Sample ID: LCS 310-190007/2
Matrix: Water
Analysis Batch: 190007

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	1060	1010		mg/L		96	90 - 110

QC Association Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

GC/MS VOA

Analysis Batch: 506145

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-1	BSA-MW-4D-1217	Total/NA	Water	8260B	
680-146443-3	BSA-MW-3D-1217	Total/NA	Water	8260B	
680-146443-5	BSA-MW-3D-1217-EB	Total/NA	Water	8260B	
MB 680-506145/9	Method Blank	Total/NA	Water	8260B	
LCS 680-506145/3	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-506145/4	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 506162

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-8	CPA-MW-3D-1217	Total/NA	Water	8260B	
680-146443-10	CPA-MW-3D-1217-AD	Total/NA	Water	8260B	
680-146443-11	CPA-MW-1D-1217	Total/NA	Water	8260B	
680-146443-13	4Q17 Trip Blank #3	Total/NA	Water	8260B	
680-146443-14	4Q17 Trip Blank #4	Total/NA	Water	8260B	
MB 680-506162/9	Method Blank	Total/NA	Water	8260B	
LCS 680-506162/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-506162/5	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 506378

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-6	BSA-MW-2D-1217	Total/NA	Water	8260B	
MB 680-506378/8	Method Blank	Total/NA	Water	8260B	
LCS 680-506378/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-506378/5	Lab Control Sample Dup	Total/NA	Water	8260B	

GC VOA

Analysis Batch: 505591

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-1	BSA-MW-4D-1217	Total/NA	Water	RSK-175	
680-146443-3	BSA-MW-3D-1217	Total/NA	Water	RSK-175	
680-146443-6	BSA-MW-2D-1217	Total/NA	Water	RSK-175	
680-146443-8	CPA-MW-3D-1217	Total/NA	Water	RSK-175	
680-146443-11	CPA-MW-1D-1217	Total/NA	Water	RSK-175	
MB 680-505591/10	Method Blank	Total/NA	Water	RSK-175	
LCS 680-505591/3	Lab Control Sample	Total/NA	Water	RSK-175	
LCS 680-505591/7	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 680-505591/4	Lab Control Sample Dup	Total/NA	Water	RSK-175	
LCSD 680-505591/8	Lab Control Sample Dup	Total/NA	Water	RSK-175	

Metals

Prep Batch: 505987

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-1	BSA-MW-4D-1217	Total Recoverable	Water	3005A	
680-146443-2	BSA-MW-4D-F(0.2)-1217	Dissolved	Water	3005A	
680-146443-3	BSA-MW-3D-1217	Total Recoverable	Water	3005A	
680-146443-4	BSA-MW-3D-F(0.2)-1217	Dissolved	Water	3005A	
680-146443-6	BSA-MW-2D-1217	Total Recoverable	Water	3005A	
680-146443-7	BSA-MW-2D-F(0.2)-1217	Dissolved	Water	3005A	

Metals (Continued)

Prep Batch: 505987 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-8	CPA-MW-3D-1217	Total Recoverable	Water	3005A	
680-146443-9	CPA-MW-3D-F(0.2)-1217	Dissolved	Water	3005A	
680-146443-11	CPA-MW-1D-1217	Total Recoverable	Water	3005A	
680-146443-12	CPA-MW-1D-F(0.2)-1217	Dissolved	Water	3005A	
MB 680-505987/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-505987/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-146443-1 MS	BSA-MW-4D-1217	Total Recoverable	Water	3005A	
680-146443-1 MSD	BSA-MW-4D-1217	Total Recoverable	Water	3005A	

Analysis Batch: 506233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-1	BSA-MW-4D-1217	Total Recoverable	Water	6010C	505987
680-146443-2	BSA-MW-4D-F(0.2)-1217	Dissolved	Water	6010C	505987
680-146443-3	BSA-MW-3D-1217	Total Recoverable	Water	6010C	505987
680-146443-4	BSA-MW-3D-F(0.2)-1217	Dissolved	Water	6010C	505987
680-146443-6	BSA-MW-2D-1217	Total Recoverable	Water	6010C	505987
680-146443-7	BSA-MW-2D-F(0.2)-1217	Dissolved	Water	6010C	505987
680-146443-8	CPA-MW-3D-1217	Total Recoverable	Water	6010C	505987
680-146443-9	CPA-MW-3D-F(0.2)-1217	Dissolved	Water	6010C	505987
680-146443-11	CPA-MW-1D-1217	Total Recoverable	Water	6010C	505987
680-146443-12	CPA-MW-1D-F(0.2)-1217	Dissolved	Water	6010C	505987
MB 680-505987/1-A	Method Blank	Total Recoverable	Water	6010C	505987
LCS 680-505987/2-A	Lab Control Sample	Total Recoverable	Water	6010C	505987
680-146443-1 MS	BSA-MW-4D-1217	Total Recoverable	Water	6010C	505987
680-146443-1 MSD	BSA-MW-4D-1217	Total Recoverable	Water	6010C	505987

General Chemistry

Analysis Batch: 189992

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-3	BSA-MW-3D-1217	Total/NA	Water	SM 4500 CO2 C	
680-146443-6	BSA-MW-2D-1217	Total/NA	Water	SM 4500 CO2 C	
680-146443-8	CPA-MW-3D-1217	Total/NA	Water	SM 4500 CO2 C	
680-146443-11	CPA-MW-1D-1217	Total/NA	Water	SM 4500 CO2 C	

Analysis Batch: 190007

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-3	BSA-MW-3D-1217	Total/NA	Water	SM 2320B	
680-146443-6	BSA-MW-2D-1217	Total/NA	Water	SM 2320B	
680-146443-8	CPA-MW-3D-1217	Total/NA	Water	SM 2320B	
680-146443-11	CPA-MW-1D-1217	Total/NA	Water	SM 2320B	
MB 310-190007/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-190007/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 505672

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-1	BSA-MW-4D-1217	Total/NA	Water	353.2-1993 R2.0	
680-146443-3	BSA-MW-3D-1217	Total/NA	Water	353.2-1993 R2.0	
680-146443-6	BSA-MW-2D-1217	Total/NA	Water	353.2-1993 R2.0	
680-146443-8	CPA-MW-3D-1217	Total/NA	Water	353.2-1993 R2.0	

General Chemistry (Continued)

Analysis Batch: 505672 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-11	CPA-MW-1D-1217	Total/NA	Water	353.2-1993 R2.0	
MB 680-505672/13	Method Blank	Total/NA	Water	353.2-1993 R2.0	
LCS 680-505672/16	Lab Control Sample	Total/NA	Water	353.2-1993 R2.0	

Analysis Batch: 506186

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-1	BSA-MW-4D-1217	Total/NA	Water	375.4-1978	
680-146443-3	BSA-MW-3D-1217	Total/NA	Water	375.4-1978	
680-146443-6	BSA-MW-2D-1217	Total/NA	Water	375.4-1978	
680-146443-8	CPA-MW-3D-1217	Total/NA	Water	375.4-1978	
680-146443-11	CPA-MW-1D-1217	Total/NA	Water	375.4-1978	
MB 680-506186/19	Method Blank	Total/NA	Water	375.4-1978	
LCS 680-506186/20	Lab Control Sample	Total/NA	Water	375.4-1978	
LCSD 680-506186/22	Lab Control Sample Dup	Total/NA	Water	375.4-1978	

Analysis Batch: 506187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-1	BSA-MW-4D-1217	Total/NA	Water	325.2-1978	
680-146443-3	BSA-MW-3D-1217	Total/NA	Water	325.2-1978	
680-146443-6	BSA-MW-2D-1217	Total/NA	Water	325.2-1978	
680-146443-8	CPA-MW-3D-1217	Total/NA	Water	325.2-1978	
680-146443-11	CPA-MW-1D-1217	Total/NA	Water	325.2-1978	
MB 680-506187/13	Method Blank	Total/NA	Water	325.2-1978	
LCS 680-506187/14	Lab Control Sample	Total/NA	Water	325.2-1978	
LCSD 680-506187/18	Lab Control Sample Dup	Total/NA	Water	325.2-1978	

Analysis Batch: 506527

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-1	BSA-MW-4D-1217	Total/NA	Water	415.1-1974	
680-146443-3	BSA-MW-3D-1217	Total/NA	Water	415.1-1974	
680-146443-6	BSA-MW-2D-1217	Total/NA	Water	415.1-1974	
680-146443-8	CPA-MW-3D-1217	Total/NA	Water	415.1-1974	
680-146443-11	CPA-MW-1D-1217	Total/NA	Water	415.1-1974	
MB 680-506527/2	Method Blank	Total/NA	Water	415.1-1974	
LCS 680-506527/3	Lab Control Sample	Total/NA	Water	415.1-1974	
LCSD 680-506527/4	Lab Control Sample Dup	Total/NA	Water	415.1-1974	
680-146443-1 MS	BSA-MW-4D-1217	Total/NA	Water	415.1-1974	
680-146443-1 MSD	BSA-MW-4D-1217	Total/NA	Water	415.1-1974	

Analysis Batch: 506528

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-2	BSA-MW-4D-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146443-4	BSA-MW-3D-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146443-7	BSA-MW-2D-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146443-9	CPA-MW-3D-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146443-12	CPA-MW-1D-F(0.2)-1217	Dissolved	Water	415.1-1974	
MB 680-506528/2	Method Blank	Dissolved	Water	415.1-1974	
LCS 680-506528/4	Lab Control Sample	Dissolved	Water	415.1-1974	
LCSD 680-506528/5	Lab Control Sample Dup	Dissolved	Water	415.1-1974	

General Chemistry (Continued)

Analysis Batch: 507269

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146443-1	BSA-MW-4D-1217	Total/NA	Water	310.1-1978	
MB 680-507269/1	Method Blank	Total/NA	Water	310.1-1978	
LCS 680-507269/5	Lab Control Sample	Total/NA	Water	310.1-1978	
LCSD 680-507269/13	Lab Control Sample Dup	Total/NA	Water	310.1-1978	

Client Sample ID: BSA-MW-4D-1217

Lab Sample ID: 680-146443-1

Date Collected: 12/06/17 08:45
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	506145	12/13/17 03:20	UI	TAL SAV
Total/NA	Analysis	RSK-175		1	505591	12/08/17 11:34	KAB	TAL SAV
Total Recoverable	Prep	3005A			505987	12/11/17 18:01	BCB	TAL SAV
Total Recoverable	Analysis	6010C		1	506233	12/13/17 02:26	BWR	TAL SAV
Total/NA	Analysis	310.1-1978		1	507269	12/14/17 19:11	KLD	TAL SAV
Total/NA	Analysis	325.2-1978		5	506187	12/13/17 08:52	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	505672	12/08/17 11:30	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		5	506186	12/13/17 08:21	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	506527	12/14/17 10:01	KLD	TAL SAV

Client Sample ID: BSA-MW-4D-F(0.2)-1217

Lab Sample ID: 680-146443-2

Date Collected: 12/06/17 08:45
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505987	12/11/17 18:01	BCB	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/13/17 03:23	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 15:59	KLD	TAL SAV

Client Sample ID: BSA-MW-3D-1217

Lab Sample ID: 680-146443-3

Date Collected: 12/06/17 09:45
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	506145	12/13/17 03:42	UI	TAL SAV
Total/NA	Analysis	RSK-175		1	505591	12/08/17 11:46	KAB	TAL SAV
Total Recoverable	Prep	3005A			505987	12/11/17 18:01	BCB	TAL SAV
Total Recoverable	Analysis	6010C		1	506233	12/13/17 03:02	BWR	TAL SAV
Total/NA	Analysis	325.2-1978		10	506187	12/13/17 08:52	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	505672	12/08/17 11:31	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		1	506186	12/12/17 15:30	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	506527	12/14/17 10:45	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 10:06	LBB	TAL CF

Client Sample ID: BSA-MW-3D-F(0.2)-1217

Lab Sample ID: 680-146443-4

Date Collected: 12/06/17 09:45
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505987	12/11/17 18:01	BCB	TAL SAV

Client Sample ID: BSA-MW-3D-F(0.2)-1217 — **Lab Sample ID: 680-146443-4**
Date Collected: 12/06/17 09:45 — **Matrix: Water**
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010C		1	506233	12/13/17 03:44	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 16:16	KLD	TAL SAV

Client Sample ID: BSA-MW-3D-1217-EB — **Lab Sample ID: 680-146443-5**
Date Collected: 12/06/17 10:10 — **Matrix: Water**
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	506145	12/13/17 04:04	UI	TAL SAV

Client Sample ID: BSA-MW-2D-1217 — **Lab Sample ID: 680-146443-6**
Date Collected: 12/06/17 10:40 — **Matrix: Water**
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		100	506378	12/14/17 20:08	EMA	TAL SAV
Total/NA	Analysis	RSK-175		1	505591	12/08/17 11:59	KAB	TAL SAV
Total Recoverable	Prep	3005A			505987	12/11/17 18:01	BCB	TAL SAV
Total Recoverable	Analysis	6010C		1	506233	12/13/17 03:07	BWR	TAL SAV
Total/NA	Analysis	325.2-1978		5	506187	12/12/17 15:45	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	505672	12/08/17 11:35	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		1	506186	12/12/17 15:30	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	506527	12/14/17 11:02	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 10:09	LBB	TAL CF

Client Sample ID: BSA-MW-2D-F(0.2)-1217 — **Lab Sample ID: 680-146443-7**
Date Collected: 12/06/17 10:40 — **Matrix: Water**
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505987	12/11/17 18:01	BCB	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/13/17 03:39	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 16:36	KLD	TAL SAV

Client Sample ID: CPA-MW-3D-1217 — **Lab Sample ID: 680-146443-8**
Date Collected: 12/06/17 11:45 — **Matrix: Water**
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	506162	12/13/17 16:48	EMA	TAL SAV

Client Sample ID: CPA-MW-3D-1217

Lab Sample ID: 680-146443-8

Date Collected: 12/06/17 11:45
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	505591	12/08/17 12:12	KAB	TAL SAV
Total Recoverable	Prep	3005A			505987	12/11/17 18:01	BCB	TAL SAV
Total Recoverable	Analysis	6010C		1	506233	12/13/17 03:13	BWR	TAL SAV
Total/NA	Analysis	325.2-1978		2	506187	12/12/17 15:45	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	505672	12/08/17 11:36	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		2	506186	12/13/17 08:30	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	506527	12/14/17 11:19	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 10:12	LBB	TAL CF

Client Sample ID: CPA-MW-3D-F(0.2)-1217

Lab Sample ID: 680-146443-9

Date Collected: 12/06/17 11:45
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505987	12/11/17 18:01	BCB	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/13/17 03:33	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 16:53	KLD	TAL SAV

Client Sample ID: CPA-MW-3D-1217-AD

Lab Sample ID: 680-146443-10

Date Collected: 12/06/17 11:45
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	506162	12/13/17 17:10	EMA	TAL SAV

Client Sample ID: CPA-MW-1D-1217

Lab Sample ID: 680-146443-11

Date Collected: 12/06/17 14:00
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		250	506162	12/13/17 17:31	EMA	TAL SAV
Total/NA	Analysis	RSK-175		1	505591	12/08/17 12:25	KAB	TAL SAV
Total Recoverable	Prep	3005A			505987	12/11/17 18:01	BCB	TAL SAV
Total Recoverable	Analysis	6010C		1	506233	12/13/17 03:18	BWR	TAL SAV
Total/NA	Analysis	325.2-1978		10	506187	12/13/17 08:52	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	505672	12/08/17 11:37	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		1	506186	12/13/17 08:18	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	506527	12/14/17 12:06	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 10:59	LBB	TAL CF

Lab Chronicle

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Client Sample ID: CPA-MW-1D-F(0.2)-1217

Lab Sample ID: 680-146443-12

Date Collected: 12/06/17 14:00
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			505987	12/11/17 18:01	BCB	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/13/17 03:28	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	506528	12/13/17 17:10	KLD	TAL SAV

Client Sample ID: 4Q17 Trip Blank #3

Lab Sample ID: 680-146443-13

Date Collected: 12/06/17 00:00
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	506162	12/13/17 14:38	EMA	TAL SAV

Client Sample ID: 4Q17 Trip Blank #4

Lab Sample ID: 680-146443-14

Date Collected: 12/06/17 00:00
Matrix: Water
Date Received: 12/07/17 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	506162	12/13/17 14:59	EMA	TAL SAV

Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Savannah
5102 LaRoche Avenue

Savannah, GA 31404
phone 912.354.7858 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐DW ☐NPDES ☑RCRA ☐Other:

Client Contact	Project Manager: Amanda Derhake	Site Contact: Samantha DiCenso	Date:	COC No:
Golder Associates Inc.	Tel/Fax: 636-724-9191	Lab Contact: Michele Kersey	Carrier: FedEx	1 of 2 COCs
820 South Main Street	Analysis Turnaround Time			Sampler: JAP
St. Charles, MO 63301	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(636) 724-9191 Phone	TAT if different from Below Standard			Walk-in Client:
(636) 724-9323 FAX	☑ 2 weeks			Lab Sampling:
Project Name: 4Q17 LTM GW Sampling-1403345	☐ 1 week			Job / SDG No.:
Site: Solutia WG Krummrich Plant	☐ 2 days			
P O # 42262863	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOCs by 8260	Total Fe/Mn by 6010C	Alk/CO2 by 310.1	Chloride by 325.2/Sulfate by 375.4	Dissolved Gases by RSK 175	Nitrate by 353.2	TOC by 415.1	Dissolved Fe/Mn by 6010C	DOC by 415.1	Sample Specific Notes:
BSA-MW-4D-1217	12/6/17	0845	G	W	14	N		3	1	1	1	3	2	3			
BSA-MW-4D-F(0.2)-1217		1			4	Y									1	3	
BSA-MW-3D-1217		0945			14	N		3	1	1	1	3	2	3			
BSA-MW-3D-F(0.2)-1217		1			4	Y									1	3	
BSA-MW-3D-1217-EB		1010			3	N		3	Q								
BSA-MW-2D-1217		1040			14	N		3	1	1	1	3	2	3			
BSA-MW-2D-F(0.2)-1217		1			4	Y									1	3	
CPA-MW-3D-1217		1145			14	N		3	1	1	1	3	2	3			
CPA-MW-3D-F(0.2)-1217		1			4	Y									1	3	
CPA-MW-3D-1217-AD		1			3	N		3									
CPA-MW-1D-1217		1400			14	N		3	1	1	1	3	2	3			
CPA-MW-1D-F(0.2)-1217		1			4	N									1	3	
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								2	4	1	1	2	1,3	3	4	3	

680-146443 Chain of Custody

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐Return to Client ☑Disposal by Lab ☐Archive for _____ Months

Special Instructions/QC Requirements & Comments:
VOC headspace upon sampling: Yes/No

1.5 M.O (Cf - 0.5) 1.0 13.5

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd _____ Corr'd: _____		Therm ID No.: _____
Relinquished by: Tammy Ford	Company: Golder	Date/Time: 12/6/17 1530	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time: 12/7/17 0915

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

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12/28/2017

680-146443

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
phone 912.354.7858 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program: ☐DW ☐NPDES ☑RCRA ☐Other:

Client Contact	Project Manager: Amanda Derhake	Site Contact: Samantha DiCenso	Date:	COC No:
Golder Associates Inc.	Tel/Fax: 636-724-9191	Lab Contact: Michele Kersey	Carrier: FedEx	2 of 2 COCs
820 South Main Street	Analysis Turnaround Time			Sampler: JAP
St. Charles, MO 63301	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(636) 724-9191 Phone	TAT if different from Below Standard			Walk-in Client:
(636) 724-9323 FAX	☑ 2 weeks			Lab Sampling:
Project Name: 4Q17 LTM GW Sampling-1403345	☐ 1 week			
Site: Solutia WG Krummrich Plant	☐ 2 days			Job / SDG No.:
P O # 42262863	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	VOCs by 8260	Total Fe/Mn by 6010C	Alk/CO2 by 310.1	Chloride by 325.2/Sulfate by 375.4	Dissolved Gases by RSK 175	Nitrate by 353.2	TOC by 415.1	Dissolved Fe/Mn by 6010C	DOC by 415.1	Sample Specific Notes:
4Q17 Trip Blank #3	—	—	G	W	2	N		2									
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								2	4	1	1	2	1,3	3	4	3	

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:
VOC headspace upon sampling: Yes/No

1.5 14.0 CCF - 0.5 1.0 13.5

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C) Obs'd _____ Corr'd: _____ Therm ID No.: _____			
Relinquished by:	Company: Golder	Date/Time: 12/4/17 1530	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TASA	Date/Time: 12/7/17 0915

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

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12/28/2017

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

680-146443 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: TA- Savannah			
City/State: CITY Savannah	STATE GA	Project:	
Receipt Information			
Date/Time Received: DATE 12/23/17	TIME 1005	Received By: MRH	
Delivery Type: ☐ UPS ☒ FedEx Sat Del ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ TA Courier ☐ TA Field Services ☐ Client Drop-off ☐ Other:			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	☒ Yes ☐ No	*If yes:* Cooler ID:	
Multiple Coolers?	☐ Yes ☒ No	*If yes:* Cooler # ____ of ____	
Cooler Custody Seals Present?	☒ Yes ~~☒ No~~ MRH 12/23/17	*If yes:* Cooler custody seals intact?	☒ Yes ☐ No
Sample Custody Seals Present?	☐ Yes ☒ No	*If yes:* Sample custody seals intact?	☐ Yes ☐ No
Trip Blank Present?	☐ Yes ☒ No	*If yes:* Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: ____ ☐ NONE			
Thermometer ID: J		Correction Factor (°C): +0.1	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): 0.3		Corrected Temp (°C): 0.4	
• Sample Container Temperature			
Sample ID(s) & bottle type used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):	TEMP 1 TEMP 2	Corrected Temp (°C):	TEMP 1 TEMP 2
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling?		☐ Yes	☐ No
a) *If yes:* Is there evidence that the chilling process began?		☐ Yes	☐ No
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles?)		☐ Yes	☐ No
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone (912) 354-7858 Fax (912) 352-0165

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Kersey, Michele R	Carrier Tracking No(s):	COC No: 680-502683.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: michele.kersey@testamericainc.com	State of Origin: Illinois	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): NELAP - Illinois		Job #: 680-146443-1
Address: 704 Enterprise Drive,	Due Date Requested: 12/22/2017			
City: Cedar Falls	TAT Requested (days):			
State, Zip: IA, 50613	PO #:			
Phone: 319-277-2401(Tel) 319-277-2425(Fax)	WO #:			
Email:	Project #: 68001754			
Project Name: WGK Long Term Monitoring (LTM)	SSOW#:			
Site:				

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2320B/ Alkalinity	SM4500_CO2_C/ (MOD) Copy Analytes	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
BSA-MW-3D-1217 (680-146443-3)	12/6/17	09:45 Central		Water			X	X	1	
BSA-MW-2D-1217 (680-146443-6)	12/6/17	10:40 Central		Water			X	X	1	
CPA-MW-3D-1217 (680-146443-8)	12/6/17	11:45 Central		Water			X	X	1	
CPA-MW-1D-1217 (680-146443-11)	12/6/17	14:00 Central		Water			X	X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification: Unconfirmed	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	12/22/17 1800	TA-SAV	Matt Zul	12/23/17 1005	TA-CF
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 09/20/2016

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SDG 680-146443-1

12/28/2017

Login Sample Receipt Checklist

Client: Solutia Inc.

Job Number: 680-146443-1
SDG Number: KPS200

Login Number: 146443
List Number: 1
Creator: Edwards, Jessica R

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
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 (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.	N/A	
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	

SJD 2/13/18

Login Sample Receipt Checklist

Client: Solutia Inc.

Job Number: 680-146443-1
SDG Number: KPS200

Login Number: 146443
List Number: 2
Creator: Hummel, Matt R

List Source: TestAmerica Cedar Falls
List Creation: 12/23/17 10:40 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
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 (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	

SSD 2/13/18

Accreditation/Certification Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-19
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-18
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-18 *
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-18
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146443-1
SDG: KPS200

Laboratory: TestAmerica Cedar Falls

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
AIHA-LAP, LLC	IHLAP		101044	11-01-18
Georgia	State Program	4	IA100001 (OR)	09-29-18
Illinois	NELAP	5	200024	11-29-18
Iowa	State Program	7	007	12-01-17 *
Kansas	NELAP	7	E-10341	01-31-18
Minnesota	NELAP	5	019-999-319	12-31-18
Minnesota (Petrofund)	State Program	1	3349	08-22-18
North Dakota	State Program	8	R-186	09-29-18
Oregon	NELAP	10	IA100001	09-29-18

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah
SJD 2/13/18

12/28/2017

Level IV Data Validation Summary
Solutia Inc., W.G. Krummrich, Sauget, Illinois
4Q17 Long-Term Monitoring Program

Company Name: Golder Associates
Project Name: WGK-4Q17 LTM
Reviewer: S. DiCenso
Laboratory: TestAmerica
SDG#: KPS201
Matrix: Water

Project Manager: A. Derhake
Project Number: 140-3345
Sample Date: December 2017

Analytical Method: VOC (8260B), Dissolved Gases (RSK-175), Metals (6010C), Alkalinity (SM 2320B), Carbon Dioxide (SM 4500 CO2C), Chloride (325.2), Nitrogen, Nitrate-Nitrite (353.2), Sulfate (375.4), TOC (415.1), and DOC (415.1)

Sample Names: CPA-MW-2D-1217, CPA-MW-2D-F(0.2)-1217, CPA-MW-2D-1217-AD, BSA-MW-1S-1217, BSA-MW-1S-F(0.2)-1217, BSA-MW-1S-1217-EB, 4Q17 LTM Trip Blank #4

Field Information	**YES**	**NO**	**NA**
a) Sampling dates noted?	☒	☐	☐
b) Does the laboratory narrative indicate deficiencies?	☒	☐	☐

Comments:

VOC: Samples CPA-MW-2D, CPA-MW-2D-AD, and BSA-MW-1S required dilution prior to analysis, reporting limits were adjusted accordingly.

Dissolved Gases: Samples CPA-MW-2D and BSA-MW-1S were analyzed with significant headspace in the sample containers.

Metals: No deficiencies noted.

Alkalinity: Due to instrument failure, samples CPA-MW-2D and BSA-MW-1S sent to an alternate lab and analyzed outside of hold time.

Chloride: Sample BSA-MW-1S required dilution prior to analysis, reporting limits were adjusted accordingly.

Nitrate-Nitrite as Nitrogen: Nitrate exceeded the recovery criteria low for the MS and MSD of sample BSA-MW-1S in batch 505753.

Sulfate: Samples CPA-MW-2D and BSA-MW-1S required dilution prior to analysis, reporting limits were adjusted accordingly.

TOC: No deficiencies noted.

DOC: No deficiencies noted.

Free Carbon Dioxide: No deficiencies noted.

Chain-of-Custody (COC)	**YES**	**NO**	**NA**
a) Was the COC signed by both field and laboratory personnel?	☒	☐	☐
b) Were samples received in good condition?	☒	☐	☐

Comments: Samples were received at 3.7°C, 4.1°C, and 4.5°C, within the 0°C to 6°C criteria.

General	YES	NO	NA
a) Were hold times met for sample analysis?	☐	☒	☐
b) Were the correct preservatives used?	☒	☐	☐
c) Was the correct method used?	☐	☒	☐
d) Any sample dilutions noted?	☒	☐	☐

Comments: Due to instrument failure, samples were sent to an alternate lab and were analyzed under a different method for alkalinity (SM 2320B) and free carbon dioxide (SM 4500 CO2C). The instrument failure and sample re-shipment resulted in alkalinity, carbon dioxide, and nitrate analyzed outside of hold time.

Detections in diluted analysis were qualified.

GC/MS Instrument Performance Check (IPC) and Internal Standards (IS)	YES	NO	NA
a) IPC analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
b) Does BFB/DFTPP meet the ion abundance criteria?	☒	☐	☐
c) Internal Standard retention times and areas met appropriate criteria?	☒	☐	☐

Comments: None.

Calibrations	YES	NO	NA
a) Initial calibration analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
b) Continuing calibrations analyzed at the appropriate frequency and met the appropriate standards?	☒	☐	☐
c) Initial calibration verifications and blanks analyzed at the appropriate frequency and met the appropriate standards?	☐	☒	☐
d) Continuing calibration verifications and blanks analyzed at the appropriate frequency and met the appropriate standards?	☐	☒	☐

Comments: Some compounds did not meet calibration requirements, data was qualified as required.

Blanks	YES	NO	NA
a) Were blanks (trip, equipment, method) performed at required frequency?	☒	☐	☐
b) Were analytes detected in any blanks?	☒	☐	☐

Comments: Equipment blank for BSA-MW-1S was submitted with SDG KPS201.

Benzene and chlorobenzene were detected in the EB. No qualification was required due to analytes either not detected in associated sample, or detected at concentrations significantly greater than the EB detections.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA
a) Was MS/MSD accuracy criteria met?	☐	☒	☐
b) Was MS/MSD precision criteria met?	☒	☐	☐

Comments: Nitrogen exceeded the recovery criteria low for MS and MSD of sample BSA-MW-1S associated with batch 505753. Data was qualified accordingly.

Laboratory Control Sample (LCS)	YES	NO	NA
a) LCS analyzed at the appropriate frequency and met appropriate standards?	☒	☐	☐

Comments: None.

Surrogate (System Monitoring) Compounds	**YES**	**NO**	**NA**
a) Surrogate compounds analyzed at the appropriate frequency and met appropriate standards?	☒	☐	☐

Comments: None.

Duplicates	**YES**	**NO**	**NA**
a) Were field duplicates collected?	☒	☐	☐
b) Was field duplicate precision criteria met?	☒	☐	☐

Comments: None.

Additional Comments: None.

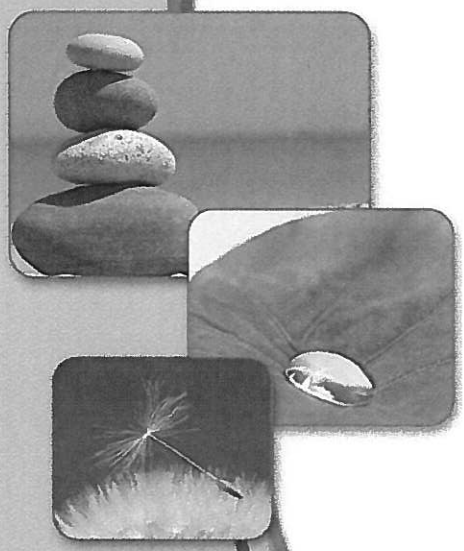
Qualifications:

Quality Control Issue	Compound(s)	Qualifier	Samples Affected
Compounds analyzed at a dilution	Benzene, Chlorobenzene, 1,4-Dichlorobenzene, Chloride, and Sulfate	D	BSA-MW-1S, CPA-MW-2D, CPA-MW-2D-AD
Analyzed outside of hold time	Alkalinity and Carbon Dioxide, Free	J	CPA-MW-2D, BSA-MW-1S
Analyzed outside of hold time; MS/MSD %Rec outside QC limits; compound not detected	Nitrate	UJ	BSA-MW-1S
CCAL %D outside QC limits	Methane	J	CPA-MW-2D, BSA-MW-1S

SDG KPS201

Sample Results from:

CPA-MW-2D
CPA-MW-2D-AD
BSA-MW-1S
BSA-MW-1S-EB



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-146571-1
TestAmerica Sample Delivery Group: KPS201
Client Project/Site: 4Q17 LTM GW Sampling - 1403345
Revision: 2

For:
Solutia Inc.
575 Maryville Centre Dr.
Saint Louis, Missouri 63141

Attn: Mr. Jerry Rinaldi

Michele R Kersey

Authorized for release by:
2/15/2018 3:13:38 PM

Michele Kersey, Project Manager II
(912)354-7858
michele.kersey@testamericainc.com

SSD 2/14/18

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SSD 2/14/18

Job ID: 680-146571-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Solutia Inc.

Project: 4Q17 LTM GW Sampling - 1403345

Report Number: 680-146571-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 12/08/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.7° C, 4.1° C and 4.5° C.

Report revised 2/12/18 to correct sample IDs.
Report revised 2/15/18 to correct Case Narrative comments.

VOLATILE ORGANIC COMPOUNDS (GC-MS)
Samples CPA-MW-2D-1217 (680-146571-1), CPA-MW-2D-1217-AD (680-146571-3), BSA-MW-1S-1217 (680-146571-4), BSA-MW-1S-1217-EB (680-146571-6) and 4Q17 Trip Blank #4 (680-146571-7) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 12/13/2017 and 12/14/2017.

Samples CPA-MW-2D-1217 (680-146571-1)[250X], CPA-MW-2D-1217-AD (680-146571-3)[250X] and BSA-MW-1S-1217 (680-146571-4) [5000X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 680-506309.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED GASES
Samples CPA-MW-2D-1217 (680-146571-1) and BSA-MW-1S-1217 (680-146571-4) were analyzed for dissolved gases in accordance with RSK-175. The samples were analyzed on 12/15/2017 and 12/18/2017.

The following volatile samples were analyzed with significant headspace in the sample Container(s): CPA-MW-2D-1217 (680-146571-1) and BSA-MW-1S-1217 (680-146571-4). Significant headspace is defined as a bubble greater than 6 mm in diameter.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP) - DISSOLVED
Samples CPA-MW-2D-F(0.2)-1217 (680-146571-2) and BSA-MW-1S-F(0.2)-1217 (680-146571-5) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 12/12/2017 and analyzed on 12/13/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

METALS (ICP)

SJD 2/14/18
TestAmerica Savannah

Job ID: 680-146571-1 (Continued)

Laboratory: TestAmerica Savannah (Continued)

Samples CPA-MW-2D-1217 (680-146571-1) and BSA-MW-1S-1217 (680-146571-4) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 12/12/2017 and analyzed on 12/13/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY
Samples CPA-MW-2D-1217 (680-146571-1) and BSA-MW-1S-1217 (680-146571-4) were analyzed for alkalinity in accordance with SM 2320B. The samples were analyzed on 12/26/2017.

Due to a significant instrument issue, the following samples were analyzed outside of hold time: CPA-MW-2D-1217 (680-146571-1) and BSA-MW-1S-1217 (680-146571-4). The samples were diverted to TA Cedar Falls for analysis to minimize the hold time exceedance.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CHLORIDE
Samples CPA-MW-2D-1217 (680-146571-1) and BSA-MW-1S-1217 (680-146571-4) were analyzed for Chloride in accordance with EPA Method 325.2. The samples were analyzed on 12/18/2017 and 12/19/2017.

Sample BSA-MW-1S-1217 (680-146571-4)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

NITRATE-NITRITE AS NITROGEN
Samples CPA-MW-2D-1217 (680-146571-1) and BSA-MW-1S-1217 (680-146571-4) were analyzed for nitrate-nitrite as nitrogen in accordance with EPA Method 353.2. The samples were analyzed on 12/08/2017.

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 680-505753 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SULFATE
Samples CPA-MW-2D-1217 (680-146571-1) and BSA-MW-1S-1217 (680-146571-4) were analyzed for sulfate in accordance with EPA Method 375.4. The samples were analyzed on 12/18/2017.

Samples CPA-MW-2D-1217 (680-146571-1)[5X] and BSA-MW-1S-1217 (680-146571-4)[2X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON
Samples CPA-MW-2D-1217 (680-146571-1) and BSA-MW-1S-1217 (680-146571-4) were analyzed for total organic carbon in accordance with EPA Method 415.1. The samples were analyzed on 12/14/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED ORGANIC CARBON (DOC)
Samples CPA-MW-2D-F(0.2)-1217 (680-146571-2) and BSA-MW-1S-F(0.2)-1217 (680-146571-5) were analyzed for Dissolved Organic Carbon (DOC) in accordance with EPA Method 415.1. The samples were analyzed on 12/14/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

FREE CARBON DIOXIDE
Samples CPA-MW-2D-1217 (680-146571-1) and BSA-MW-1S-1217 (680-146571-4) were analyzed for free carbon dioxide in accordance with SM 4500 CO2 C. The samples were analyzed on 12/26/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SJD 2/14/18
TestAmerica Savannah

Sample Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-146571-1	CPA-MW-2D-1217	Water	12/07/17 09:05	12/08/17 09:40
680-146571-2	CPA-MW-2D-F(0.2)-1217	Water	12/07/17 09:05	12/08/17 09:40
680-146571-3	CPA-MW-2D-1217-AD	Water	12/07/17 09:05	12/08/17 09:40
680-146571-4	BSA-MW-1S-1217	Water	12/07/17 10:05	12/08/17 09:40
680-146571-5	BSA-MW-1S-F(0.2)-1217	Water	12/07/17 10:05	12/08/17 09:40
680-146571-6	BSA-MW-1S-1217-EB	Water	12/07/17 10:30	12/08/17 09:40
680-146571-7	4Q17 Trip Blank #4	Water	12/07/17 00:00	12/08/17 09:40

SSD 2/14/18
TestAmerica Savannah

Method Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
RSK-175	Dissolved Gases (GC)	RSK	TAL SAV
6010C	Metals (ICP)	SW846	TAL SAV
325.2-1978	Chloride	MCAWW	TAL SAV
353.2-1993 R2.0	Nitrogen, Nitrate-Nitrite	MCAWW	TAL SAV
375.4-1978	Sulfate	MCAWW	TAL SAV
415.1-1974	TOC	MCAWW	TAL SAV
415.1-1974	DOC	MCAWW	TAL SAV
SM 2320B	Alkalinity	SM	TAL CF
SM 4500 CO2 C	Free Carbon Dioxide	SM	TAL CF

Protocol References:

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

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

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 CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

SJD 2/14/18

TestAmerica Savannah

Definitions/Glossary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

GC VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
H	Sample was prepped or analyzed beyond the specified holding time
U	Indicates the analyte was analyzed for but not detected.
F1	MS and/or MSD Recovery is outside acceptance limits.

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	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
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 (Radiochemistry)
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)

SSD 2/14/18
TestAmerica Savannah

Detection Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: CPA-MW-2D-1217 — Lab Sample ID: 680-146571-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	22000	D	250		ug/L	250		8260B	Total/NA
1,4-Dichlorobenzene	700	D	250		ug/L	250		8260B	Total/NA
Methane (TCD)	990	J	390		ug/L	1		RSK-175	Total/NA
Iron	7.7		0.050		mg/L	1		6010C	Total Recoverable
Manganese	0.45		0.010		mg/L	1		6010C	Total Recoverable
Chloride	49		1.0		mg/L	1		325.2-1978	Total/NA
Sulfate	47	D	25		mg/L	5		375.4-1978	Total/NA
Total Organic Carbon	5.9		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	480	~~H~~ J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	67	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

Client Sample ID: CPA-MW-2D-F(0.2)-1217 — Lab Sample ID: 680-146571-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	7.6		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	0.45		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	5.8		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: CPA-MW-2D-1217-AD — Lab Sample ID: 680-146571-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	22000	D	250		ug/L	250		8260B	Total/NA
1,4-Dichlorobenzene	730	D	250		ug/L	250		8260B	Total/NA

Client Sample ID: BSA-MW-1S-1217 — Lab Sample ID: 680-146571-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	430000	D	5000		ug/L	5000		8260B	Total/NA
Methane (TCD)	3600	J	390		ug/L	1		RSK-175	Total/NA
Iron	25		0.050		mg/L	1		6010C	Total Recoverable
Manganese	2.2		0.010		mg/L	1		6010C	Total Recoverable
Chloride	370	D	10		mg/L	10		325.2-1978	Total/NA
Sulfate	66	D	10		mg/L	2		375.4-1978	Total/NA
Total Organic Carbon	12		1.0		mg/L	1		415.1-1974	Total/NA
Alkalinity as CaCO3	1200	~~H~~ J	5.0		mg/L	1		SM 2320B	Total/NA
Carbon Dioxide, Free	440	~~HF~~ J	5.0		mg/L	1		SM 4500 CO2 C	Total/NA

Client Sample ID: BSA-MW-1S-F(0.2)-1217 — Lab Sample ID: 680-146571-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron, Dissolved	26		0.050		mg/L	1		6010C	Dissolved
Manganese, Dissolved	2.3		0.010		mg/L	1		6010C	Dissolved
Dissolved Organic Carbon	12		1.0		mg/L	1		415.1-1974	Dissolved

Client Sample ID: BSA-MW-1S-1217-EB — Lab Sample ID: 680-146571-6

This Detection Summary does not include radiochemical test results.

SJD 2/14/18
TestAmerica Savannah

Detection Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: BSA-MW-1S-1217-EB (Continued) — Lab Sample ID: 680-146571-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	39		1.0		ug/L	1		8260B	Total/NA
Chlorobenzene	1.0		1.0		ug/L	1		8260B	Total/NA

Client Sample ID: 4Q17 Trip Blank #4 — Lab Sample ID: 680-146571-7

No Detections.

This Detection Summary does not include radiochemical test results.

SJD 2/14/18
TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: CPA-MW-2D-1217
Date Collected: 12/07/17 09:05
Date Received: 12/08/17 09:40

Lab Sample ID: 680-146571-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	250	U	250		ug/L			12/14/17 03:06	250
Chlorobenzene	**22000**	D	250		ug/L			12/14/17 03:06	250
1,2-Dichlorobenzene	250	U	250		ug/L			12/14/17 03:06	250
1,3-Dichlorobenzene	250	U	250		ug/L			12/14/17 03:06	250
1,4-Dichlorobenzene	**700**	D	250		ug/L			12/14/17 03:06	250

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*96*		*80 - 120*		*12/14/17 03:06*	*250*
1,2-Dichloroethane-d4 (Surr)	*100*		*73 - 131*		*12/14/17 03:06*	*250*
Dibromofluoromethane (Surr)	*104*		*80 - 122*		*12/14/17 03:06*	*250*
4-Bromofluorobenzene (Surr)	*89*		*80 - 120*		*12/14/17 03:06*	*250*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/15/17 15:05	1
Ethylene	1.0	U	1.0		ug/L			12/15/17 15:05	1
Methane (TCD)	**990**	J	390		ug/L			12/18/17 16:57	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**7.7**		0.050		mg/L		12/12/17 10:44	12/13/17 05:49	1
Manganese	**0.45**		0.010		mg/L		12/12/17 10:44	12/13/17 05:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**49**		1.0		mg/L			12/18/17 14:16	1
Nitrate as N	0.050	U	0.050		mg/L			12/08/17 16:59	1
Sulfate	**47**	D	25		mg/L			12/18/17 15:44	5
Total Organic Carbon	**5.9**		1.0		mg/L			12/14/17 12:22	1
Alkalinity as CaCO3	**480**	~~H~~ J	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	**67**	~~HF~~ J	5.0		mg/L			12/26/17 09:54	1

SDD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: CPA-MW-2D-F(0.2)-1217
Date Collected: 12/07/17 09:05
Date Received: 12/08/17 09:40

Lab Sample ID: 680-146571-2
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	7.6		0.050		mg/L		12/12/17 10:44	12/13/17 06:10	1
Manganese, Dissolved	0.45		0.010		mg/L		12/12/17 10:44	12/13/17 06:10	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	5.8		1.0		mg/L			12/14/17 12:42	1

SJD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: CPA-MW-2D-1217-AD
Date Collected: 12/07/17 09:05
Date Received: 12/08/17 09:40

Lab Sample ID: 680-146571-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	250	U	250		ug/L			12/14/17 05:16	250
Chlorobenzene	**22000**	D	250		ug/L			12/14/17 05:16	250
1,2-Dichlorobenzene	250	U	250		ug/L			12/14/17 05:16	250
1,3-Dichlorobenzene	250	U	250		ug/L			12/14/17 05:16	250
1,4-Dichlorobenzene	**730**	P	250		ug/L			12/14/17 05:16	250

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*96*		*80 - 120*		*12/14/17 05:16*	*250*
1,2-Dichloroethane-d4 (Surr)	*99*		*73 - 131*		*12/14/17 05:16*	*250*
Dibromofluoromethane (Surr)	*103*		*80 - 122*		*12/14/17 05:16*	*250*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*12/14/17 05:16*	*250*

SSD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: BSA-MW-1S-1217
Date Collected: 12/07/17 10:05
Date Received: 12/08/17 09:40

Lab Sample ID: 680-146571-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	430000	D	5000		ug/L			12/14/17 02:23	5000
Chlorobenzene	5000	U	5000		ug/L			12/14/17 02:23	5000
1,2-Dichlorobenzene	5000	U	5000		ug/L			12/14/17 02:23	5000
1,3-Dichlorobenzene	5000	U	5000		ug/L			12/14/17 02:23	5000
1,4-Dichlorobenzene	5000	U	5000		ug/L			12/14/17 02:23	5000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*97*		*80 - 120*		*12/14/17 02:23*	*5000*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*12/14/17 02:23*	*5000*
Dibromofluoromethane (Surr)	*109*		*80 - 122*		*12/14/17 02:23*	*5000*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*12/14/17 02:23*	*5000*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/18/17 17:10	1
Ethylene	1.0	U	1.0		ug/L			12/18/17 17:10	1
Methane (TCD)	3600	J	390		ug/L			12/18/17 17:10	1

Method: 6010C - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	25		0.050		mg/L		12/12/17 10:44	12/13/17 06:05	1
Manganese	2.2		0.010		mg/L		12/12/17 10:44	12/13/17 06:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	370	D	10		mg/L			12/19/17 07:43	10
Nitrate as N	0.050	U ~~F1~~ J	0.050		mg/L			12/08/17 16:52	1
Sulfate	66	D	10		mg/L			12/18/17 16:11	2
Total Organic Carbon	12		1.0		mg/L			12/14/17 12:58	1
Alkalinity as CaCO3	1200	~~H~~ J	5.0		mg/L			12/26/17 19:08	1
Carbon Dioxide, Free	440	~~HF~~ J	5.0		mg/L			12/26/17 09:58	1

SDD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: BSA-MW-1S-F(0.2)-1217
Date Collected: 12/07/17 10:05
Date Received: 12/08/17 09:40

Lab Sample ID: 680-146571-5
Matrix: Water

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	26		0.050		mg/L		12/12/17 10:44	12/13/17 06:15	1
Manganese, Dissolved	2.3		0.010		mg/L		12/12/17 10:44	12/13/17 06:15	1

General Chemistry - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Organic Carbon	12		1.0		mg/L			12/14/17 13:15	1

SDD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: BSA-MW-1S-1217-EB
Date Collected: 12/07/17 10:30
Date Received: 12/08/17 09:40

Lab Sample ID: 680-146571-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**39**		1.0		ug/L			12/13/17 15:48	1
Chlorobenzene	**1.0**		1.0		ug/L			12/13/17 15:48	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 15:48	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 15:48	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 15:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*80 - 120*		*12/13/17 15:48*	*1*
1,2-Dichloroethane-d4 (Surr)	*98*		*73 - 131*		*12/13/17 15:48*	*1*
Dibromofluoromethane (Surr)	*109*		*80 - 122*		*12/13/17 15:48*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*12/13/17 15:48*	*1*

SJD 2/14/18

TestAmerica Savannah

Client Sample Results

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: 4Q17 Trip Blank #4
Date Collected: 12/07/17 00:00
Date Received: 12/08/17 09:40

Lab Sample ID: 680-146571-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/13/17 16:11	1
Chlorobenzene	1.0	U	1.0		ug/L			12/13/17 16:11	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 16:11	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 16:11	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 16:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*80 - 120*		*12/13/17 16:11*	*1*
1,2-Dichloroethane-d4 (Surr)	*96*		*73 - 131*		*12/13/17 16:11*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 122*		*12/13/17 16:11*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*12/13/17 16:11*	*1*

SJD 2/14/18

TestAmerica Savannah

Surrogate Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

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

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	DBFM	BFB
Lab Sample ID	Client Sample ID	(80-120)	(73-131)	(80-122)	(80-120)
680-146571-1	CPA-MW-2D-1217	96	100	104	89
680-146571-3	CPA-MW-2D-1217-AD	96	99	103	90
680-146571-4	BSA-MW-1S-1217	97	97	109	90
680-146571-6	BSA-MW-1S-1217-EB	101	98	109	102
680-146571-7	4Q17 Trip Blank #4	103	96	108	102
LCS 680-506230/3	Lab Control Sample	99	100	97	101
LCS 680-506309/3	Lab Control Sample	96	93	96	92
LCSD 680-506230/4	Lab Control Sample Dup	103	102	102	102
LCSD 680-506309/4	Lab Control Sample Dup	96	92	94	93
MB 680-506230/8	Method Blank	100	97	106	101
MB 680-506309/9	Method Blank	95	93	100	91

Surrogate Legend

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

SDD 2/14/18

TestAmerica Savannah

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

Lab Sample ID: MB 680-506230/8
Matrix: Water
Analysis Batch: 506230

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/13/17 14:48	1
Chlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:48	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:48	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:48	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 14:48	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*80 - 120*		*12/13/17 14:48*	*1*
1,2-Dichloroethane-d4 (Surr)	*97*		*73 - 131*		*12/13/17 14:48*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 122*		*12/13/17 14:48*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*12/13/17 14:48*	*1*

Lab Sample ID: LCS 680-506230/3
Matrix: Water
Analysis Batch: 506230

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	50.0	49.7		ug/L		99	80 - 120
Chlorobenzene	50.0	49.6		ug/L		99	80 - 120
1,2-Dichlorobenzene	50.0	48.9		ug/L		98	80 - 120
1,3-Dichlorobenzene	50.0	49.2		ug/L		98	80 - 120
1,4-Dichlorobenzene	50.0	49.3		ug/L		99	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*100*		*73 - 131*
Dibromofluoromethane (Surr)	*97*		*80 - 122*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*

Lab Sample ID: LCSD 680-506230/4
Matrix: Water
Analysis Batch: 506230

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
Benzene	50.0	51.6		ug/L		103	80 - 120	4	20
Chlorobenzene	50.0	50.0		ug/L		100	80 - 120	1	20
1,2-Dichlorobenzene	50.0	49.0		ug/L		98	80 - 120	0	20
1,3-Dichlorobenzene	50.0	49.4		ug/L		99	80 - 120	0	20
1,4-Dichlorobenzene	50.0	49.4		ug/L		99	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*102*		*73 - 131*
Dibromofluoromethane (Surr)	*102*		*80 - 122*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*

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

Lab Sample ID: MB 680-506309/9
Matrix: Water
Analysis Batch: 506309

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			12/13/17 22:02	1
Chlorobenzene	1.0	U	1.0		ug/L			12/13/17 22:02	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 22:02	1
1,3-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 22:02	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			12/13/17 22:02	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*80 - 120*		*12/13/17 22:02*	*1*
1,2-Dichloroethane-d4 (Surr)	*93*		*73 - 131*		*12/13/17 22:02*	*1*
Dibromofluoromethane (Surr)	*100*		*80 - 122*		*12/13/17 22:02*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*12/13/17 22:02*	*1*

Lab Sample ID: LCS 680-506309/3
Matrix: Water
Analysis Batch: 506309

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	50.0	47.6		ug/L		95	80 - 120
Chlorobenzene	50.0	50.3		ug/L		101	80 - 120
1,2-Dichlorobenzene	50.0	48.6		ug/L		97	80 - 120
1,3-Dichlorobenzene	50.0	47.8		ug/L		96	80 - 120
1,4-Dichlorobenzene	50.0	48.8		ug/L		98	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*93*		*73 - 131*
Dibromofluoromethane (Surr)	*96*		*80 - 122*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*

Lab Sample ID: LCSD 680-506309/4
Matrix: Water
Analysis Batch: 506309

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
Benzene	50.0	47.5		ug/L		95	80 - 120	0	20
Chlorobenzene	50.0	48.9		ug/L		98	80 - 120	3	20
1,2-Dichlorobenzene	50.0	48.8		ug/L		98	80 - 120	0	20
1,3-Dichlorobenzene	50.0	48.2		ug/L		96	80 - 120	1	20
1,4-Dichlorobenzene	50.0	48.7		ug/L		97	80 - 120	0	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*92*		*73 - 131*
Dibromofluoromethane (Surr)	*94*		*80 - 122*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*

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Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 680-506553/12
Matrix: Water
Analysis Batch: 506553

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/15/17 12:43	1
Ethylene	1.0	U	1.0		ug/L			12/15/17 12:43	1
Methane	0.58	U	0.58		ug/L			12/15/17 12:43	1
Methane (TCD)	390	U	390		ug/L			12/15/17 12:43	1

Lab Sample ID: LCS 680-506553/6
Matrix: Water
Analysis Batch: 506553

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane (TCD)	1920	1660		ug/L		87	75 - 125

Lab Sample ID: LCS 680-506553/9
Matrix: Water
Analysis Batch: 506553

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethane	288	264		ug/L		91	75 - 125
Ethylene	269	251		ug/L		93	75 - 125

Lab Sample ID: LCSD 680-506553/10
Matrix: Water
Analysis Batch: 506553

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
Ethane	288	254		ug/L		88	75 - 125	4	30
Ethylene	269	237		ug/L		88	75 - 125	6	30

Lab Sample ID: LCSD 680-506553/7
Matrix: Water
Analysis Batch: 506553

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
Methane (TCD)	1920	1700		ug/L		88	75 - 125	2	30

Lab Sample ID: MB 680-506635/42
Matrix: Water
Analysis Batch: 506635

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/14/17 18:10	1
Ethylene	1.0	U	1.0		ug/L			12/14/17 18:10	1
Methane	0.58	U	0.58		ug/L			12/14/17 18:10	1
Methane (TCD)	390	U	390		ug/L			12/14/17 18:10	1

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Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCS 680-506635/37
Matrix: Water
Analysis Batch: 506635

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane (TCD)	1920	1630		ug/L		85	75 - 125

Lab Sample ID: LCS 680-506635/39
Matrix: Water
Analysis Batch: 506635

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethane	288	265		ug/L		92	75 - 125
Ethylene	269	248		ug/L		92	75 - 125

Lab Sample ID: LCSD 680-506635/38
Matrix: Water
Analysis Batch: 506635

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
Methane (TCD)	1920	1600		ug/L		83	75 - 125	2	30

Lab Sample ID: LCSD 680-506635/40
Matrix: Water
Analysis Batch: 506635

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
Ethane	288	250		ug/L		87	75 - 125	6	30
Ethylene	269	234		ug/L		87	75 - 125	6	30

Lab Sample ID: MB 680-506830/10
Matrix: Water
Analysis Batch: 506830

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	1.1	U	1.1		ug/L			12/18/17 15:52	1
Ethylene	1.0	U	1.0		ug/L			12/18/17 15:52	1
Methane	0.58	U	0.58		ug/L			12/18/17 15:52	1
Methane (TCD)	390	U	390		ug/L			12/18/17 15:52	1

Lab Sample ID: LCS 680-506830/3
Matrix: Water
Analysis Batch: 506830

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane (TCD)	1920	1730		ug/L		90	75 - 125

Lab Sample ID: LCS 680-506830/7
Matrix: Water
Analysis Batch: 506830

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethane	288	278		ug/L		96	75 - 125
Ethylene	269	261		ug/L		97	75 - 125

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Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCSD 680-506830/4
Matrix: Water
Analysis Batch: 506830

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
Methane (TCD)	1920	1800		ug/L		94	75 - 125	4	30

Lab Sample ID: LCSD 680-506830/8
Matrix: Water
Analysis Batch: 506830

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
Ethane	288	300		ug/L		104	75 - 125	8	30
Ethylene	269	279		ug/L		103	75 - 125	7	30

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-506047/1-A
Matrix: Water
Analysis Batch: 506233

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 506047

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.050	U	0.050		mg/L		12/12/17 10:44	12/13/17 04:05	1
Iron, Dissolved	0.050	U	0.050		mg/L		12/12/17 10:44	12/13/17 04:05	1
Manganese	0.010	U	0.010		mg/L		12/12/17 10:44	12/13/17 04:05	1
Manganese, Dissolved	0.010	U	0.010		mg/L		12/12/17 10:44	12/13/17 04:05	1

Lab Sample ID: LCS 680-506047/2-A
Matrix: Water
Analysis Batch: 506233

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 506047

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5.00	5.19		mg/L		104	80 - 120
Iron, Dissolved	5.00	5.19		mg/L		104	80 - 120
Manganese	0.500	0.538		mg/L		108	80 - 120
Manganese, Dissolved	0.500	0.538		mg/L		108	80 - 120

Method: 325.2-1978 - Chloride

Lab Sample ID: MB 680-506967/17
Matrix: Water
Analysis Batch: 506967

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.0	U	1.0		mg/L			12/18/17 16:07	1

Lab Sample ID: LCS 680-506967/18
Matrix: Water
Analysis Batch: 506967

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	25.0	26.3		mg/L		105	85 - 115

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Method: 325.2-1978 - Chloride (Continued)

Lab Sample ID: LCSD 680-506967/20
Matrix: Water
Analysis Batch: 506967

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
Chloride	25.0	27.2		mg/L		109	85 - 115	3	30

Lab Sample ID: MB 680-506968/7
Matrix: Water
Analysis Batch: 506968

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.0	U	1.0		mg/L			12/18/17 14:29	1

Lab Sample ID: LCS 680-506968/8
Matrix: Water
Analysis Batch: 506968

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	25.0	26.1		mg/L		105	85 - 115

Lab Sample ID: LCSD 680-506968/10
Matrix: Water
Analysis Batch: 506968

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
Chloride	25.0	26.2		mg/L		105	85 - 115	0	30

Method: 353.2-1993 R2.0 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 680-505753/13
Matrix: Water
Analysis Batch: 505753

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	0.050	U	0.050		mg/L			12/08/17 16:48	1

Lab Sample ID: LCS 680-505753/16
Matrix: Water
Analysis Batch: 505753

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	0.500	0.490		mg/L		98	75 - 125
Nitrate Nitrite as N	1.00	0.982		mg/L		98	90 - 110
Nitrite as N	0.500	0.492		mg/L		98	90 - 110

Lab Sample ID: 680-146571-4 MS
Matrix: Water
Analysis Batch: 505753

Client Sample ID: BSA-MW-1S-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	0.050	U F1	0.500	0.268	F1	mg/L		54	75 - 125
Nitrate Nitrite as N	0.050	U F1	1.00	0.589	F1	mg/L		59	90 - 110
Nitrite as N	0.050	U F1	0.500	0.321	F1	mg/L		64	90 - 110

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Method: 353.2-1993 R2.0 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: 680-146571-4 MSD
Matrix: Water
Analysis Batch: 505753

Client Sample ID: BSA-MW-1S-1217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	0.050	U F1	0.500	0.262	F1	mg/L		52	75 - 125	2	30
Nitrate Nitrite as N	0.050	U F1	1.00	0.585	F1	mg/L		58	90 - 110	1	10
Nitrite as N	0.050	U F1	0.500	0.323	F1	mg/L		65	90 - 110	1	10

Method: 375.4-1978 - Sulfate

Lab Sample ID: MB 680-506969/4
Matrix: Water
Analysis Batch: 506969

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	5.0	U	5.0		mg/L			12/18/17 13:47	1

Lab Sample ID: LCS 680-506969/5
Matrix: Water
Analysis Batch: 506969

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	20.0	19.3		mg/L		97	75 - 125

Lab Sample ID: LCSD 680-506969/7
Matrix: Water
Analysis Batch: 506969

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
Sulfate	20.0	18.9		mg/L		94	75 - 125	2	30

Method: 415.1-1974 - DOC

Lab Sample ID: LCS 680-511920/4
Matrix: Water
Analysis Batch: 511920

Client Sample ID: Lab Control Sample
Prep Type: Dissolved

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dissolved Organic Carbon	20.0	20.7		mg/L		104	80 - 120

Lab Sample ID: LCSD 680-511920/5
Matrix: Water
Analysis Batch: 511920

Client Sample ID: Lab Control Sample Dup
Prep Type: Dissolved

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dissolved Organic Carbon	20.0	20.2		mg/L		101	80 - 120	3	20

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Method: 415.1-1974 - TOC

Lab Sample ID: MB 680-506527/2
Matrix: Water
Analysis Batch: 506527

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1.0	U	1.0		mg/L			12/14/17 08:20	1

Lab Sample ID: LCS 680-506527/3
Matrix: Water
Analysis Batch: 506527

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	20.0	18.7		mg/L		94	80 - 120

Lab Sample ID: LCSD 680-506527/4
Matrix: Water
Analysis Batch: 506527

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
Total Organic Carbon	20.0	18.6		mg/L		93	80 - 120	0	25

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-190007/1
Matrix: Water
Analysis Batch: 190007

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity as CaCO3	5.0	U	5.0		mg/L			12/26/17 19:08	1

Lab Sample ID: LCS 310-190007/2
Matrix: Water
Analysis Batch: 190007

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity as CaCO3	1060	1010		mg/L		96	90 - 110

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QC Association Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

GC/MS VOA

Analysis Batch: 506230

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-6	BSA-MW-1S-1217-EB	Total/NA	Water	8260B	
680-146571-7	4Q17 Trip Blank #4	Total/NA	Water	8260B	
MB 680-506230/8	Method Blank	Total/NA	Water	8260B	
LCS 680-506230/3	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-506230/4	Lab Control Sample Dup	Total/NA	Water	8260B	

Analysis Batch: 506309

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total/NA	Water	8260B	
680-146571-3	CPA-MW-2D-1217-AD	Total/NA	Water	8260B	
680-146571-4	BSA-MW-1S-1217	Total/NA	Water	8260B	
MB 680-506309/9	Method Blank	Total/NA	Water	8260B	
LCS 680-506309/3	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-506309/4	Lab Control Sample Dup	Total/NA	Water	8260B	

GC VOA

Analysis Batch: 506553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total/NA	Water	RSK-175	
MB 680-506553/12	Method Blank	Total/NA	Water	RSK-175	
LCS 680-506553/6	Lab Control Sample	Total/NA	Water	RSK-175	
LCS 680-506553/9	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 680-506553/10	Lab Control Sample Dup	Total/NA	Water	RSK-175	
LCSD 680-506553/7	Lab Control Sample Dup	Total/NA	Water	RSK-175	

Analysis Batch: 506635

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-506635/42	Method Blank	Total/NA	Water	RSK-175	
LCS 680-506635/37	Lab Control Sample	Total/NA	Water	RSK-175	
LCS 680-506635/39	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 680-506635/38	Lab Control Sample Dup	Total/NA	Water	RSK-175	
LCSD 680-506635/40	Lab Control Sample Dup	Total/NA	Water	RSK-175	

Analysis Batch: 506830

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total/NA	Water	RSK-175	
680-146571-4	BSA-MW-1S-1217	Total/NA	Water	RSK-175	
MB 680-506830/10	Method Blank	Total/NA	Water	RSK-175	
LCS 680-506830/3	Lab Control Sample	Total/NA	Water	RSK-175	
LCS 680-506830/7	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 680-506830/4	Lab Control Sample Dup	Total/NA	Water	RSK-175	
LCSD 680-506830/8	Lab Control Sample Dup	Total/NA	Water	RSK-175	

Metals

Prep Batch: 506047

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total Recoverable	Water	3005A	
680-146571-2	CPA-MW-2D-F(0.2)-1217	Dissolved	Water	3005A	

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Metals (Continued)

Prep Batch: 506047 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-4	BSA-MW-1S-1217	Total Recoverable	Water	3005A	
680-146571-5	BSA-MW-1S-F(0.2)-1217	Dissolved	Water	3005A	
MB 680-506047/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-506047/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 506233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total Recoverable	Water	6010C	506047
680-146571-2	CPA-MW-2D-F(0.2)-1217	Dissolved	Water	6010C	506047
680-146571-4	BSA-MW-1S-1217	Total Recoverable	Water	6010C	506047
680-146571-5	BSA-MW-1S-F(0.2)-1217	Dissolved	Water	6010C	506047
MB 680-506047/1-A	Method Blank	Total Recoverable	Water	6010C	506047
LCS 680-506047/2-A	Lab Control Sample	Total Recoverable	Water	6010C	506047

General Chemistry

Analysis Batch: 189992

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total/NA	Water	SM 4500 CO2 C	
680-146571-4	BSA-MW-1S-1217	Total/NA	Water	SM 4500 CO2 C	

Analysis Batch: 190007

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total/NA	Water	SM 2320B	
680-146571-4	BSA-MW-1S-1217	Total/NA	Water	SM 2320B	
MB 310-190007/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-190007/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 505753

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total/NA	Water	353.2-1993 R2.0	
680-146571-4	BSA-MW-1S-1217	Total/NA	Water	353.2-1993 R2.0	
MB 680-505753/13	Method Blank	Total/NA	Water	353.2-1993 R2.0	
LCS 680-505753/16	Lab Control Sample	Total/NA	Water	353.2-1993 R2.0	
680-146571-4 MS	BSA-MW-1S-1217	Total/NA	Water	353.2-1993 R2.0	
680-146571-4 MSD	BSA-MW-1S-1217	Total/NA	Water	353.2-1993 R2.0	

Analysis Batch: 506527

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total/NA	Water	415.1-1974	
680-146571-4	BSA-MW-1S-1217	Total/NA	Water	415.1-1974	
MB 680-506527/2	Method Blank	Total/NA	Water	415.1-1974	
LCS 680-506527/3	Lab Control Sample	Total/NA	Water	415.1-1974	
LCSD 680-506527/4	Lab Control Sample Dup	Total/NA	Water	415.1-1974	

Analysis Batch: 506967

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-4	BSA-MW-1S-1217	Total/NA	Water	325.2-1978	
MB 680-506967/17	Method Blank	Total/NA	Water	325.2-1978	
LCS 680-506967/18	Lab Control Sample	Total/NA	Water	325.2-1978	

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General Chemistry (Continued)

Analysis Batch: 506967 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 680-506967/20	Lab Control Sample Dup	Total/NA	Water	325.2-1978	

Analysis Batch: 506968

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total/NA	Water	325.2-1978	
MB 680-506968/7	Method Blank	Total/NA	Water	325.2-1978	
LCS 680-506968/8	Lab Control Sample	Total/NA	Water	325.2-1978	
LCSD 680-506968/10	Lab Control Sample Dup	Total/NA	Water	325.2-1978	

Analysis Batch: 506969

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-1	CPA-MW-2D-1217	Total/NA	Water	375.4-1978	
680-146571-4	BSA-MW-1S-1217	Total/NA	Water	375.4-1978	
MB 680-506969/4	Method Blank	Total/NA	Water	375.4-1978	
LCS 680-506969/5	Lab Control Sample	Total/NA	Water	375.4-1978	
LCSD 680-506969/7	Lab Control Sample Dup	Total/NA	Water	375.4-1978	

Analysis Batch: 511920

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146571-2	CPA-MW-2D-F(0.2)-1217	Dissolved	Water	415.1-1974	
680-146571-5	BSA-MW-1S-F(0.2)-1217	Dissolved	Water	415.1-1974	
LCS 680-511920/4	Lab Control Sample	Dissolved	Water	415.1-1974	
LCSD 680-511920/5	Lab Control Sample Dup	Dissolved	Water	415.1-1974	

SJD 2/14/18
TestAmerica Savannah

Lab Chronicle

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: CPA-MW-2D-1217

Lab Sample ID: 680-146571-1
Matrix: Water
Date Collected: 12/07/17 09:05
Date Received: 12/08/17 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		250	506309	12/14/17 03:06	UI	TAL SAV
Total/NA	Analysis	RSK-175		1	506553	12/15/17 15:05	KAB	TAL SAV
Total/NA	Analysis	RSK-175		1	506830	12/18/17 16:57	KAB	TAL SAV
Total Recoverable	Prep	3005A			506047	12/12/17 10:44	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1	506233	12/13/17 05:49	BWR	TAL SAV
Total/NA	Analysis	325.2-1978		1	506968	12/18/17 14:16	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	505753	12/08/17 16:59	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		5	506969	12/18/17 15:44	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	506527	12/14/17 12:22	KLD	TAL SAV
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 09:54	LBB	TAL CF

Client Sample ID: CPA-MW-2D-F(0.2)-1217

Lab Sample ID: 680-146571-2
Matrix: Water
Date Collected: 12/07/17 09:05
Date Received: 12/08/17 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			506047	12/12/17 10:44	AJR	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/13/17 06:10	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	511920	12/14/17 12:42	KLD	TAL SAV

Client Sample ID: CPA-MW-2D-1217-AD

Lab Sample ID: 680-146571-3
Matrix: Water
Date Collected: 12/07/17 09:05
Date Received: 12/08/17 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		250	506309	12/14/17 05:16	UI	TAL SAV

Client Sample ID: BSA-MW-1S-1217

Lab Sample ID: 680-146571-4
Matrix: Water
Date Collected: 12/07/17 10:05
Date Received: 12/08/17 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5000	506309	12/14/17 02:23	UI	TAL SAV
Total/NA	Analysis	RSK-175		1	506830	12/18/17 17:10	KAB	TAL SAV
Total Recoverable	Prep	3005A			506047	12/12/17 10:44	AJR	TAL SAV
Total Recoverable	Analysis	6010C		1	506233	12/13/17 06:05	BWR	TAL SAV
Total/NA	Analysis	325.2-1978		10	506967	12/19/17 07:43	ALG	TAL SAV
Total/NA	Analysis	353.2-1993 R2.0		1	505753	12/08/17 16:52	AMH	TAL SAV
Total/NA	Analysis	375.4-1978		2	506969	12/18/17 16:11	ALG	TAL SAV
Total/NA	Analysis	415.1-1974		1	506527	12/14/17 12:58	KLD	TAL SAV

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TestAmerica Savannah

Lab Chronicle

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Client Sample ID: BSA-MW-1S-1217

Lab Sample ID: 680-146571-4
Matrix: Water
Date Collected: 12/07/17 10:05
Date Received: 12/08/17 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2320B		1	190007	12/26/17 19:08	BER	TAL CF
Total/NA	Analysis	SM 4500 CO2 C		1	189992	12/26/17 09:58	LBB	TAL CF

Client Sample ID: BSA-MW-1S-F(0.2)-1217

Lab Sample ID: 680-146571-5
Matrix: Water
Date Collected: 12/07/17 10:05
Date Received: 12/08/17 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			506047	12/12/17 10:44	AJR	TAL SAV
Dissolved	Analysis	6010C		1	506233	12/13/17 06:15	BWR	TAL SAV
Dissolved	Analysis	415.1-1974		1	511920	12/14/17 13:15	KLD	TAL SAV

Client Sample ID: BSA-MW-1S-1217-EB

Lab Sample ID: 680-146571-6
Matrix: Water
Date Collected: 12/07/17 10:30
Date Received: 12/08/17 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	506230	12/13/17 15:48	UI	TAL SAV

Client Sample ID: 4Q17 Trip Blank #4

Lab Sample ID: 680-146571-7
Matrix: Water
Date Collected: 12/07/17 00:00
Date Received: 12/08/17 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	506230	12/13/17 16:11	UI	TAL SAV

Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

SJD 2/14/18
TestAmerica Savannah

TestAmerica Savannah
5102 LaRoche Avenue

Savannah, GA 31404
phone 912.354.7858 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐DW ☐NPDES ☑RCRA ☐Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Amanda Derhake	Site Contact: Samantha DiCenso	Date: 12/7/17	COC No: 1 of 1 COCs
Golder Associates Inc.	Tel/Fax: 636-724-9191	Lab Contact: Michele Kersey	Carrier: FedEx	Sampler: JAP
820 South Main Street	Analysis Turnaround Time			For Lab Use Only:
St. Charles, MO 63301	☑ CALENDAR DAYS ☐ WORKING DAYS			Walk-in Client:
(636) 724-9191 Phone	TAT if different from Below Standard			Lab Sampling:
(636) 724-9323 FAX	☑ 2 weeks			
Project Name: 4Q17 LTM GW Sampling-1403345	☐ 1 week			
Site: Solutia WG Krummrich Plant	☐ 2 days			Job / SDG No.:
P O # 42262863	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	VOCs by 8260	Total Fe/Mn by 6010C	Alk/CO2 by 310.1	Chloride by 325.2/Sulfate by 375.4	Dissolved Gases by RSK 175	Nitrate by 353.2	TOC by 415.1	Dissolved Fe/Mn by 6010C	DOC by 415.1	Sample Specific Notes:
CPA-MW-2D-1217	12/7/17	0906	G	W	14	N		3	1	1	1	3	2	3			
CPA-MW-2D-F(0.2)-1217	|	|	|	|	4	Y									1	3	
CPA-MW-2D-1217-AD	|	|	|	|	3	N		3									
BSA-MW-1S-1217	|	1005	|	|	14	N		3	1	1	1	3	2	3			
BSA-MW-1S-F(0.2)-1217	|	|	|	|	4	Y									1	3	
BSA-MW-1S-1217-EB	|	1030	|	|	3	N		3									
4Q17 Trip Blank #4	|	—	G	W	2	N		2									

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______ — VOCs 2; Total Fe/Mn 4; Alk/CO2 1; Chloride/Sulfate 1; Dissolved Gases 2; Nitrate 1,3; TOC 3; Dissolved Fe/Mn 4; DOC 3

680-146571 Chain of Custody

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐Return to Client ☑Disposal by Lab ☐Archive for ______ Months

Special Instructions/QC Requirements & Comments:
VOC headspace upon sampling: Yes/No

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd ____ Corr'd ____		Therm ID No.:
Relinquished by: Tommy J. Goodall	Company: Golder	Date/Time: 12/7/17 1600	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: MTA	Company: TAJ[illegible]	Date/Time: 12/8/17 940

4.1°((UF)4.5 3.3°((UF)3.7 3.4°/(IR)4.0

Form No. CA-C-WI-002, Rev. 4.3, dated 12/05/2013

SJD 2/14/18

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

680-146571 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: TA- Savannah

City/State: CITY Savannah STATE GA | Project:

Receipt Information

Date/Time Received: DATE 12/23/17 TIME 1005 | Received By: MRH

Delivery Type: ☐ UPS ☒ FedEx Sat Del ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☐ TA Courier ☐ TA Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☐ Yes ☒ No *If yes:* Cooler # _____ of _____

Cooler Custody Seals Present? ☒ Yes ~~☒ No~~ MRH 12/23/17 *If yes:* Cooler custody seals intact? ☒ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: J | Correction Factor (°C): +0.1

• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 0.3 | Corrected Temp (°C): 0.4

• Sample Container Temperature

Sample ID(s) & bottle type used: CONTAINER 1 | CONTAINER 2

Uncorrected Temp (°C): TEMP 1 | TEMP 2 | Corrected Temp (°C): TEMP 1 | TEMP 2

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

SJD 2/14/18

General temperature criteria is 0 to 6°C
Bacteria temperature criteria is 0 to 10°C

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone (912) 354-7858 Fax (912) 352-0165

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Kersey, Michele R	Carrier Tracking No(s):	COC No: 680-502683.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: michele.kersey@testamericainc.com	State of Origin: Illinois	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note): NELAP - Illinois		Job #: 680-146571-1
Address: 704 Enterprise Drive,	Due Date Requested: 12/26/2017			
City: Cedar Falls	TAT Requested (days):			
State, Zip: IA, 50613				
Phone: 319-277-2401(Tel) 319-277-2425(Fax)	PO #:			
Email:	WO #:			
Project Name: WGK Long Term Monitoring (LTM)	Project #: 68001754			
Site:	SSOW#:			

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Analysis Requested

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2320B/ Alkalinity	SM4500_CO2_C/ (MOD) Copy Analytes	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
CPA-MW-2D-1217 (680-146571-1)	12/7/17	09:05 Central		Water			X	X	1	
BSA-MW-1S-1217 (680-146571-4)	12/7/17	10:05 Central		Water			X	X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ________ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) | Primary Deliverable Rank: 2
Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
[signature]	12/22/17 1800	[illegible]	Matt [signature]	12/23/17 1005	TA-CF

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 09/20/2016

SJD 2/14/18

Login Sample Receipt Checklist

Client: Solutia Inc.

Job Number: 680-146571-1
SDG Number: KPS201

Login Number: 146571
List Number: 1
Creator: Tyler, Matthew M

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
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 (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.	N/A	
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	

SJD 2/14/18

Login Sample Receipt Checklist

Client: Solutia Inc.

Job Number: 680-146571-1
SDG Number: KPS201

Login Number: 146571
List Number: 2
Creator: Hummel, Matt R

List Source: TestAmerica Cedar Falls
List Creation: 12/23/17 10:40 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
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 (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	

SJD 2/14/18

Accreditation/Certification Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	09-22-19
Arizona	State Program	9	AZ0808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-19
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-18
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-18
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-18 *
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-18
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-18
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-18
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-18
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah
SSD 2/14/18

Accreditation/Certification Summary

Client: Solutia Inc.
Project/Site: 4Q17 LTM GW Sampling - 1403345

TestAmerica Job ID: 680-146571-1
SDG: KPS201

Laboratory: TestAmerica Cedar Falls

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
AIHA-LAP, LLC	IHLAP		101044	11-01-18
Georgia	State Program	4	IA100001 (OR)	09-29-18
Illinois	NELAP	5	200024	11-29-18
Iowa	State Program	7	007	12-01-17 *
Kansas	NELAP	7	E-10341	01-31-18 *
Minnesota	NELAP	5	019-999-319	12-31-18
Minnesota (Petrofund)	State Program	1	3349	08-22-18
North Dakota	State Program	8	R-186	09-29-18
Oregon	NELAP	10	IA100001	09-29-18

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Savannah
SJD 2/14/18

APPENDIX E
MICROBIAL INSIGHTS DATA PACKAGE

(On CD)

10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Client: Samantha Dicenso
Golder Associates Inc.
820 S. Main Street
Suite 100
St. Charles, MO 63301

Phone:

Fax:

Identifier: 008OL **Date Rec:** 12/01/2017 **Report Date:** 02/12/2018

Client Project #: 1403345 **Client Project Name:** W.G. Krummrich

Purchase Order #:

Analysis Requested: PLFA, Stable Isotope Probing, Standard Bio-Trap

Reviewed By:

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

PLFA

Client: **Golder Associates Inc.**
Project: W.G. Krummrich

MI Project Number: **008OL**
Date Received: 12/01/2017

Sample Information

Sample Name:	**BSA-MW-1S-1117**	**BSA-MW-2D-1117**	**BSA-MW-3D-1117**	**BSA-MW-4D-1117**	**BSA-MW-5D-1117**
Sample Date:	11/30/2017	11/30/2017	11/30/2017	11/30/2017	11/30/2017
Sample Matrix:	Std. Bio-Trap	Adv. Bio-Trap	Std. Bio-Trap	Std. Bio-Trap	Std. Bio-Trap
Analyst/Reviewer:	KH	KH	KH	KH	KH

Biomass Concentrations

Total Biomass (cells/bead)	**2.39E+05**	**1.22E+05**	**3.15E+04**	**2.52E+04**	**1.60E+05**

Community Structure (% total PLFA)

Firmicutes (TerBrSats)	**2.69**	**6.25**	**0.00**	**1.93**	**0.00**
Proteobacteria (Monos)	**80.65**	**29.96**	**45.00**	**50.37**	**84.90**
Anaerobic metal reducers (BrMonos)	**0.00**	**2.81**	**0.00**	**0.00**	**0.00**
SRB/Actinomycetes (MidBrSats)	**0.57**	**2.11**	**0.00**	**0.00**	**0.00**
General (Nsats)	**15.54**	**24.99**	**55.01**	**47.70**	**14.81**
Eukaryotes (polyenoics)	**0.56**	**33.88**	**0.00**	**0.00**	**0.29**

Physiological Status (Proteobacteria only)

Slowed Growth	**0.20**	**0.71**	**0.92**	**0.47**	**0.00**
Decreased Permeability	**0.00**	**0.10**	**0.00**	**0.00**	**0.11**

Legend:
NA = Not Analyzed NS = Not Sampled

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

PLFA

Client: **Golder Associates Inc.**
Project: W.G. Krummrich

MI Project Number: **008OL**
Date Received: 12/01/2017

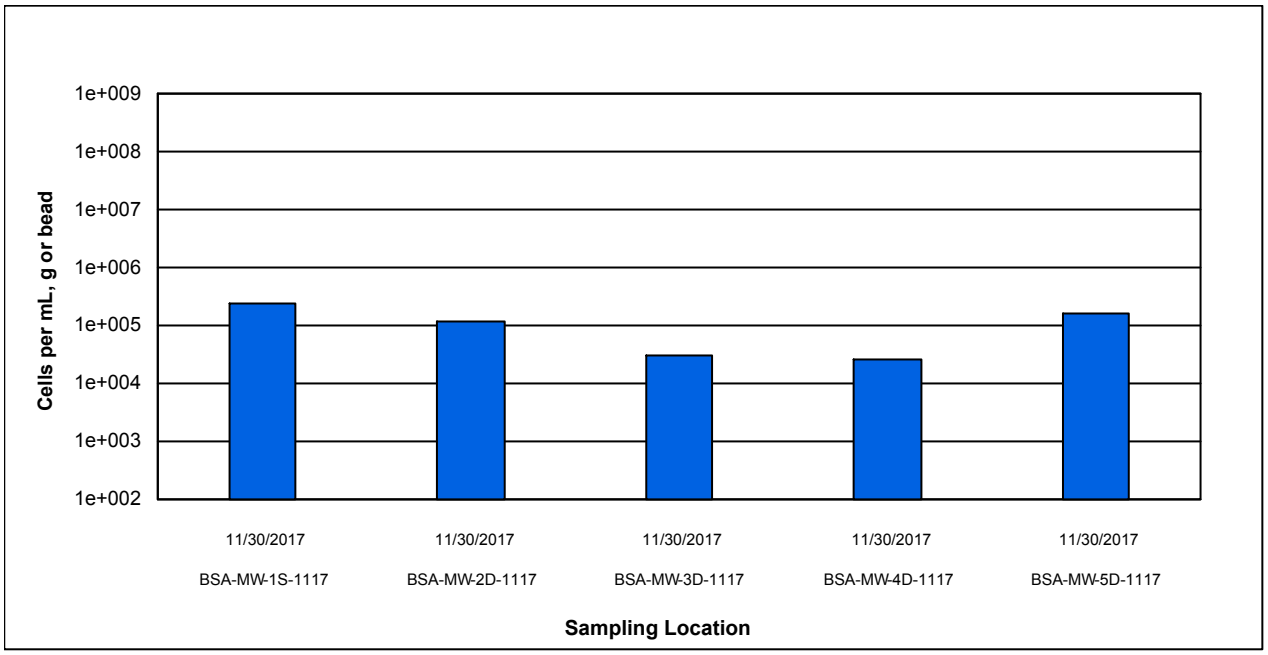

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass

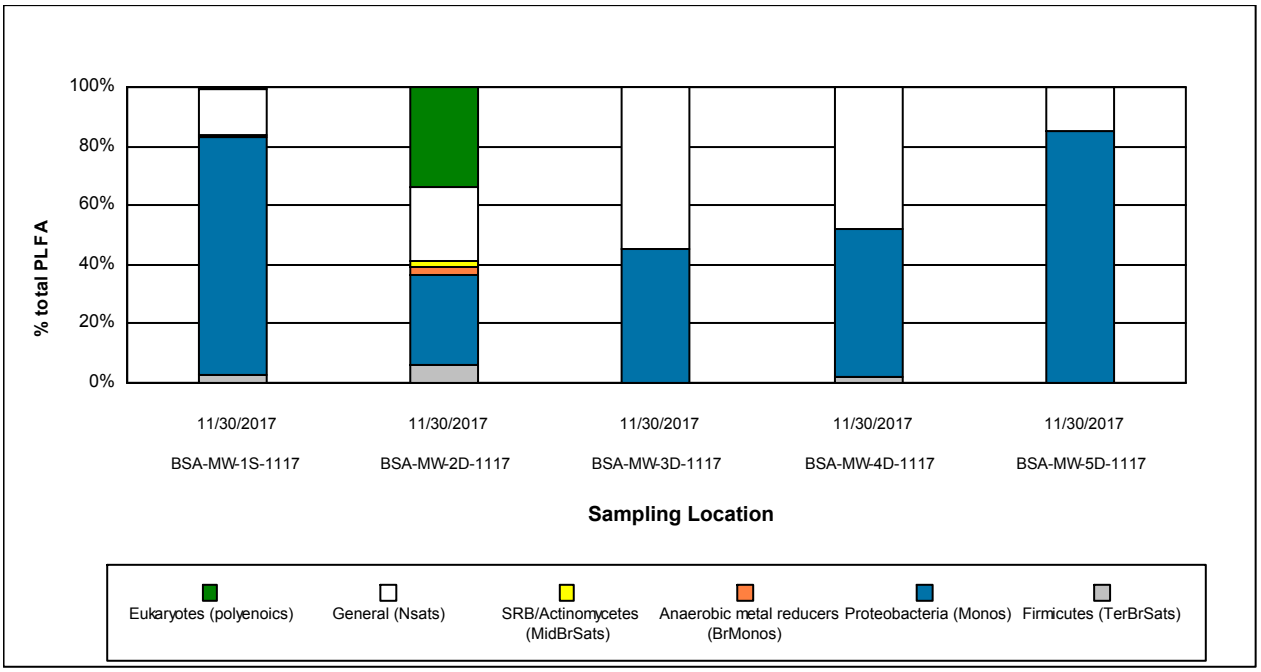

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis.

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
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PLFA

Client: **Golder Associates Inc.**
Project: W.G. Krummrich

MI Project Number: **008OL**
Date Received: 12/01/2017

Sample Information

Sample Name:	**CPA-MW-1D-1117**	**CPA-MW-2D-1117**	**CPA-MW-3D-1117**	**CPA-MW-4D-1117**	**CPA-MW-5D-1117**
Sample Date:	11/30/2017	11/30/2017	11/30/2017	11/30/2017	11/30/2017
Sample Matrix:	Std. Bio-Trap	Std. Bio-Trap	Adv. Bio-Trap	Std. Bio-Trap	Std. Bio-Trap
Analyst/Reviewer:	KH	KH	KH	KH	KH

Biomass Concentrations

Total Biomass (cells/bead)	**1.17E+05**	**7.45E+04**	**4.56E+05**	**2.06E+05**	**2.78E+04**

Community Structure (% total PLFA)

Firmicutes (TerBrSats)	**0.72**	**13.24**	**17.06**	**12.44**	**19.33**
Proteobacteria (Monos)	**79.51**	**44.13**	**27.47**	**54.94**	**55.50**
Anaerobic metal reducers (BrMonos)	**0.00**	**0.00**	**0.94**	**0.00**	**0.00**
SRB/Actinomycetes (MidBrSats)	**0.00**	**1.43**	**2.69**	**3.68**	**0.00**
General (Nsats)	**19.39**	**35.56**	**46.61**	**20.12**	**25.18**
Eukaryotes (polyenoics)	**0.38**	**5.67**	**5.25**	**8.81**	**0.00**

Physiological Status (Proteobacteria only)

Slowed Growth	**0.94**	**1.56**	**1.49**	**1.79**	**1.09**
Decreased Permeability	**0.04**	**0.00**	**0.13**	**0.30**	**0.00**

Legend:
NA = Not Analyzed NS = Not Sampled

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

Client: **Golder Associates Inc.**
Project: W.G. Krummrich

MI Project Number: **008OL**
Date Received: 12/01/2017

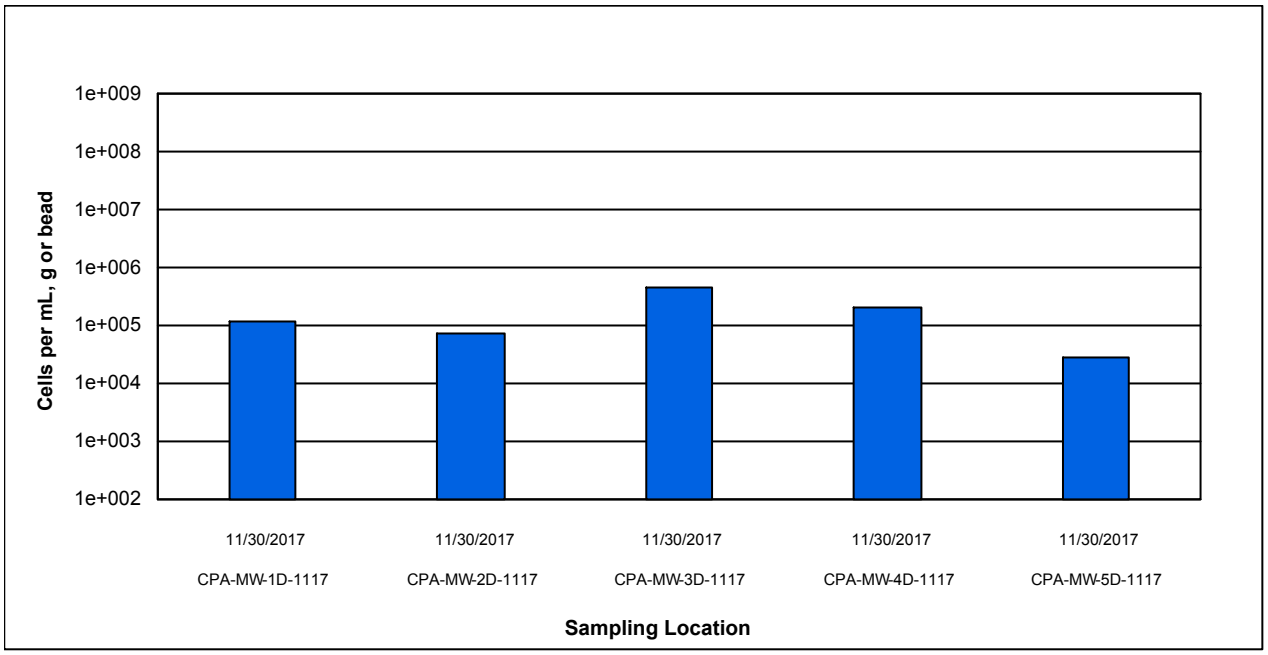

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass

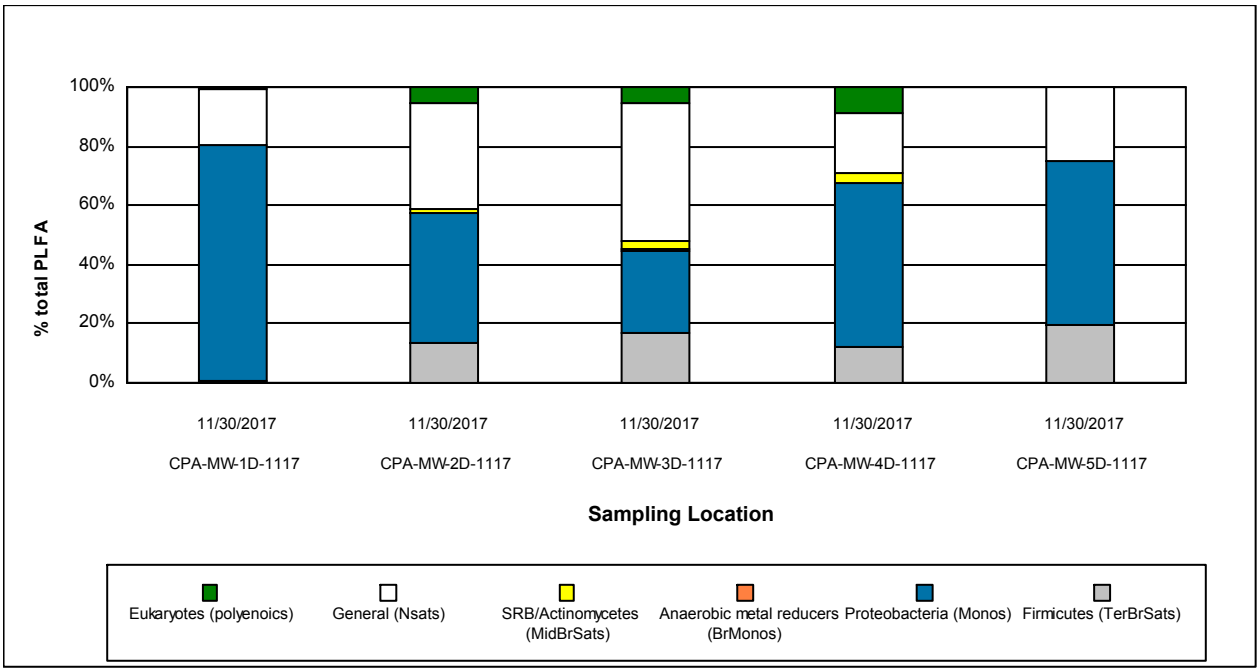

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis.

Quality Assurance/Quality Control Data

Samples Received **12/1/2017**

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
PLFA	12/01/2017	02/12/2018	13 °C	64%	non-detect	non-detect
PLFA	12/01/2017	02/12/2018	13 °C	80%	non-detect	non-detect

10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Identifier: 008OL **Date Rec:** 12/01/2017 **Report Date:** 02/12/2018

Client Project #: 1403345 **Client Project Name:** W.G. Krummrich

Purchase Order #:

Comments: Please note results for samples BSA-MW-3D-1117, BSA-MW-4D-1117 and CPA-MW-5D-1117 fell between reporting and detection limits for PLFA analysis.

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Phospholipid Fatty Acid Analysis

Interpretation Guidelines

Phospholipids fatty acids (PLFA) are a main component of the membrane (essentially the "skin") of microbes and provide a powerful tool for assessing microbial responses to changes in their environment. This type of analysis provides direct information for assessing and monitoring sites where bioremediation processes, including natural attenuation, are of interest. Analysis of the types and amount of PLFA provides a broad based understanding of the entire microbial community with information obtained in three key areas viable biomass, community structure and metabolic activity.

What is the detection limit for PLFA?

Our limit of detection for PLFA analysis is ~150 picomoles of total PLFA and our limit of quantification is ~500 picomoles of total PLFA. Samples which contain PLFA amounts at or below 150 pmol cannot be used to determine biomass, likewise samples with PLFA content below ~500 pmol are generally considered to contain too few fatty acids to discuss community composition.

How should I interpret the PLFA results?

Interpreting the results obtained from PLFA analysis can be somewhat difficult, so this document was designed to provide a technical guideline. For convenience, this guideline has been divided into the three key areas.

Viable Biomass

PLFA analysis is one of the most reliable and accurate methods available for the determination of viable microbial biomass. Phospholipids break down rapidly upon cell death (21, 23), so biomass calculations based on PLFA content do not contain 'fossil' lipids of dead cells.

How is biomass measured?

Viable biomass is determined from the total amount of PLFA detected in a given sample. Since, phospholipids are an essential part of intact cell membranes they provide an accurate measure of viable cells.

How is biomass calculated?

Biomass levels are reported as cells per gram, mL or bead, and are calculated using a conversion factor of 20,000 cells/pmole of PLFA. This conversation factor is based upon cells grown in laboratory media, and varies somewhat with the type of organism and environmental conditions.

What does the concentration of biomass mean?

The overall abundance of microbes within a given sample is often used as an indicator of the potential for bioremediation to occur, but understanding the levels of biomass within each sample can be cumbersome. The following are benchmarks that can be used to understand whether the biomass levels are low, moderate or high.

Low	Moderate	High
10^3 to 10^4 cells	10^5 to 10^6 cells	10^7 to 10^8 cells

How do I know if a change in biomass is significant?

One of the primary functions of using PLFA analysis at contaminated sites is to evaluate how a community responds following a given treatment, but how does one know if the changes observed between two events are significant? As a general rule, biomass levels which increase or decrease by at least an order of magnitude are considered to be significant. However, changes in biomass levels of less than an order of magnitude may still show a trend. It is important to remember that many factors can affect microbial growth, so factors other than the treatment could be influencing the changes observed between sampling events. Some of the factors to consider are: temperature, moisture, pH, etc. The following illustration depicts three types of changes that occurred over time and the conclusions that could be drawn.

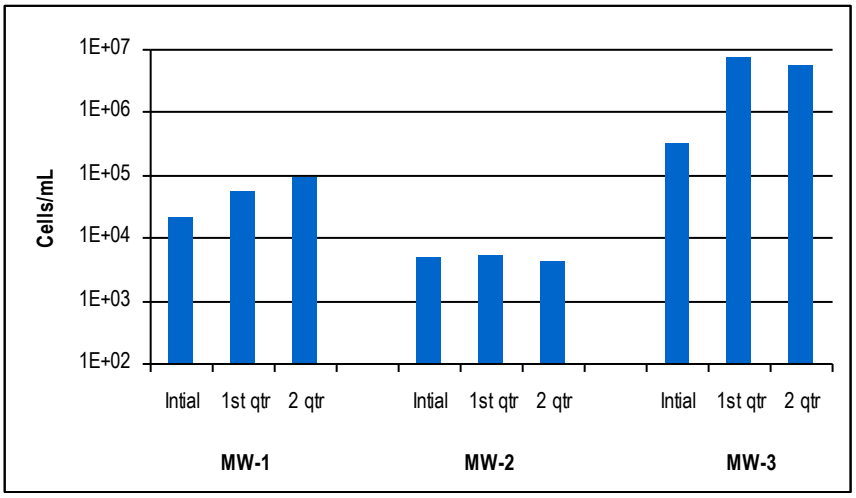

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass (associated with higher organisms).

Conclusions from graph above:

- MW-1 showed a trend of biomass levels increasing steadily over time, although cell concentrations were ~10^4 cells/mL at each sampling event.
- MW-2 showed no notable trends or significant changes in biomass concentrations.
- MW-3 showed a significant increase in biomass levels between the initial and 1st quarter sampling events (from ~10^5 to ~10^6 cells/mL).

Community Structure:

The PLFA in a sample can be separated into particular types, and the resulting PLFA "profile" reflects the proportions of the categories of organisms present in the sample. Because groups of bacteria differ in their metabolic capabilities, determining which bacterial groups are present and their relative distributions within the community can provide information on what metabolic processes are occurring at that location. This in turn can also provide information on the subsurface conditions (i.e oxidation/reduction status, etc.). Table 1 describes the six major structural groups used and their potential relevance to site specific projects.

Table 1. Description of PLFA structural groups.

PLFA Structural Group	General classification	Potential Relevance to Bioremediation Studies
Monoenoic (Monos)	Abundant in Proteobacteria (Gram negative bacteria), typically fast growing, utilize many carbon sources, and adapt quickly to a variety of environments.	Proteobacteria is one of the largest groups of bacteria and represents a wide variety of both aerobes and anaerobes. The majority of Hydrocarbon utilizing bacteria fall within the Proteobacteria
Terminally Branched Saturated (TerBrSats)	Characteristic of Firmicutes (Low G+C Gram-positive bacteria), and also found in Bacteriodes, and some Gram-negative bacteria (especially anaerobes).	Firmicutes are indicative of presence of anaerobic fermenting bacteria (mainly *Clostridia/Bacteriodes*-like), which produce the H_2 necessary for reductive dechlorination
Branched Monoenoic (BrMonos)	Found in the cell membranes of micro-aerophiles and anaerobes, such as sulfate- or iron-reducing bacteria	In contaminated environments high proportions are often associated with anaerobic sulfate and iron reducing bacteria
Mid-Chain Branched Saturated (MidBrSats)	Common in sulfate reducing bacteria and also Actinobacteria (High G+C Gram-positive bacteria).	In contaminated environments high proportions are often associated with anaerobic sulfate and iron reducing bacteria
Normal Saturated (Nsats)	Found in all organisms.	High proportions often indicate less diverse populations.
Polyenoic	Found in eukaryotes such as fungi, protozoa, algae, higher plants, and animals.	Eukaryotic scavengers will often rise up and prey on contaminant utilizing bacteria

Following are answers to some of the common questions about community composition and some detailed descriptions of some typical shifts which can be observed between sampling events.

How is the community structure data presented?

Community structure data is presented as percentage (%) of the total amount of PLFA. In order to relate the complex mixture of PLFA to the organisms present, the ratio of a specific PLFA group is determined (detailed in Table 1 above), and this corresponds to the proportion of the related bacterial classification within the overall community structure. Because normal saturated PLFA are found in both prokaryotes (bacteria) and eukaryotes (fungi, protozoa, diatoms etc), their distribution provides little insight into the types of microbes that are present at a sampling location. However, high proportions of normal saturates are often associated with less diverse microbial populations.

How can community structure data be used to manage my site?

It is important to understand that microbial communities are often a mixture of different types of bacteria (e.g. aerobes, sulfate reducers, methanogens, etc) with the abundance of each group behaving like a seesaw, i.e. as the population of one group increases, another is likely decreasing, mostly due to competition for available resources. The PLFA profile of a sample provides a "fingerprint" of the microbial community, showing relative proportions of the specific bacterial types at the time of sampling. This is a great tool for detecting shifts within the community over time and also to evaluate similarities/differences between sampling locations. It is important to note that PLFA analysis of community structure is analyzing the microbes directly, not just secondary breakdown products. So this provides evidence of how the entire microbial community is responding to the treatment.

How do I recognize community shifts and what they mean?

Shifts in the community structure are indications of changing conditions and their effect on the microbial community, and, by extension on the metabolic processes occurring at the sampling location. Some of the more commonly seen shifts within the community are illustrated and discussed below:

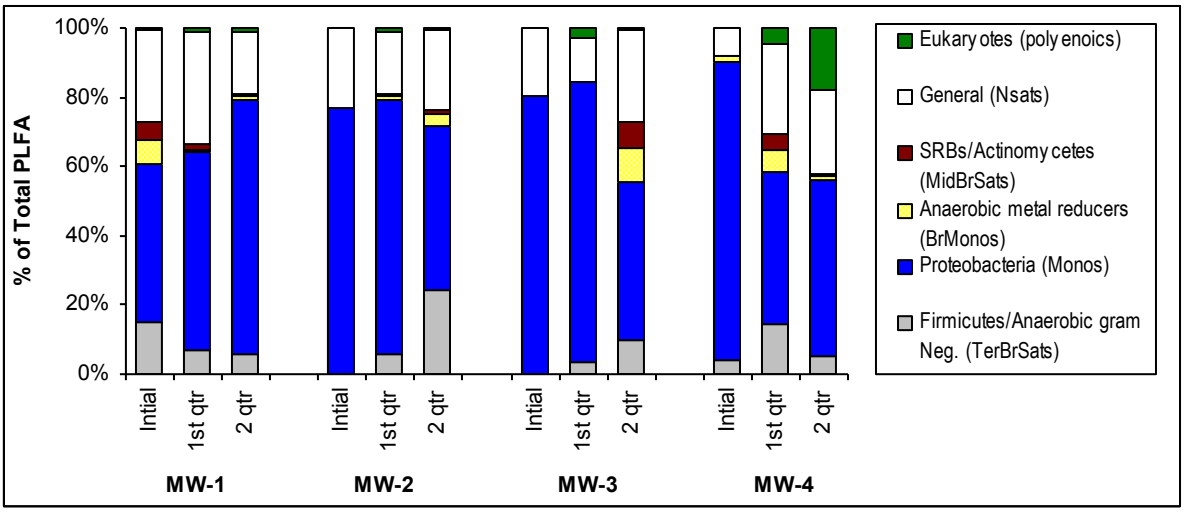

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis. See Table 1 for detailed descriptions of structural groups.

- **Increased Proteobacteria**

Proportions of Proteobacteria are of interest because it is one of the largest groups of bacteria and represents a wide variety of both aerobe and anaerobes. The majority of hydrocarbons (including benzene and naphthalene) are metabolized by some member of Proteobacteria, mainly due to their ability to grow opportunistically, quickly taking advantage of available food (i.e. hydrocarbons), and adapting quickly to changes in the environment. The detection of increased proportions of Proteobacteria coupled with increased biomass suggests that the Proteobacteria are consuming something. In situations where it is important to determine the extent to which the Proteobacteria are utilizing anaerobic or aerobic pathways, it is possible to measure relative proportions of specific biomarkers that are associated with anaerobic or aerobic pathways thus separating the Proteobacteria into different groups, based on pathways used. Sample MW-1 from Figure 2 depicts a shift in community structure where the proportion of Proteobacteria has increased over time.

- **Increased Firmicutes/Anaerobic Gram negative bacteria**

Increased proportions of Firmicutes/Anaerobic Gram negative bacteria generally indicate that conditions are becoming more reductive (i.e. more anaerobic). Proportions of Firmicutes are of particular interest in sites contaminated with chlorinated hydrocarbons because Firmicutes include anaerobic fermenting bacteria (mainly *Clostridia/Bacteriodes*-like), which produce the H_2 necessary for reductive dechlorination.

Enhanced bioremediation of chlorinated solvents often employs the injection of fermentable substrates which, when utilized by fermenting bacteria, results in the release of H_2. Engineered shifts in the microbial community can be shown by observing increased proportions Firmicutes following an injection of fermentable substrate. Through long-term monitoring of the community structure it is possible to know when re-injection may be necessary or desirable. Sample MW-2 from Figure 2 depicts a shift in community structure where the proportion of Firmicutes has increased over time.

- **Increased anaerobic metal reducing bacteria (BrMonos) and SRB/Actinomycetes (MidBrSats)**

An increase in the proportions of metal and sulfate reducing bacterial groups, especially when combined with shifts in the other bacterial groups, can provide information helpful to monitoring bioremediation. Generally, an increase in metal and sulfate reducers points to more reduced (anaerobic) conditions at the sampled location. This is especially true if there is an increase in Firmicutes at the same time. Large increases in either metal and sulfate reducers, particularly if accompanied by a decrease in Firmicutes, may suggest that conditions are becoming increasingly reduced. In this situation the metal and sulfate reducers may be out-competing dechlorinators for available H_2, thereby limiting the potential for reductive dechlorination at that location. Sample MW-3 from Figure 2 depicts a shift in community structure where the proportion of metal reducing bacteria has increased over time.

- **Increased Eukaryotes**

Eukaryotes include organisms such as fungi, protozoa, and diatoms. At a contaminated location, an increase in eukaryotes, particularly if seen with a decrease in the contaminant utilizing bacteria, suggests that eukaryotic scavengers are preying upon what had been an abundance of bacteria which were consuming the contaminant. Sample MW-4 from Figure 2 depicts a shift in community structure where the proportion of eukaryotes has increased over time.

Physiological status of Proteobacteria

The membrane of a microbe adapts to the changing conditions of its environment, and these changes are reflected in the PLFA. Toxic compounds or environmental conditions may disrupt the membrane and some bacteria respond by making *trans* fatty acids instead of the usual *cis* fatty acids (7) in order to strengthen the cell membrane, making it less permeable. Many Proteobacteria respond to lack of available substrate or to highly toxic conditions by making cyclopropyl (7) or mid-chain branched fatty acids (20) which point to less energy expenditure and a slowed growth rate. The physiological status ratios for Decreased Permeability (trans/cis ratio) and for Slowed Growth (cy/cis ratio) are based on dividing the amount of the fatty acid induced by environmental conditions by the amount of its biosynthetic precursor.

What does slowed growth or decreased permeability mean?

Ratios for slowed growth and for decreased permeability of the cell membrane provide information on the "health" of the Gram negative community, that is, how this population is responding to the conditions present in the environment. It should be noted that one must be cautious when interpreting these measures from only one sampling event. The most effective way to use the physiological status indicators is in long term monitoring and comparing how these ratios increase/decrease over time.

A marked increase in either of these ratios suggests a change in environment which is less favorable to the Gram negative Proteobacteria population. The ratio for slowed growth is a relative measure, and does not directly correspond to log or stationary phases of growth, but is useful as a comparison of growth rates among sampling locations and also over time. An increase in this ratio (i.e. slower growth rate) suggests a change in conditions which is not as supportive of rapid, "healthy" growth of the Gram negative population, often due to reduced available substrate (food). A larger ratio for decreased permeability suggests that the environment has become more toxic to the Gram negative population, requiring energy expenditure to produce *trans* fatty acids in order to make the membrane more rigid.

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SITE LOGIC Report

Stable Isotope Probing (SIP) Study

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Report Date: February 12, 2018

Project: WG Krummrich, 140-3345

Comments:

Executive Summary

A Stable Isotope Probing (SIP) study was performed to determine whether biodegradation of benzene and chlorobenzene is occurring under existing site conditions. Bio-Trap® samplers baited with ^{13}C labeled benzene and ^{13}C labeled chlorobenzene were deployed in monitoring wells BSA-MW-2D-1117 and CPA-MW-3D-1117, respectively. Following a 29-day deployment period, the Bio-Traps were recovered to quantify ^{13}C incorporation into biomass and dissolved inorganic carbon (DIC). A complete summary of the SIP results is provided in Table 1 and Figures 1 through 5. Tables 2 and 3 and Figures 6 through 9 contain summaries of PLFA analysis performed on standard Bio-Trap samplers deployed in BSA and CPA monitoring wells.

Stable Isotope Probing (SIP)

- The detection of ^{13}C-enriched biomass confirmed that benzene biodegradation had occurred at BSA-MW-2D-1117 during the deployment period.
    - Total PLFA biomass for well BSA-MW-2D-1117 (1.22E+05 cells/bead) was in the moderate range.
    - The average PLFA $\delta^{13}C$ value was 2087‰, indicating a high level of incorporation of ^{13}C-labeled benzene into microbial biomass.
    - The average DIC $\delta^{13}C$ value was 175‰, indicating that moderate benzene mineralization occurred during the deployment period.
    - The PLFA community structure was primarily composed of eukaryotes (33.88%), monoenoics (29.96%), and normal saturates (24.99%). Indicators of firmicutes, anaerobic metal reducers, and actinomycetes were also detected.

- The detection of ^{13}C-enriched biomass confirmed that chlorobenzene biodegradation had occurred at CPA-MW-3D-1117 during the deployment period.
    - Total PLFA biomass for well CPA-MW-3D-1117 (4.56+05 cells/bead) was in the moderate range.
    - The average PLFA $\delta^{13}C$ value was 54‰, indicating some ^{13}C-labeled chlorobenzene had been metabolized and incorporated into microbial biomass.
    - The average DIC $\delta^{13}C$ value was -11‰, which is near background and suggests that little to no chlorobenzene mineralization occurred during the deployment period.
    - The PLFA community structure was primarily composed of normal saturates (46.61%) and monoenoics (27.47%) followed by firmicutes (17.06%). Indicators of eukaryotes, actinomycetes, and anaerobic metal reducers were also detected.

PLFA Analysis - Standard Bio-Traps

- Total biomass concentrations in the standard BSA bio-traps fell within the low to moderate range (10^4 to 10^5 cells/bead). Results for samples BSA-MW-3D-1117 and BSA-MW-4D-1117 fell between reporting and detection limits for PLFA analysis.
- The community structures in the standard BSA bio-traps indicated that monoenoics and normal saturates were the most abundant groups.
- In the CPA wells, total PLFA biomass concentrations fell within fell within the low to moderate range (10^4 to 10^5 cells/bead). Total biomass in CPA-MW-5D-1117 fell between the reporting and detection limits for PLFA.
- The community structures in the standard CPA bio-traps were primarily composed of monoenoics, normal saturates, and firmicutes.

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Overview of Approach

Stable Isotope Probing (SIP)

Stable isotope probing (SIP) is an innovative method to track the environmental fate of a "labeled" contaminant of concern to unambiguously demonstrate biodegradation. Two stable carbon isotopes exist in nature – carbon 12 (^{12}C) which accounts for 99% of carbon and carbon 13 (^{13}C) which is considerably less abundant (~1%). With the SIP method, the Bio-Trap® sampler is baited with a specially synthesized form of the contaminant containing ^{13}C labeled carbon. Since ^{13}C is rare, the labeled compound can be readily differentiated from the contaminants present at the site. Following deployment, the Bio-Trap® is recovered and three approaches are used to conclusively demonstrate biodegradation of the contaminant of concern.

- The loss of the labeled compound provides an estimate of the degradation rate (% loss of ^{13}C).
- Quantification of ^{13}C enriched phospholipid fatty acids (PLFA) indicates incorporation into microbial biomass.
- Quantification of ^{13}C enriched dissolved inorganic carbon (DIC) indicates contaminant mineralization.

Phospholipid Fatty Acids (PLFA)

PLFA are a primary component of the membrane of all living cells including bacteria. PLFA decomposes rapidly upon cell death (1, 2), so the total amount of PLFA present in a sample is indicative of the viable biomass. When combined with stable isotope probing (SIP), incorporation of ^{13}C into PLFA is a conclusive indicator of biodegradation.

Some organisms produce "signature" types of PLFA allowing quantification of important microbial functional groups (e.g. iron reducers, sulfate reducers, or fermenters). The relative proportions of the groups of PLFA provide a "fingerprint" of the microbial community. In addition, *Proteobacteria* modify specific PLFA during periods of slow growth or in response to environmental stress providing an index of their health and metabolic activity.

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Results

Table 1. Summary of the results obtained from the Bio-Trap® Units. Interpretation guidelines and definitions are found later in the document.

Sample Name	BSA-MW-2D-1117	CPA-MW-3D-1117
Sample Date	11/30/17	11/30/17
^{13}C Contaminant Loss		
^{13}C Benzene Pre-deployment (µg/bead)	**116 ± 20**	**---**
^{13}C Benzene Post-deployment (µg/bead)	**99 ± 14**	**---**
^{13}C Chlorobenzene Pre-deployment (µg/bead)	**---**	**219 ± 11**
^{13}C Chlorobenzene Post-deployment (µg/bead)	**---**	**165 ± 26**
Biomass & ^{13}C Incorporation		
Total Biomass (Cells/bead)	**1.22E+05**	**4.56E+05**
^{13}C Enriched Biomass (Cells/bead)	**4.11E+02**	**3.97E+02**
Average PLFA Delta (‰)	**2087**	**54**
Maximum PLFA Delta (‰)	**2087**	**54**
^{13}C Mineralization		
DIC Delta (‰)	**175**	**-11**
% ^{13}C	**1.1**	**1.8**
Community Structure (% total PLFA)		
Firmicutes (TerBrSats)	**6.25**	**17.06**
Proteobacteria (Monos)	**29.96**	**27.47**
Anaerobic metal reducers (BrMonos)	**2.81**	**0.94**
Actinomycetes (MidBrSats)	**2.11**	**2.69**
General (Nsats)	**24.99**	**46.61**
Eukaryotes (Polyenoics)	**33.88**	**5.25**
Physiological Status (Proteobacteria only)		
Slowed Growth	**0.71**	**1.49**
Decreased Permeability	**0.10**	**0.13**

Legend: ND= Non Detect J = Estimated value between detection limit and reporting limit

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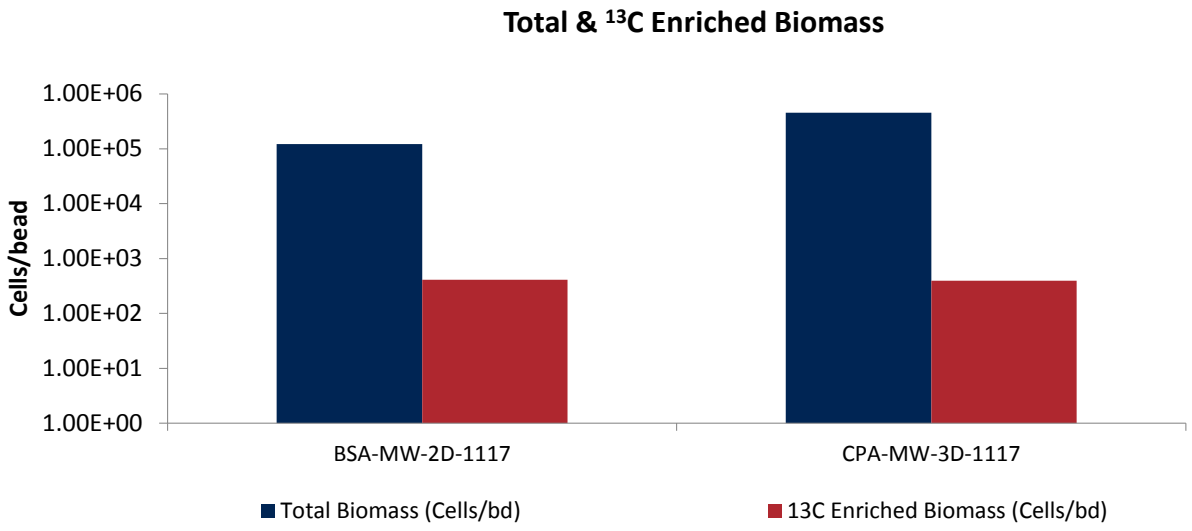

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass (associated with higher organisms).

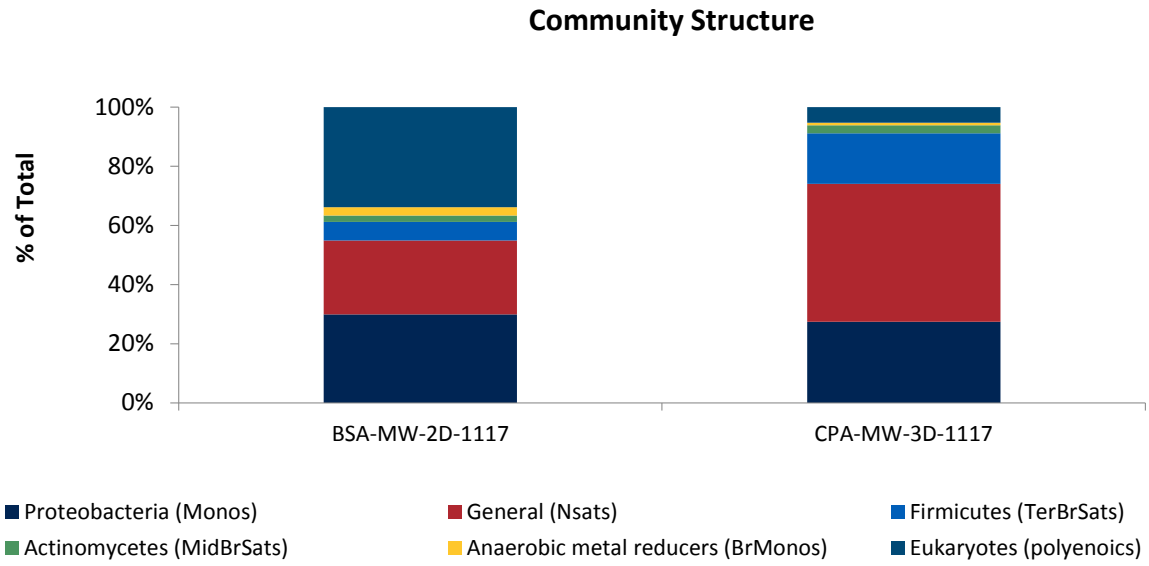

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis. See the table in the interpretation section for detailed descriptions of the structural groups.

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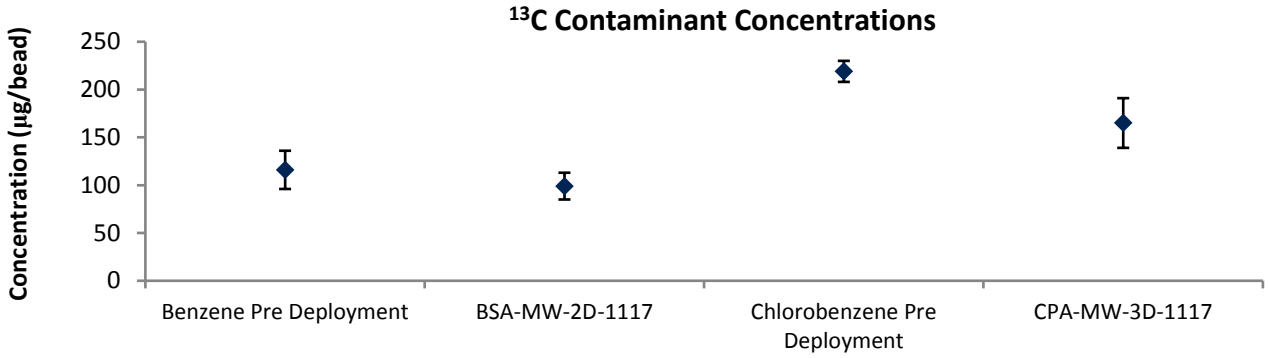

Figure 3. Comparison of Pre-deployment concentrations loaded on Bio-Sep beads to the concentrations detected after incubation.

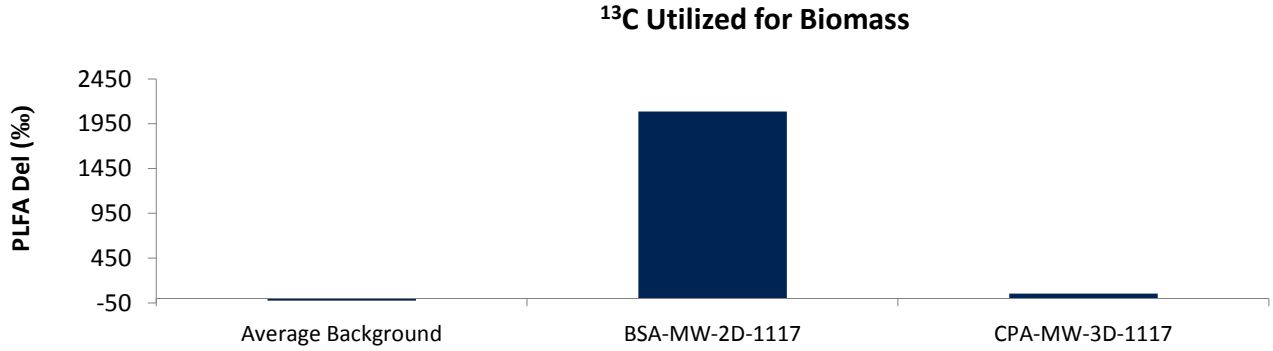

Figure 4. Comparison of the average Delta value obtained from PLFA biomarkers from each Bio-Trap® unit to the average background Delta observed in samples not exposed to ^{13}C enriched compounds.

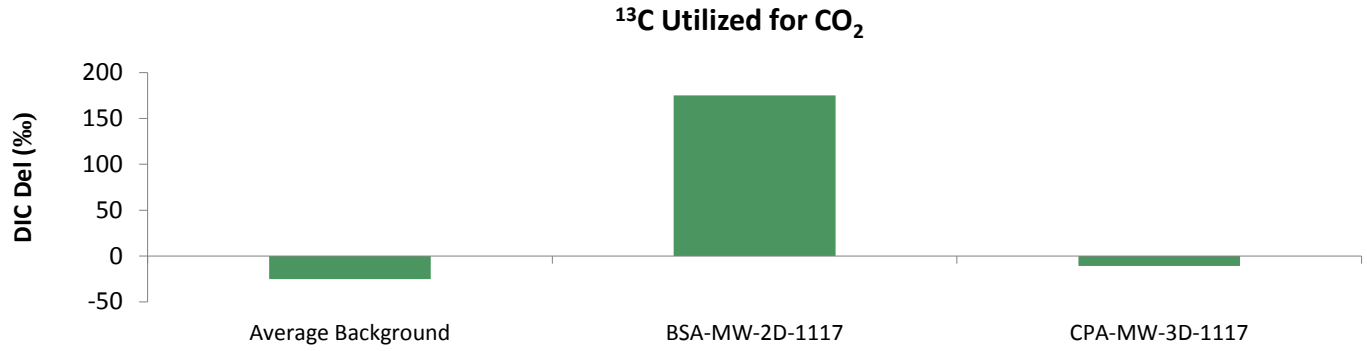

Figure 5. Comparison of the Delta value obtained from DIC from each Bio-Trap® unit to the average background Delta observed in samples not exposed to ^{13}C enriched compounds.

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Table 2. Summary of the PLFA results for the benzene wells obtained from the Bio-Trap® Units.

Sample Name	BSA-MW-1S	BSA-MW-2D	BSA-MW-3D	BSA-MW-4D	BSA-MW-5D
Sample Date	11-30-17	11-30-17	11-30-17	11-30-17	11-30-17
Biomass Concentration					
Total Biomass (Cells/bead)	**2.39E+05**	**1.22E+05**	**3.15E+04 (J)**	**2.52E+04 (J)**	**1.60E+05**
Community Structure (% total PLFA)					
Firmicutes (TerBrSats)	**2.69**	**6.25**	0.00	**1.93**	0.00
Proteobacteria (Monos)	**80.65**	**29.96**	**45.00**	**50.37**	**84.90**
Anaerobic metal reducers (BrMonos)	0.00	**2.81**	0.00	0.00	0.00
Actinomycetes (MidBrSats)	**0.57**	**2.11**	0.00	0.00	0.00
General (Nsats)	**15.54**	**24.99**	**55.01**	**47.70**	**14.81**
Eukaryotes (Polyenoics)	**0.56**	**33.88**	0.00	0.00	**0.29**
Physiological Status (Proteobacteria only)					
Slowed Growth	**0.20**	**0.71**	**0.92**	**0.47**	0.00
Decreased Permeability	0.00	**0.10**	0.00	0.00	**0.11**

Legend: ND= Non Detect J = Estimated value between detection limit and reporting limit

Table 3. Summary of the PLFA results for the chlorobenzene wells obtained from the Bio-Trap® Units.

Sample Name	CPA-MW-1D	CPA-MW-2D	CPA-MW-3D	CPA-MW-4D	CPA-MW-5D
Sample Date	11-30-17	11-30-17	11-30-17	11-30-17	11-30-17
Biomass Concentration					
Total Biomass (Cells/bead)	**1.17E+05**	**7.45E+04**	**4.56E+05**	**2.06E+05**	**2.78E+04 (J)**
Community Structure (% total PLFA)					
Firmicutes (TerBrSats)	**0.72**	**13.24**	**17.06**	**12.44**	**19.33**
Proteobacteria (Monos)	**79.51**	**44.13**	**27.47**	**54.94**	**55.50**
Anaerobic metal reducers (BrMonos)	0.00	0.00	**0.94**	0.00	0.00
Actinomycetes (MidBrSats)	0.00	**1.43**	**2.69**	**3.68**	0.00
General (Nsats)	**19.39**	**35.56**	**46.61**	**20.12**	**25.18**
Eukaryotes (Polyenoics)	**0.38**	**5.67**	**5.25**	**8.81**	0.00
Physiological Status (Proteobacteria only)					
Slowed Growth	**0.94**	**1.56**	**1.49**	**1.79**	**1.09**
Decreased Permeability	**0.04**	0.00	**0.13**	**0.30**	0.00

Legend: ND= Non Detect J = Estimated value between detection limit and reporting limit

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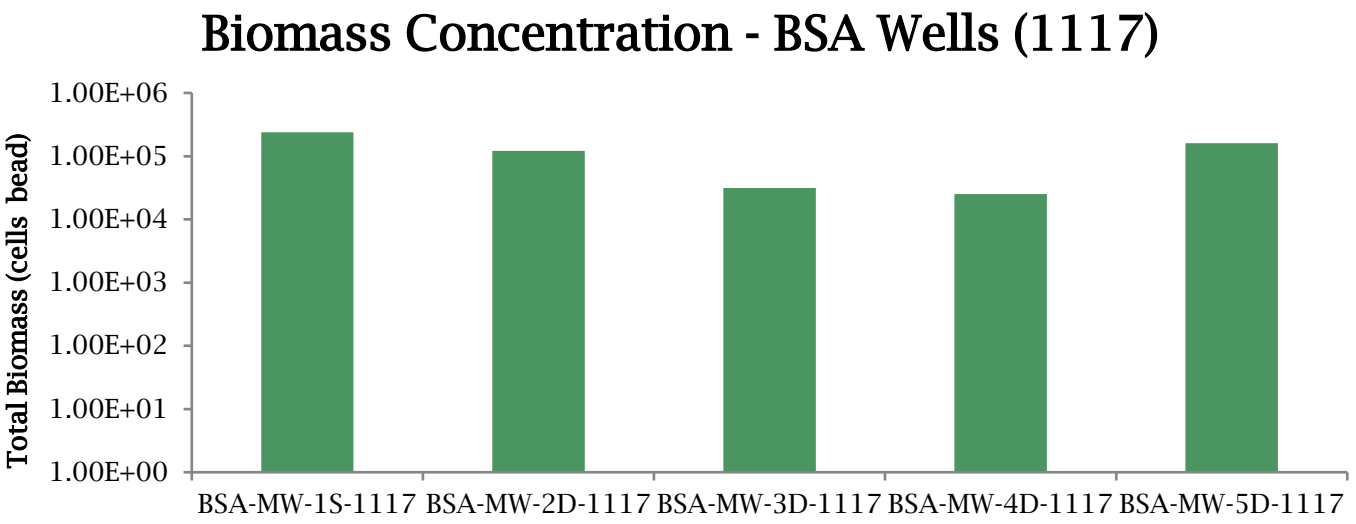

Figure 6. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass (associated with higher organisms).

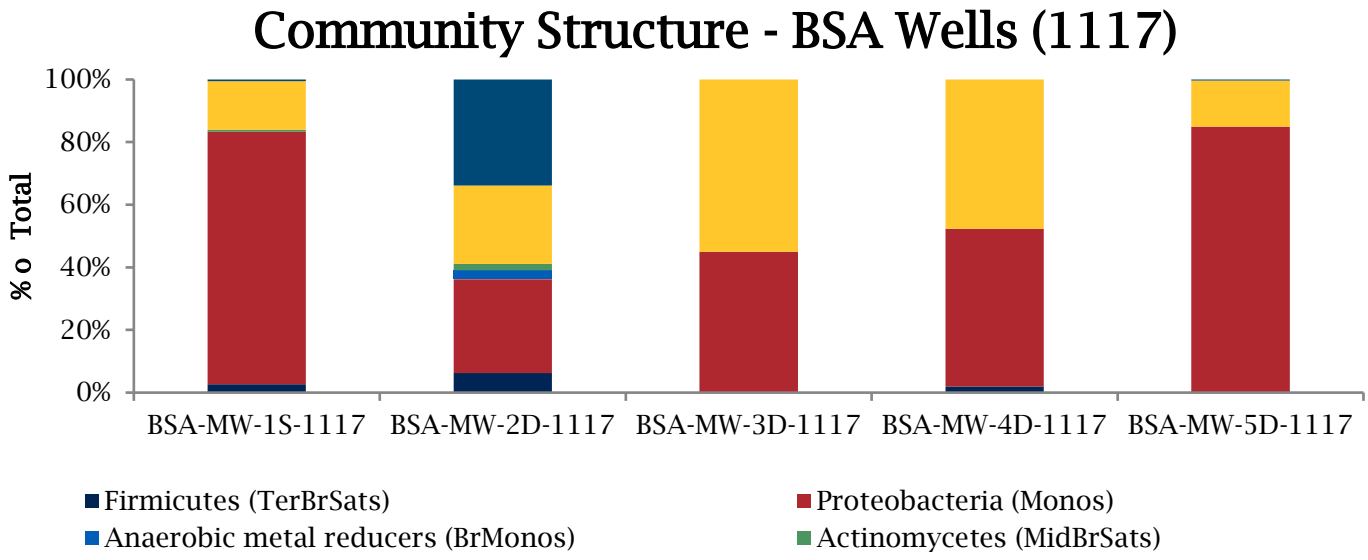

Figure 7. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis. See the table in the interpretation section for detailed descriptions of the structural groups.

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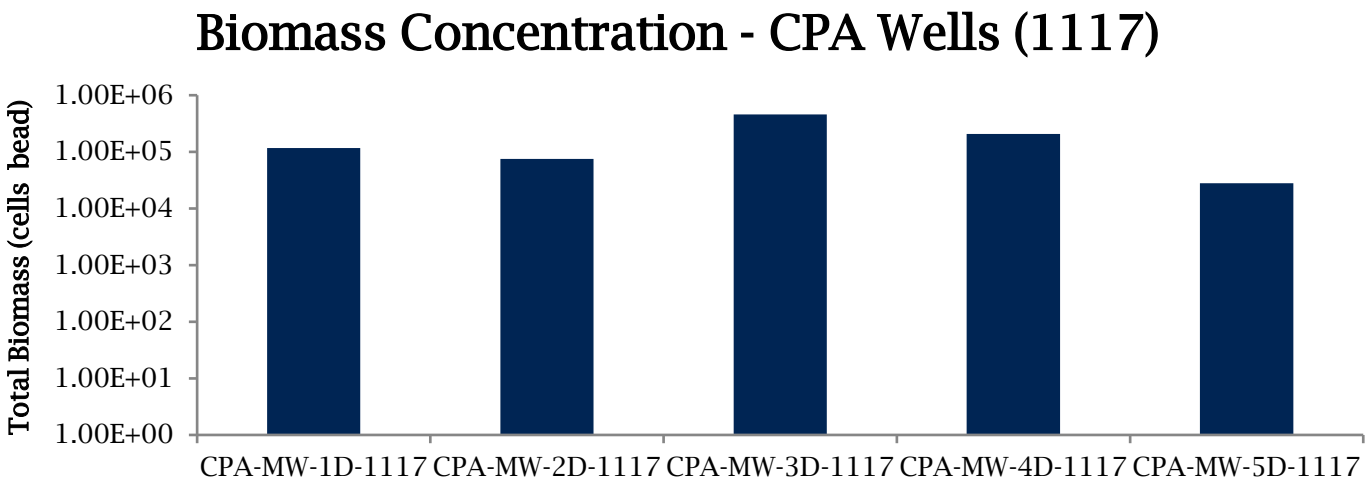

Figure 8. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass (associated with higher organisms).

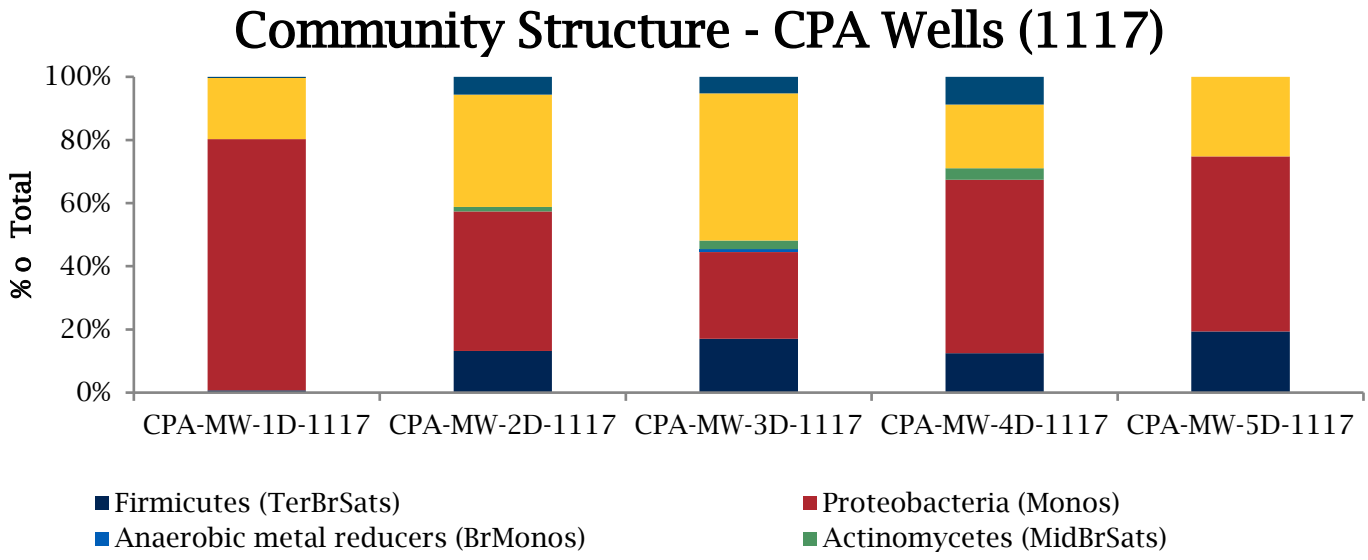

Figure 9. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis. See the table in the interpretation section for detailed descriptions of the structural groups.

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Interpretation

Interpretation of the results of the SIP Bio-Trap® study must be performed with due consideration of site conditions, site activities, and the desired treatment mechanism. The following discussion describes interpretation of results in general terms and is meant to serve as a guide.

Contaminant Concentration: Bio-Traps® are baited with a ^{13}C labeled contaminant of concern and a pre-deployment concentration is determined prior to shipping. Following deployment, Bio-Traps® are recovered for analysis including measurement of the concentration of the ^{13}C labeled contaminant remaining. Pre- and post-deployment concentrations are used to calculate percent loss.

Biomass Concentrations: PLFA analysis is one of the most reliable and accurate methods available for the determination of viable (live) biomass. Phospholipids break down rapidly upon cell death, so biomass calculations based on PLFA content do not include "fossil" lipids from dead cells. Total biomass (cells/bead) is calculated from total PLFA using a conversion factor of 20,000 cells/pmole of PLFA. When making comparisons between wells, treatments, or over time, differences of one order of magnitude or more are considered significant.

Total Biomass		
Low	**Moderate**	**High**
10^3 to 10^4 cells	10^5 to 10^6 cells	10^7 to 10^8 cells

For SIP studies, the ^{13}C enriched PLFA is also determined to conclusively demonstrate contaminant biodegradation and quantify incorporation into biomass as a result of the ^{13}C being used for cellular growth. The % ^{13}C incorporation (^{13}C enriched biomass/total biomass) is also provided in the data summary table, but the value must be interpreted carefully especially when comparing wells or treatments. Typically, biodegradation of a contaminant of concern is performed by a small subset of the total microbial community. For Bio-Traps® with large total biomass, the % ^{13}C incorporation value could be low despite significant ^{13}C labeled biomass and loss of the compound. The % ^{13}C incorporation should be viewed in light of total biomass, percent loss, and dissolved inorganic carbon (DIC) results.

^{13}C enrichment data is often reported as a delta value. The delta value is the difference between the isotopic ratio ($^{13}C/^{12}C$) of the sample (R_x) and a standard (R_{std}) normalized to the isotopic ratio of the standard (R_{std}) and multiplied by 1,000 (units are parts per thousand, denoted ‰).

R_{std} is the naturally occurring isotopic ratio and is approximately 0.011180 (roughly 1% of naturally occurring carbon is ^{13}C). The isotopic ratio, R_x, of PLFA is typically less than the R_{std} under natural conditions, resulting in a delta value between -20 and -30‰. For a SIP Bio-Trap® study, biodegradation and incorporation of the ^{13}C labeled compound into PLFA results in a larger $^{13}C/^{12}C$ ratio (R_x) and thus delta values greater than under natural conditions. Typical PLFA delta values are provided below.

PLFA Delta (‰)		
Low	**Moderate**	**High**
0 to 100	100 to 1,000	>1,000

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Dissolved Inorganic Carbon (DIC): Often, bacteria can utilize the ^{13}C labeled compound as both a carbon and energy source. The ^{13}C portion used as a carbon source for growth can be incorporated into PLFA as discussed above, while the ^{13}C used for energy is oxidized to $^{13}CO_2$ (mineralized).

^{13}C enriched CO_2 data is often reported as a delta value as described above for PLFA. Under natural conditions, the R_x of CO_2 is approximately the same as R_{std} (0.01118 or about 1.1% ^{13}C). For an SIP Bio-Trap® study, mineralization of the ^{13}C labeled contaminant of concern would lead to a greater value of R_x (increased $^{13}CO_2$ production) and thus a positive delta value. As with PLFA, delta values between 0 and 100‰ are considered low, values between 100 and 1,000‰ are considered moderate, and values greater than 1,000‰ are considered high. Thus DIC $\%^{13}C$ are considered low if the value is less than 1.23%, moderate if between 1.23 and 2.24%, and high if greater than 2.24%.

Dissolved Inorganic Carbon (DIC) Delta and $\%^{13}C$		
Low	**Moderate**	**High**
0 to 100	100 to 1,000	>1,000
1.11 to 1.23%	1.23 to 2.24%	>2.24%

Community Structure (% total PLFA): Community structure data is presented as a percentage of PLFA structural groups normalized to the total PLFA biomass. The relative proportions of the PLFA structural groups provide a "fingerprint" of the types of microbial groups (e.g. anaerobes, sulfate reducers, etc.) present and therefore offer insight into the dominant metabolic processes occurring at the sample location. Thorough interpretation of the PLFA structural groups depends in part on an understanding of site conditions and the desired microbial biodegradation pathways. For example, an increase in mid chain branched saturated PLFA (MidBrSats), indicative of sulfate reducing bacteria (SRB) and *Actinomycetes*, may be desirable at a site where anaerobic BTEX biodegradation is the treatment mechanism, but would not be desirable for a corrective action promoting aerobic BTEX or MTBE biodegradation. The following table provides a brief summary of each PLFA structural group and its potential relevance to bioremediation.

Table 2. Description of PLFA structural groups.

PLFA Structural Group	General classification	Potential Relevance to Bioremediation Studies
Monoenoic (Monos)	Abundant in Proteobacteria (Gram negative bacteria), typically fast growing, utilize many carbon sources, and adapt quickly to a variety of environments.	Proteobacteria is one of the largest groups of bacteria and represents a wide variety of both aerobes and anaerobes. The majority of Hydrocarbon utilizing bacteria fall within the Proteobacteria
Terminally Branched Saturated (TerBrSats)	Characteristic of Firmicutes (Low G+C Gram-positive bacteria), and also found in Bacteriodes, and some Gram-negative bacteria (especially anaerobes).	Firmicutes are indicative of presence of anaerobic fermenting bacteria (mainly *Clostridia/Bacteriodes*-like), which produce the H_2 necessary for reductive dechlorination
Branched Monoenoic (BrMonos)	Found in the cell membranes of micro-aerophiles and anaerobes, such as sulfate- or iron-reducing bacteria	In contaminated environments high proportions are often associated with anaerobic sulfate and iron reducing bacteria
Mid-Chain Branched Saturated (MidBrSats)	Common in sulfate reducing bacteria and also Actinobacteria (High G+C Gram-positive bacteria).	In contaminated environments high proportions are often associated with anaerobic sulfate and iron reducing bacteria
Normal Saturated (Nsats)	Found in all organisms.	High proportions often indicate less diverse populations.
Polyenoic	Found in higher plants, and animals.	Eukaryotic scavengers will often prey on contaminant utilizing bacteria.

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Physiological Status (*Proteobacteria*): Some *Proteobacteria* modify specific PLFA as a strategy to adapt to stressful environmental conditions (3, 4). For example, *cis* monounsaturated fatty acids may be modified to cyclopropyl fatty acids during periods of slowed growth or modified to *trans* monounsaturated fatty acids to decrease membrane permeability in response to environmental stress. The ratio of product to substrate fatty acid thus provides an index of their health and metabolic activity. In general, status ratios greater than 0.25 indicate a response to unfavorable environmental conditions.

Glossary

Delta (δ): A Delta value is the difference between the isotopic ratio ($^{13}C/^{12}C$) of the sample (R_x) and a standard (R_{std}) normalized to the isotopic ratio of the standard (R_{std}) and multiplied by 1,000 (units are parts per thousand denoted ‰).

$$Delta = (R_x - R_{std})/R_{std} \times 1000$$

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