REPLICATE RESULTS-CONVENTIONALS
Z053-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/05/15

Project: Gas Works Park-Play Area
Event: 0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: Z053A Client ID: PAI-10GW						
Total Dissolved Solids	SM2540C	12/18/14	mg/L	388	365	6.1%
Ferrous Iron	SM3500 FeD	12/11/14	mg/L	0.957	0.946	1.2%
Chloride	EPA 300.0	12/17/14	mg/L	5.7	5.3	7.3%
N-Nitrate	EPA 300.0	12/13/14	mg-N/L	< 0.1	< 0.1	NA
Sulfate	EPA 300.0	12/17/14	mg/L	35.1	35.1	0.0%

LAB CONTROL RESULTS-CONVENTIONALS
Z053-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/05/15

Project: Gas Works Park-Play Area
Event: 0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Dissolved Solids SM2540C	ICVL	12/18/14	mg/L	488	500	97.6%
Ferrous Iron SM3500 FeD	ICVL	12/11/14	mg/L	0.498	0.500	99.6%
Sulfide SM4500-S2D	ICVL	12/17/14	mg/L	0.521	0.501	104.0%

METHOD BLANK RESULTS-CONVENTIONALS
Z053-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/05/15

Project: Gas Works Park-Play Area
Event: 0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Total Dissolved Solids	SM2540C	12/18/14	mg/L	< 5.0 U	
Ferrous Iron	SM3500 FeD	12/11/14	mg/L	< 0.040 U	
Chloride	EPA 300.0	12/17/14	mg/L	< 0.1 U	
N-Nitrate	EPA 300.0	12/13/14	mg-N/L	< 0.1 U	
Sulfate	EPA 300.0	12/17/14	mg/L	< 0.1 U	
Sulfide	SM4500-S2D	12/17/14	mg/L	< 0.050 U	

STANDARD REFERENCE RESULTS-CONVENTIONALS
Z053-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/05/15

Project: Gas Works Park-Play Area
Event: 0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Alkalinity ERA #P114506	SM 2320	12/17/14	mg/L CaCO3	58.5	61.7	94.8%
Chloride ERA #290313	EPA 300.0	12/17/14	mg/L	2.8	3.0	93.3%
N-Nitrate ERA #320614	EPA 300.0	12/13/14	mg-N/L	2.8	3.0	93.3%
Sulfate ERA 131013	EPA 300.0	12/17/14	mg/L	3.0	3.0	100.0%

Subcontracted Results
Arsenic Speciation Analyzed by Applied Speciation & Consulting

ARI Job ID: ZO53

APPLIED SPECIATION AND CONSULTING, LLC

18804 Northcreek Parkway Bothell, WA. 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

January 15, 2015

Cheronne Oreiro
Analytical Resources Inc.
4611 S. 134th Place Suite 100
Tukwila, WA 98168
(206) 695-6200

Re: SDG A141217S1 (Gas Works Park – Play Area Investigation)

Ms. Oreiro,

Attached is the report associated with six (6) aqueous samples submitted for arsenite, arsenate, monomethylarsonic acid, and dimethylarsinic acid quantitation on December 17, 2014. The samples were received on the day of submittal in a sealed cooler at 0.3°C. Arsenite, arsenate, monomethylarsonic acid, and dimethylarsinic acid quantitation was performed via ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). Any issues associated with the analyses are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Ben Wozniak

Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Cheronne Oreiro
Analytical Resources Inc.
4611 S. 134th Place Suite 100
Tukwila, WA 98168

January 15, 2015

1. Sample Reception

Six (6) aqueous samples were submitted for arsenite, arsenate, monomethylarsonic acid, and dimethylarsinic acid quantitation on December 17, 2014. The samples were received on the day of submittal in a sealed cooler at 0.3°C, as indicated on the attached chain of custody (COC) forms.

The samples were received in a laminar flow clean hood, void of trace metals contamination and ultra-violet radiation, and assigned discrete sample identifiers. All samples were then stored in a secure, monitored refrigerator (maintained at a temperature of 4°C) until the analyses could occur.

It should be noted that one aqueous sample, identified as PAI-10GW, was included in the sample shipment but was not originally listed on any of the COC forms submitted with the samples. The client was contacted and submitted a new COC for this sample. Both the original COCs and this additional COC have been included in this report.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are also monitored for contamination to account for any biases associated with the sample results.

Arsenic Speciation Analysis by IC-ICP-CRC-MS Each sample submitted in an evacuated vial containing an EDTA preservative (provided by Applied Speciation and Consulting) was analyzed as received, without further chemical preservation.

3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimum interval of every ten analytical runs.

Arsenic Speciation Analysis by IC-ICP-CRC-MS All samples for arsenite, arsenate, monomethylarsonic acid, and dimethylarsinic acid quantitation were analyzed by ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS) on December 17-18, 2014. Aliquots of each sample are injected onto an anion exchange column and are mobilized by an alkaline (pH > 7) gradient. The eluting arsenic species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (CRC) containing a specific collision gas. Polyatomic interferences, due to their inherently larger size, collide more frequently with the collision gas and therefore may be separated from the analyte of interest via kinetic energy discrimination (KED). A solid-state detector detects ions transmitted through the mass analyzer on the basis of their mass-to-charge ratio (m/z), and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

No significant analytical issues were encountered during the requested analyses. All quality control parameters associated with these samples were within acceptance limits.

It should be noted that several additional arsenic-containing species were detected in the submitted samples during the speciation analyses. While the identities of these species could not be confirmed at this time, the estimated concentration of arsenic associated with each detected species has been provided for each sample in the attached results table. Applied Speciation and Consulting may be able to pursue identification of these additional species upon client request.

The estimated method detection limits (eMDLs) for arsenite, arsenate, and dimethylarsinic acid are generated from replicate analyses of the lowest standard in the calibration curve. Not all arsenic species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks may be artificially biased low for individual arsenic species.

The eMDL for monomethylarsonic acid is calculated using the average eMDL of the species present in the calibration curve (*i.e.*, arsenite, arsenate, and dimethylarsinic acid). The ICP-CRC-MS determinative method exhibits a species-independent response, which is confirmed by the analysis of ICV standards for each species. Monomethylarsonic acid is not included

in the calibration standards, CCV standards, and matrix spikes due to impurities which would bias the results for other arsenic species.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Ben Wozniak

Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Arsenic Speciation Results for ARI
SDG: A141217S1
Contact: Cheronne Oreiro

Report Date: January 15, 2015
Report Generated by. Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

ARI Sample ID	Date Sampled	Dilution	As(III)	As(V)	MMAs	DMAs	Unk 8.4*	Unk 9.2*	Unk 10.2*	Unk 13.1*
14-27440-ZO83A	12/12/14	50	28.9	1.74	< 0.21 U	< 0.23 U	14.2	2.94	52.5	7.60
14-27441-ZO83B	12/12/14	500	702	141	< 2.1 U	< 2.3 U	144	7.9 J	120	19.4
14-27442-ZO83C	12/12/14	25000	42900	1200	< 110 U	< 120 U	1100	620	10500	680
14-27173-ZO53A	12/11/14	1000	482	15.4 J	< 4.2 U	< 4.6 U	102	128	2240	8.2 J
14-27518-ZP15A	12/15/14	50000	39700	790 J	< 210 U	< 230 U	3920	1210	19400	18700
14-27519-ZP15B	12/15/14	100	37.7	6.41	< 0.42 U	< 0.46 U	< 0.42 U	< 0.42 U	< 0.42 U	1.65 J

All results reflect the applied dilution and are reported in µg/L

U = Sample concentration is less than the estimated Method Detection Limit (eMDL)

J = Sample concentration is between the eMDL and the Reporting Limit (RL)

* Unknown arsenical species; please see narrative

Arsenic Speciation Results for ARI
SDG: A141217S1
Contact: Cheronne Oreiro

Report Date: January 15, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blanks

Analyte	Units	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL* at 1x	RL at 1x	eMDL* at 50x	RL at 50x
As(III)	µg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.020	0.13	1.0
As(V)	µg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.020	0.27	1.0
MMAs	µg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.020	0.21	1.0
DMAs	µg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.021	0.23	1.0

eMDL = Estimated Method Detection Limit; RL = Reporting Limit
*Please see narrative regarding eMDL calculations

Quality Control Summary - Certified Reference Materials

Analyte	Units	CRM	True Value	Result	Recovery
As(III)	µg/L	ICV	5.000	5.079	101.6
As(V)	µg/L	ICV	5.000	4.736	94.7
MMAs	µg/L	ICV	4.610	4.680	101.5
DMAs	µg/L	ICV	3.625	3.682	101.6

Arsenic Speciation Results for ARI
SDG: A141217S1
Contact: Cheronne Oreiro

Report Date: January 15, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Matrix Duplicate

Analyte	Units	Sample ID	Rep 1	Rep 2	Mean	RPD
As(III)	µg/L	14-27519-ZP15B	37.72	37.36	37.54	1.0
As(V)	µg/L	14-27519-ZP15B	6.41	6.24	6.33	2.8
MMAs	µg/L	14-27519-ZP15B	< 0.42 U	< 0.42 U	NC	NC
DMAs	µg/L	14-27519-ZP15B	< 0.46 U	< 0.46 U	NC	NC

NC = Value was not calculated due to one or more concentrations below the eMDL

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte	Units	Sample ID	MS Spike Conc	MS Result	MS Recovery	MSD Spike Conc	MSD Result	MSD Recovery	RPD
As(III)	µg/L	14-27519-ZP15B	100.0	139.5	102.0	100.0	138.2	100.7	0.9
As(V)	µg/L	14-27519-ZP15B	100.0	105.3	99.0	100.0	103.9	97.6	1.3
DMAs	µg/L	14-27519-ZP15B	104.9	106.9	101.9	104.9	105.3	100.4	1.5

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/15/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: ZP16

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

ARI Client: Geoengineers
Project ID: Gas Works Park-Play Area Investigat
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around:
Email Results (Y/N): **Yes**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
14-27414-ZP16F	PAI-10-31.5-32.0	12/11/14 12:30	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As,Fe					
14-27415-ZP16G	PAI-11-12.0-12.5	12/11/14 13:50	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As,Fe					
14-27416-ZP16H	PAI-11-22-22.5	12/11/14 14:20	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As,Fe					

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/17/14	Time 1330
Received by	Company ACS	Date 12/17/14	Time 13:34

@ 0.3°C

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/15/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: Z083

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

ARI Client: Geoengineers
Project ID: Gas Works Park-Play Area Investigat
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around:
Email Results (Y/N): **email**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
14-27440-Z083A	PAI-11GW	12/12/14 10:00	Water	1	Metals (Sub)
Special Instructions: Speciated As 6800					
14-27441-Z083B	PAI-12GW	12/12/14 12:30	Water	1	Metals (Sub)
Special Instructions: Speciated As 6800					
14-27442-Z083C	PAI-2GW	12/12/14 14:00	Water	1	Metals (Sub)
Special Instructions: Speciated As 6800					
14-27447-Z083H	PAI-12-8.5-9.0	12/12/14 09:55	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					
14-27448-Z083I	PAI-12-13.5-14.0	12/12/14 10:15	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					
14-27449-Z083J	PAI-2-17.5-18.0	12/12/14 12:00	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					
14-27450-Z083K	PAI-2-19.0-19.5	12/12/14 11:50	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					

Sample not included on COC. 12/17/14
• PAI-10GW

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/17/14	Time 1330
Received by	Company ACS	Date 12/17/14	Time 13:34 @ 0.3°

Subcontractor Custody Form - Z083
Page 1 of 12

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/15/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: Z083

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads

ARI Client: Geoengineers
Project ID: 0186-846-01 Task 152O

ARI Sample ID	Client Sample ID/ Add'l Sample ID	Sampled	Matrix	Bottles	Analyses
14-27451-Z083L	PAI-3-33.5-34.0	12/12/14 14:30	Soil	1	Metals (Sub)

Special Instructions: Sequential Extraction As, Fe

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/12/14	Time 1330
Received by	Company ACS	Date 12/12/14	Time 13:34

@ 0.3°

Subcontractor Custody Form - Z083
Page 2 of 2

Z053:00127

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/16/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: ZP15

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

ARI Client: Geoengineers
Project ID: Gas Works Park-Paly Area Investigat
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around:
Email Results (Y/N): **email**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
14-27518-ZP15A	MW-36D-141215	12/15/14 10:00	Water	1	Metals (Sub)
Special Instructions: Arsenic Speciation 6800					
14-27519-ZP15B	MW-36S-141215	12/15/14 11:30	Water	1	Metals (Sub)
Special Instructions: Arsenic Speciation 6800					

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/17/14	Time 1330
Received by	Company ACS	Date 12/17/14	Time 13:34

@ 0.3°C

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/12/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: Z053

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

ARI Client: Geoengineers
Project ID: 0186-846-01 Task 1520
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around:
Email Results (Y/N): **email**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
14-27173-Z053A	PAI-10GW	12/11/14 15:00	Water	1	Arsenic Speciation

Special Instructions: None

Carrier		Airbill		Date	
Relinquished by	Company		Date		Time
Received by	Company		Date		Time

Analytical Resources, Incorporated
Analytical Chemists and Consultants

January 20, 2015

Zanna Satterwhite
GeoEngineers, Inc.
Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, WA 98101

RE: Client Project: Gas Works Park-Play Area Investigation, 0186-846-01 Task 1520
ARI Job No.: ZO83

Dear Zanna:

Please find enclosed the Chain of Custody record (COC), sample receipt documentation, and the final data package for samples from the project referenced above.

Sample receipt and details of these analyses are discussed in the Case Narrative.

An electronic copy of this package will remain on file with ARI. Should you have any questions or problems, please feel free to contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Cheronne Oreiro
Project Manager
(206) 695-6214
cheronneo@arilabs.com
www.arilabs.com

cc: eFile: ZO83

Enclosures

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Documentation

ARI Job ID: ZO83

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 2083	Turn-around Requested:	Page: 1 of 1	
ARI Client Company: GeoEngineers	Phone: 206-239-3231	Date: 12/12/14	Ice Present?
Client Contact: Zanna Satterwhite		No. of Coolers:	Cooler Temps:
Client Project Name: Gas Works Park - Play Area Investigation			
Client Project #: 0186-846-01	Samplers: Robert + Claudia + Hannah		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Hold	Notes/Comments
PAI-11GW	12/12	1000	Water	13+1	X	Ferrous Iron
PAI-12-8.5-9.0	12/12	0955	Soil	3		↑
PAI-12-13.5-14.0	12/12	1015	Soil	3		Dry ice cores (bottom cap = black)
PAI-12-19.5-20.0	12/12	1040	Soil	1		
PAI-2-17.5-18.0	12/12	1150	Soil	3		↓
PAI-2-19.0-19.5	12/12	1200	Soil	3		
PAI-12GW	12/12	1230	Water	13+1		Ferrous Iron
PAI-2GW	12/12	1400	Water	13+1		Ferrous Iron
PAI-3-33.5-34.0	12/12	1430	Soil	3		
TRIP BLANK			Water	3		

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by: (Signature)	Received by (Signature)
	Printed Name: Hannah McDonough	Printed Name: C. OREIRO	Printed Name.	Printed Name
	Company: GeoEngineers	Company: ARI	Company	Company:
	Date & Time: 12/12/14 @ 1645	Date & Time: 12/12/14 1645	Date & Time:	Date & Time.

2083 : 000003

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

ZAS revisions 12-12-14

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: ~~ERO~~ 7083	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: GeoEngineers	Phone: 206-239-3231	Date: 12/12/14	Ice Present?
Client Contact: Emma Satterwhite		No. of Coolers:	Cooler Temps:
Client Project Name: Gas Works Park - Play Area Investigation			
Client Project #: 0186-846-01 Task 1520	Samplers: Robert + Claudia + Hannah		

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: As Speciation EPA Modified Method 6800*	Analysis Requested: PAHs (Lab Filtered and unfiltered)	Analysis Requested: As - EPA 200.8	Analysis Requested: BTEX - 8260LL	Analysis Requested: Sulfide, Sulfate, Cl, Alk, TDS, Nit, Permeation, Mass, Dissolved	Analysis Requested: Acid Soluble Sulfur by ASTM D1915	Analysis Requested: Acid Extractable Sulfide by SM4500-S2D	Analysis Requested: Separate Extraction Tcthg (As, Fe)*	Analysis Requested: HOLD	Notes/Comments
PAI-11GW	12/12	1000	Gwater	13+1	X	X	X	X	X					Ferrous Iron
PAI-12-8.5-9.0	12/12	0955	Soil	3						X	X	X		↑
PAI-12-13.5-14.0	12/12	1015	Soil	3						X	X	X		Dry ice cores X
PAI-12-19.5-20.0	12/12	1040	Soil	1									X	(bottom caps black) X
PAI-2-17.5-18.0	12/12	1150	Soil	3						X	X	X		↓ X
PAI-2-19.0-19.5	12/12	1200	Soil	3						X	X	X		X
PAI-12GW	12/12	1230	Water	13+1	X	X	X	X	X					Ferrous Iron
PAI-2GW	12/12	1400	Water	13+1	X	X	X	X	X					Ferrous Iron
PAI-3-33.5-34.0	12/12	1430	Soil	3						X	X	X		
Trip Blank			Water	3				X						

Comments/Special Instructions
*Methods specified in quote dated 12-10-14.
Please analyze unfiltered volume for sulfide, alk., TDS, if available

Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name:	Printed Name:	Printed Name:	Printed Name:
Company:	Company:	Company:	Company:
Date & Time:	Date & Time:	Date & Time:	Date & Time:

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client. GeoEngineers — Project Name: GasWorks Park - PAI

COC No(s): _____ (NA) — Delivered by Fed-Ex UPS Courier (Hand Delivered) Other: _____

Assigned ARI Job No: Z083 — Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2 0-6 0 °C for chemistry) 10.2 9.1 11.3 ___

Time 1645

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: 90877952

Cooler Accepted by: CO (N) Date: 12/12/14 Time: 1645

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	Bubble Wrap (Wet Ice) (Gel Packs) Baggies Foam Block Paper Other: BOX		
Was sufficient ice used (if appropriate)?	NA	YES	(NO)
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		YES	(NO)
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	NA	(YES)	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI.	NA	12/1/14	

Was Sample Split by ARI : (NA) YES Date/Time:_____ Equipment._____ Split by:_____

Samples Logged by: AV Date: 12/15/14 Time: 1625

** ***Notify Project Manager of discrepancies or concerns*** **

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

PAI-12GW has ~~13~~ ~~bottles~~ ~~PAI-12GW has 11 bottles~~ FF Sulfides placed on NO unfiltered conv volume on ~~GW~~ PAI-12GW ~~except Sulfide~~ hold for NO unfiltered conv volume for PAI-12GW ~~12GW~~ 2GW except for Sulfide

By: Date:

Small Air Bubbles – 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • • •	● ● ●

Small → "sm" (< 2 mm)	
Peabubbles → "pb" (2 to < 4 mm)	
Large → "lg" (4 to < 6 mm)	
Headspace → "hs" (> 6 mm)	

NO unfiltered conv volume for PAI-2GW except for Sulfide

PAI-~~12~~GW did not have unfiltered volume for Sulfide bottle says FF Z083 : 00006

PRESERVATION VERIFICATION 12/15/14
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **ZO83**

PC: Cheronne
VTSR: 12/12/14

Inquiry Number: NONE
Analysis Requested: 12/15/14
Contact: Satterwhite, Zanna
Client: Geoengineers
Logged by: AV
Sample Set Used: Yes-481
Validatable Package: Lv4
Deliverables:

Project #: 0186-846-01 Task 1520
Project: Gas Works Park-Play Area Investigat
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
14-27440 **ZO83A**	PAI-11GW						DIS pas						** Fail		*	Y		S-	>12		2 mL NaOH 6N	12-15-14
14-27441 **ZO83B**	PAI-12GW						DIS pas						Fail		*	Y						
14-27442 **ZO83C**	PAI-2GW						DIS pas						Fail		*	Y						

* Lab to determine Ferrous Iron preservation
** Sulfide preserved w/ZnOAC, lab to adjust ph

Checked By AV Date 12/15/14

ZO83 : 00007

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ZO83
Client: Geoengineers
Project Event: 0186-846-01 Task 1520
Project Name: Gas Works Park-Play Area Investigat

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	PAI-11GW	ZO83A	14-27440	Groundwater	12/12/14 10:00	12/12/14 16:45
2.	PAI-12GW	ZO83B	14-27441	Groundwater	12/12/14 12:30	12/12/14 16:45
3.	PAI-2GW	ZO83C	14-27442	Groundwater	12/12/14 14:00	12/12/14 16:45
4.	TRIP BLANK	ZO83D	14-27443	Water	12/12/14	12/12/14 16:45
5.	PAI-11GW	ZO83E	14-27444	Groundwater	12/12/14 10:00	12/12/14 16:45
6.	PAI-12GW	ZO83F	14-27445	Groundwater	12/12/14 12:30	12/12/14 16:45
7.	PAI-2GW	ZO83G	14-27446	Groundwater	12/12/14 14:00	12/12/14 16:45
8.	PAI-12-8.5-9.0	ZO83H	14-27447	Soil	12/12/14 09:55	12/12/14 16:45
9.	PAI-12-13.5-14.0	ZO83I	14-27448	Soil	12/12/14 10:15	12/12/14 16:45
10.	PAI-2-17.5-18.0	ZO83J	14-27449	Soil	12/12/14 12:00	12/12/14 16:45
11.	PAI-2-19.0-19.5	ZO83K	14-27450	Soil	12/12/14 11:50	12/12/14 16:45
12.	PAI-3-33.5-34.0	ZO83L	14-27451	Soil	12/12/14 14:30	12/12/14 16:45
13.	PAI-12-8.5-9.0	ZO83M	14-27452	Soil	12/12/14 09:55	12/12/14 16:45
14.	PAI-12-13.5-14.0	ZO83N	14-27453	Soil	12/12/14 10:15	12/12/14 16:45
15.	PAI-2-17.5-18.0	ZO83O	14-27454	Soil	12/12/14 12:00	12/12/14 16:45
16.	PAI-2-19.0-19.5	ZO83P	14-27455	Soil	12/12/14 11:50	12/12/14 16:45
17.	PAI-3-33.5-34.0	ZO83Q	14-27456	Soil	12/12/14 14:30	12/12/14 16:45
18.	PAI-12-19.5-20.0	ZO83R	14-27459	Soil	12/12/14 10:40	12/12/14 16:45

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: ZO83

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Client: GeoEngineers, Inc.
Project: Gas Works Park-Play Area Investigation, 0186-846-01 Task 1520
ARI Job No.: ZO83

Sample Receipt

Six soil samples, three water samples, and a trip blank were received on December 12, 2014. The soil sample results have been reported under a separate cover. The cooler temperature measured by IR thermometer following ARI SOP was 4.0°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

BETX by SW8260C

The samples were analyzed within the method recommended holding times.

Initial and continuing calibrations were within method requirements. Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blanks were clean at the reporting limits. The LCS and LCSD percent recoveries were within control limits.

PAHs by SW8270-SIM

Two five-hundred milliliter amber glass bottles were submitted for each water sample. One bottle from each sample was filtered prior to extraction using a 0.7 micron borosilicate glass, binder free filter. The filtered samples have been reported under ARI IDs ZO83E, ZO83F, and ZO83G.

All sample volumes were extracted and analyzed within method recommended holding times.

Initial and continuing calibrations were within method requirements. Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limit. The LCS and LCSD percent recoveries were within control limits.

Dissolved Metals by SW6010C

The samples and associated laboratory QC were digested and analyzed within recommended holding times.

The method blank was clean at the reporting limits. The LCS percent recoveries were control limits.

The matrix spike percent recoveries and duplicate RPDs were within control limits.

General Chemistry Parameters

The samples and associated laboratory QC were initially prepared and analyzed within recommended holding times.

The percent recovery of the initial analysis of the sulfide LCS fell outside control limits low. All samples were re-analyzed outside the method recommended holding time of seven days. Only the re-analysis results have been reported. Both sets of raw data have been included in this package for review. No further corrective action was taken.

The method blanks were clean at the reporting limits. The LCS percent recoveries were within control limits.

The SRM percent recoveries were within limits.

The matrix spike percent recovery of sulfide was outside the control limits high for sample **PAI-11GW**. All other quality control parameters were met. No further corrective action was taken.

The matrix spike percent recovery of sulfide fell outside the control limits low for sample **PAI-12-8.5-9.0**. All other quality control parameters were met. No further corrective action was taken.

The replicate RPDs were within control limits.

Subcontract Analyses

All subcontracted results have been included in this data package.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: GeoEngineers	**Client Project No.:** 0186-846-01 Task 1520
ARI Job No.: ZO83	**Client Project:** Gas Works Park-Play Area Investigation

Case Narrative

1. Three samples were submitted for filtering on December 15, 2014.
2. The samples were filtered using all glass filtering equipment. All equipment was decontaminated prior to use.
3. All of the water was filtered through a 0.7µm borosilicate glass, binder free filter. All of the filters were burned at 440 °C for 15 minutes prior to use.
4. A filter blank of deionized water was created for this job.
5. The samples were filtered and then placed into appropriate sample bottles for the requested analysis.
6. There were no noted anomalies in the samples or methods.

Released by: _____ Date: Dec 26, 2014
Geotechnical Laboratory Supervisor

Reviewed by: _____ Date: 12/29/14
Reviewer

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8260C VOA in Water (EPA 8260C)								
Preservation: pH<2; HCL, Cool <6°C								
Container: VOA Vial, Clear, 40 mL, HCL		**Amount Required:** 120 mL				**Hold Time:** 14 days		
Chloromethane	0.0948	0.500 ug/L		30	77 - 122	30	77 - 122	30
Vinyl Chloride	0.0572	0.200 ug/L		30	74 - 123	30	74 - 123	30
Bromomethane	0.252	1.00 ug/L		30	68 - 130	30	68 - 130	30
Chloroethane	0.0861	0.200 ug/L		30	68 - 133	30	68 - 133	30
Trichlorofluoromethane	0.0375	0.200 ug/L		30	74 - 135	30	74 - 135	30
Acrolein	2.48	5.00 ug/L		30	60 - 124	30	60 - 124	30
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.0429	0.200 ug/L		30	76 - 124	30	76 - 124	30
Acetone	2.06	5.00 ug/L		30	64 - 125	30	64 - 125	30
1,1-Dichloroethene	0.0540	0.200 ug/L		30	74 - 120	30	74 - 120	30
Bromoethane	0.0412	0.200 ug/L		30	77 - 122	30	77 - 122	30
Iodomethane	0.227	1.00 ug/L		30	76 - 123	30	76 - 123	30
Methylene Chloride	0.485	1.00 ug/L		30	71 - 125	30	71 - 125	30
Acrylonitrile	0.604	1.00 ug/L		30	76 - 123	30	76 - 123	30
Carbon Disulfide	0.0370	0.200 ug/L		30	77 - 124	30	77 - 124	30
trans-1,2-Dichloroethene	0.0485	0.200 ug/L		30	75 - 120	30	75 - 120	30
Vinyl Acetate	0.0688	0.200 ug/L		30	74 - 120	30	74 - 120	30
1,1-Dichloroethane	0.0533	0.200 ug/L		30	80 - 120	30	80 - 120	30
2-Butanone	0.814	5.00 ug/L		30	73 - 123	30	73 - 123	30
2,2-Dichloropropane	0.0518	0.200 ug/L		30	72 - 133	30	72 - 133	30
cis-1,2-Dichloroethene	0.0427	0.200 ug/L		30	78 - 120	30	78 - 120	30
Chloroform	0.0273	0.200 ug/L		30	80 - 120	30	80 - 120	30
Bromochloromethane	0.0607	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,1,1-Trichloroethane	0.0408	0.200 ug/L		30	79 - 124	30	79 - 124	30
1,1-Dichloropropene	0.0340	0.200 ug/L		30	80 - 120	30	80 - 120	30
Carbon tetrachloride	0.0439	0.200 ug/L		30	71 - 139	30	71 - 139	30
1,2-Dichloroethane	0.0717	0.200 ug/L		30	80 - 121	30	80 - 121	30
Benzene	0.0266	0.200 ug/L		30	80 - 120	30	80 - 120	30
Trichloroethene	0.0489	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,2-Dichloropropane	0.0352	0.200 ug/L		30	80 - 120	30	80 - 120	30
Bromodichloromethane	0.0506	0.200 ug/L		30	80 - 122	30	80 - 122	30
Dibromomethane	0.145	0.200 ug/L		30	80 - 120	30	80 - 120	30
2-Chloroethyl vinyl ether	0.250	1.00 ug/L		30	62 - 130	30	62 - 130	30
4-Methyl-2-Pentanone	0.974	5.00 ug/L		30	80 - 125	30	80 - 125	30
cis-1,3-Dichloropropene	0.0610	0.200 ug/L		30	80 - 127	30	80 - 127	30
Toluene	0.0399	0.200 ug/L		30	80 - 120	30	80 - 120	30
trans-1,3-Dichloropropene	0.0815	0.200 ug/L		30	79 - 132	30	79 - 132	30
2-Hexanone	0.902	5.00 ug/L		30	80 - 129	30	80 - 129	30
1,1,2-Trichloroethane	0.129	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,3-Dichloropropane	0.0622	0.200 ug/L		30	80 - 120	30	80 - 120	30
Tetrachloroethene	0.0474	0.200 ug/L		30	80 - 120	30	80 - 120	30
Dibromochloromethane	0.0481	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,2-Dibromoethane	0.0745	0.200 ug/L		30	80 - 120	30	80 - 120	30
Chlorobenzene	0.0230	0.200 ug/L		30	80 - 120	30	80 - 120	30
Ethylbenzene	0.0371	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,1,1,2-Tetrachloroethane	0.0396	0.200 ug/L		30	80 - 128	30	80 - 128	30
m,p-Xylene	0.0522	0.400 ug/L		30	80 - 120	30	80 - 120	30

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
o-Xylene	0.0349	0.200 ug/L		30	80 - 120	30	80 - 120	30
Styrene	0.0454	0.200 ug/L		30	80 - 121	30	80 - 121	30
Bromoform	0.0618	0.200 ug/L		30	62 - 149	30	62 - 149	30
1,1,2,2-Tetrachloroethane	0.0598	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,2,3-Trichloropropane	0.131	0.500 ug/L		30	80 - 120	30	80 - 120	30
trans-1,4-Dichloro 2-Butene	0.324	1.00 ug/L		30	47 - 147	30	47 - 147	30
n-Propylbenzene	0.0235	0.200 ug/L		30	80 - 120	30	80 - 120	30
Bromobenzene	0.0605	0.200 ug/L		30	80 - 120	30	80 - 120	30
Isopropyl Benzene	0.0212	0.200 ug/L		30	80 - 120	30	80 - 120	30
2-Chlorotoluene	0.0236	0.200 ug/L		30	80 - 120	30	80 - 120	30
4-Chlorotoluene	0.0159	0.200 ug/L		30	80 - 120	30	80 - 120	30
t-Butylbenzene	0.0256	0.200 ug/L		30	80 - 121	30	80 - 121	30
1,3,5-Trimethylbenzene	0.0150	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,2,4-Trimethylbenzene	0.0243	0.200 ug/L		30	80 - 122	30	80 - 122	30
s-Butylbenzene	0.0237	0.200 ug/L		30	80 - 121	30	80 - 121	30
4-Isopropyl Toluene	0.0263	0.200 ug/L		30	80 - 124	30	80 - 124	30
1,3-Dichlorobenzene	0.0362	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,4-Dichlorobenzene	0.0397	0.200 ug/L		30	80 - 120	30	80 - 120	30
n-Butylbenzene	0.0248	0.200 ug/L		30	80 - 125	30	80 - 125	30
1,2-Dichlorobenzene	0.0365	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,2-Dibromo-3-chloropropane	0.366	0.500 ug/L		30	79 - 129	30	79 - 129	30
1,2,4-Trichlorobenzene	0.107	0.500 ug/L		30	77 - 127	30	77 - 127	30
Hexachloro-1,3-Butadiene	0.0734	0.500 ug/L		30	80 - 135	30	80 - 135	30
Naphthalene	0.118	0.500 ug/L		30	80 - 128	30	80 - 128	30
1,2,3-Trichlorobenzene	0.110	0.500 ug/L		30	80 - 125	30	80 - 125	30
Dichlorodifluoromethane	0.0521	0.200 ug/L		30	68 - 133	30	68 - 133	30
Methyl tert-butyl Ether	0.0729	0.500 ug/L		30	79 - 121	30	79 - 121	30
n-Hexane	0.100	0.200 ug/L						
surr: 1,2-Dichloroethane-d4			80 - 120					
surr: 1,2-Dichlorobenzene-d4			80 - 120					
surr: Toluene-d8			80 - 120					
surr: 4-Bromofluorobenzene			80 - 120					
surr: Dibromofluoromethane			80 - 120					
Pentafluorobenzene								
Chlorobenzene-d5								
1,4-Difluorobenzene								
1,4-Dichlorobenzene-d4								

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8270D-SIM PAH (0.1 ug/L) in Water (EPA 8270D-SIM)								
Preservation: Cool <6°C								
Container: Glass NM, Amber, 500 mL		**Amount Required:** 1000			**Hold Time:** 7 days			
Naphthalene	0.0296	0.100 ug/L		30	33 - 120	30	33 - 120	30
2-Methylnaphthalene	0.0302	0.100 ug/L		30	29 - 120	30	29 - 120	30
1-Methylnaphthalene	0.0289	0.100 ug/L		30	37 - 120	30	37 - 120	30
Biphenyl				30	30 - 160	30	30 - 160	40
2,6-Dimethylnaphthalene				30	30 - 160	30	30 - 160	40
Acenaphthylene	0.0380	0.100 ug/L		30	32 - 120	30	32 - 120	30
Acenaphthene	0.0304	0.100 ug/L		30	38 - 120	30	38 - 120	30
Dibenzofuran	0.0280	0.100 ug/L		30	38 - 120	30	38 - 120	30
2,3,5-Trimethylnaphthalene				30				
Fluorene	0.0278	0.100 ug/L		30	41 - 120	30	41 - 120	30
Dibenzothiophene				30				
Phenanthrene	0.0279	0.100 ug/L		30	49 - 120	30	49 - 120	30
Anthracene	0.0352	0.100 ug/L		30	39 - 120	30	39 - 120	30
Carbazole				30	30 - 160	30	30 - 160	40
1-Methylphenanthrene				30	30 - 160	30	30 - 160	40
Fluoranthene	0.0347	0.100 ug/L		30	48 - 120	30	48 - 120	30
Pyrene	0.0434	0.100 ug/L		30	48 - 120	30	48 - 120	30
Benzo(a)anthracene	0.0399	0.100 ug/L		30	37 - 120	30	37 - 120	30
Chrysene	0.0321	0.100 ug/L		30	48 - 120	30	48 - 120	30
Benzo(b)fluoranthene	0.0417	0.100 ug/L		30	38 - 128	30	38 - 128	30
Benzo(k)fluoranthene	0.0433	0.100 ug/L		30	36 - 130	30	36 - 130	30
Benzo(j)fluoranthene	0.0376	0.100 ug/L		30	49 - 120	30	49 - 120	30
Benzo(e)pyrene				30	30 - 160	30	30 - 160	30
Benzo(a)pyrene	0.0429	0.100 ug/L		30	25 - 120	30	25 - 120	30
Perylene	0.0420	0.100 ug/L		30	30 - 160	30	30 - 160	30
Indeno(1,2,3-cd)pyrene	0.0422	0.100 ug/L		30	32 - 120	30	32 - 120	30
Dibenzo(a,h)anthracene	0.0535	0.100 ug/L		30	21 - 120	30	21 - 120	30
Benzo(g,h,i)perylene	0.0388	0.100 ug/L		30	28 - 120	30	28 - 120	30
surr: 2-Methylnaphthalene-d10			31 - 120					
surr: Dibenzo[a,h]anthracene-d14			10 - 125					
surr: Fluoranthene-d10			46 - 121					
Naphthalene-d8								
Acenaphthene-d10								
Phenanthrene-d10								
Chrysene-d12								
Perylene-d12								

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Met Diss 6010C in Water (EPA 6010C)								
Preservation: pH<2; HNO3, Cool <6°C								
Container: HDPE NM, 500 mL		**Amount Required:** 500 mL				**Hold Time:** 180 days		
Aluminum	0.00757	0.0500 mg/L		20	75 - 125	20	80 - 120	20
Antimony	0.00628	0.0500 mg/L		20	75 - 125	20	80 - 120	20
Arsenic	0.00333	0.0500 mg/L		20	75 - 125	20	80 - 120	20
Barium	0.00133	0.00300 mg/L		20	75 - 125	20	80 - 120	20
Beryllium	0.000160	0.00100 mg/L		20	75 - 125	20	80 - 120	20
Boron	0.00739	0.0200 mg/L		20	75 - 125	20	80 - 120	20
Cadmium	0.000180	0.00200 mg/L		20	75 - 125	20	80 - 120	20
Calcium	0.0113	0.0500 mg/L		20	75 - 125	20	80 - 120	20
Chromium	0.00124	0.00500 mg/L		20	75 - 125	20	80 - 120	20
Cobalt	0.000270	0.00300 mg/L		20	75 - 125	20	80 - 120	20
Copper	0.000920	0.00200 mg/L		20	75 - 125	20	80 - 120	20
Iron	0.00750	0.0500 mg/L		20	75 - 125	20	80 - 120	20
Lead	0.00155	0.0200 mg/L		20	75 - 125	20	80 - 120	20
Magnesium	0.00961	0.0500 mg/L		20	75 - 125	20	80 - 120	20
Manganese	0.000280	0.00100 mg/L		20	75 - 125	20	80 - 120	20
Molybdenum	0.000790	0.00500 mg/L		20	75 - 125	20	80 - 120	20
Nickel	0.00386	0.0100 mg/L		20	75 - 125	20	80 - 120	20
Potassium	0.0657	0.500 mg/L		20	75 - 125	20	80 - 120	20
Selenium	0.00499	0.0500 mg/L		20	75 - 125	20	80 - 120	20
Silicon	0.00817	0.0600 mg/L		20	75 - 125	20	80 - 120	20
Silver	0.000430	0.00300 mg/L		20	75 - 125	20	80 - 120	20
Sodium	0.0114	0.500 mg/L		20	75 - 125	20	80 - 120	20
Sodium-1	1.14	50.0 mg/L		20	75 - 125	20	80 - 120	20
Strontium	0.0000900	0.00100 mg/L		20	75 - 125	20	80 - 120	20
Thallium	0.00310	0.0500 mg/L		20	75 - 125	20	80 - 120	20
Tin	0.00141	0.0100 mg/L		20	75 - 125	20	80 - 120	20
Titanium	0.00211	0.00500 mg/L		20	75 - 125	20	80 - 120	20
Vanadium	0.000270	0.00300 mg/L		20	75 - 125	20	80 - 120	20
Zinc	0.00145	0.0100 mg/L		20	75 - 125	20	80 - 120	20

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Alkalinity, Carbonate SM 2320 B-97 in Water (SM 2320 B-97)								
Preservation: Cool <6°C								
Container: HDPE NM, 500 mL, No Headspace		**Amount Required:** 500 mL					**Hold Time:** 14 days	
Alkalinity, Carbonate		mg/L CaCO3		20				

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Alkalinity, Bicarbonate SM 2320 B-97 in Water (SM 2320 B-97)								
Preservation: Cool <6°C								
Container: HDPE NM, 500 mL, No Headspace		**Amount Required:** 500 mL				**Hold Time:** 14 days		
Alkalinity, Bicarbonate		mg/L CaCO3		20				

Analytical Resources, Inc.

1/19/2015

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Alkalinity, Hydroxide SM 2320 B-97 in Water (SM 2320 B-97)								
Preservation: Cool <6°C								
Container: HDPE NM, 500 mL, No Headspace		**Amount Required:** 500 mL					**Hold Time:** 14 days	
Alkalinity, Hydroxide		mg/L CaCO3		20				

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Iron, Ferrous SM 3500-Fe B-97 in Water (SM 3500-Fe B-97)								
Preservation: HCL								
Container: Glass NM, Amber, 500 mL, HCl		**Amount Required:** 500 mL				**Hold Time:** 0.01 days		
Ferrous Iron	0.0100	0.0400 mg/L		20	75 - 125		75 - 125	20

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Anions, EPA 300.0 in Water (EPA 300.0)								
Preservation: None								
Container: Small OJ, 500 mL		**Amount Required:** 500 mL			**Hold Time:** 28 days			
Fluoride	0.0110	0.100 mg/L		20	75 - 125		90 - 110	20
Chloride	0.0300	0.100 mg/L		20	75 - 125		90 - 110	20
Nitrite-N	0.0240	0.100 mg/L		20	75 - 125		90 - 110	20
Bromide	0.00700	0.100 mg/L		20	75 - 125		90 - 110	20
Nitrate-N	0.0180	0.100 mg/L		20	75 - 125		90 - 110	20
Phosphate-P	0.0200	0.100 mg/L		20	75 - 125		90 - 110	20
Sulfate	0.0460	0.100 mg/L		20	75 - 125		90 - 110	20

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Sulfide, SM 4500-S2 D-0 in Water (SM 4500-S2 D-00)								
Preservation: ZnOAc, Cool <6°C (NaOH added at lab)								
Container: Small OJ, 500 mL, ZnOAC			**Amount Required:** 250 mL			**Hold Time:** 7 days		
Sulfide	0.0300	0.0500 mg/L		20	75 - 125		75 - 125	20

Volatile Analysis
Report and Summary QC Forms

ARI Job ID: ZO83

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-11GW**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZO83A
LIMS ID: 14-27440
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Instrument/Analyst: NT3/LH
Date Analyzed: 12/18/14 23:14

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
71-43-2	**Benzene**	**0.03**	**0.20**	**1.2**
108-88-3	Toluene	0.04	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	100%
d8-Toluene	100%
Bromofluorobenzene	98.0%
d4-1,2-Dichlorobenzene	99.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-12GW**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZO83B
LIMS ID: 14-27441
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Instrument/Analyst: NT2/PAB
Date Analyzed: 12/18/14 00:09

Sample Amount: 0.20 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	1.3	10	800
108-88-3	Toluene	2.0	10	60
100-41-4	Ethylbenzene	1.9	10	94
179601-23-1	m,p-Xylene	2.6	20	300
95-47-6	o-Xylene	1.7	10	200

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	92.5%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-2GW**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZO83C
LIMS ID: 14-27442
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Instrument/Analyst: NT2/PAB
Date Analyzed: 12/18/14 00:38

Sample Amount: 0.20 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	1.3	10	3,600
108-88-3	Toluene	2.0	10	240
100-41-4	Ethylbenzene	1.9	10	460
179601-23-1	m,p-Xylene	2.6	20	910
95-47-6	o-Xylene	1.7	10	500

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	98.2%
d8-Toluene	92.2%
Bromofluorobenzene	95.8%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: TRIP BLANK SAMPLE**
Page 1 of 1

Lab Sample ID: ZO83D
LIMS ID: 14-27443
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Instrument/Analyst: NT2/PAB
Date Analyzed: 12/17/14 17:50

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	0.03	0.20	< 0.20 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	108%
d8-Toluene	97.0%
Bromofluorobenzene	96.2%
d4-1,2-Dichlorobenzene	104%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-121814A	Method Blank	10	99.5%	98.2%	97.2%	98.7%	0
LCS-121814A	Lab Control	10	100%	101%	98.4%	101%	0
LCSD-121814A	Lab Control Dup	10	99.4%	98.9%	98.3%	100%	0
ZO83A	PAI-11GW	10	100%	100%	98.0%	99.2%	0
MB-121714A	Method Blank	10	106%	97.4%	95.2%	98.4%	0
LCS-121714A	Lab Control	10	105%	101%	97.6%	98.4%	0
LCSD-121714A	Lab Control Dup	10	101%	102%	99.5%	98.4%	0
ZO83B	PAI-12GW	10	104%	92.5%	101%	103%	0
ZO83C	PAI-2GW	10	98.2%	92.2%	95.8%	101%	0
ZO83D	TRIP BLANK	10	108%	97.0%	96.2%	104%	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(80-120)	(80-120)
(TOL) = d8-Toluene	(80-120)	(80-120)
(BFB) = Bromofluorobenzene	(80-120)	(80-120)
(DCB) = d4-1,2-Dichlorobenzene	(80-120)	(80-120)

Prep Method: SW5030B
Log Number Range: 14-27440 to 14-27443

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-121714A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-121714A
LIMS ID: 14-27441
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT2/PAB
LCSD: NT2/PAB
Date Analyzed LCS: 12/17/14 16:29
LCSD: 12/17/14 16:56

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	9.87	10.0	98.7%	10.2	10.0	102%	3.3%
Toluene	9.85	10.0	98.5%	10.2	10.0	102%	3.5%
Ethylbenzene	10.7	10.0	107%	11.2	10.0	112%	4.6%
m,p-Xylene	22.0	20.0	110%	22.6	20.0	113%	2.7%
o-Xylene	10.9	10.0	109%	11.4	10.0	114%	4.5%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	105%	101%
d8-Toluene	101%	102%
Bromofluorobenzene	97.6%	99.5%
d4-1,2-Dichlorobenzene	98.4%	98.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-121814A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-121814A
LIMS ID: 14-27440
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/LH
LCSD: NT3/LH
Date Analyzed LCS: 12/18/14 21:52
LCSD: 12/18/14 22:20

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	9.77	10.0	97.7%	10.1	10.0	101%	3.3%
Toluene	9.68	10.0	96.8%	9.97	10.0	99.7%	3.0%
Ethylbenzene	9.83	10.0	98.3%	10.3	10.0	103%	4.7%
m,p-Xylene	19.8	20.0	99.0%	20.8	20.0	104%	4.9%
o-Xylene	9.67	10.0	96.7%	10.1	10.0	101%	4.4%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	100%	99.4%
d8-Toluene	101%	98.9%
Bromofluorobenzene	98.4%	98.3%
d4-1,2-Dichlorobenzene	101%	100%

4A
VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB1217

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: 20141217A

Project: GAS WORKS PARK- PLAY

Lab File ID: MB1217

Lab Sample ID: MB1217

Date Analyzed: 12/17/14

Time Analyzed: 1723

Instrument ID: NT2

Heated Purge: (Y/N) N

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1217	LCS1217	LCS1217	1629
02	LCS1217	LCS1217	LCS1217A	1656
03	TRIP BLANK	ZO83D	ZO83D	1750
04	PAI-12GW	ZO83B	ZO83B0	0009
05	PAI-2GW	ZO83C	ZO83C0	0038
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-121714A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-121714A
LIMS ID: 14-27441
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT2/PAB
Date Analyzed: 12/17/14 17:23

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	0.03	0.20	< 0.20 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
d8-Toluene	97.4%
Bromofluorobenzene	95.2%
d4-1,2-Dichlorobenzene	98.4%

4A
VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB1218

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: ZO83

Project: GAS WORKS PARK - PLAY A

Lab File ID: MB1218X

Lab Sample ID: MB1218

Date Analyzed: 12/18/14

Time Analyzed: 2247

Instrument ID: NT3

Heated Purge: (Y/N) N

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1218	LCS1218	LCS1218X	2152
02	LCS1218	LCS1218	LCS1218XA	2220
03	PAI-11GW	ZO83A	ZO83A2	2314
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-121814A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-121814A
LIMS ID: 14-27440
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/LH
Date Analyzed: 12/18/14 22:47

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	0.03	0.20	< 0.20 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	99.5%
d8-Toluene	98.2%
Bromofluorobenzene	97.2%
d4-1,2-Dichlorobenzene	98.7%

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: GEOENGINEERS

Lab Code: ARI Case No.: GAS WORKS PARK- PLAY AREA SDG No.: 20141217A

Lab File ID: BFB1217 BFB Injection Date: 12/17/14

Instrument ID: NT2 BFB Injection Time: 0841

GC Column: RTXVMS ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	25.2
75	30.0 - 60.0% of mass 95	50.1
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.0
173	Less than 2.0% of mass 174	0.3 (0.5)1
174	50.0 - 100.0% of mass 95	73.6
175	5.0 - 9.0% of mass 174	5.3 (7.3)1
176	95.0 - 101.0% of mass 174	70.4 (95.7)1
177	5.0 - 9.0% of mass 176	4.5 (6.5)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD0.2	SCL0022-CAL1	SCL0022CAL1	12/17/14	1019
02	VSTD80	SCL0022-CAL8	SCL0022CAL8	12/17/14	1045
03	VSTD40	SCL0022-CAL7	SCL0022CAL7	12/17/14	1112
04	VSTD20	SCL0022-CAL6	SCL0022CAL6	12/17/14	1138
05	VSTD10	SCL0022-CAL5	SCL0022CAL5	12/17/14	1205
06	VSTD02	SCL0022-CAL4	SCL0022CAL4	12/17/14	1232
07	VSTD01	SCL0022-CAL3	SCL0022CAL3	12/17/14	1258
08	VSTD0.5	SCL0022-CAL2	SCL0022CAL2	12/17/14	1325
09	ICV10	SCL0022-SCV1	SCL0022SCV1	12/17/14	1352
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: GEOENGINEERS

Lab Code: ARI Case No.: GAS WORKS PARK- PLAY AREA SDG No.: 20141217A

Lab File ID: BFB1217C BFB Injection Date: 12/17/14

Instrument ID: NT2 BFB Injection Time: 1530

GC Column: RTXVMS ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	25.3
75	30.0 - 60.0% of mass 95	52.0
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.1
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	74.5
175	5.0 - 9.0% of mass 174	6.6 (8.8)1
176	95.0 - 101.0% of mass 174	72.7 (97.5)1
177	5.0 - 9.0% of mass 176	5.0 (6.9)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	CC1217	CC1217	CC1217A	12/17/14	1602
02	LCS1217	LCS1217	LCS1217	12/17/14	1629
03	LCS1217	LCS1217	LCS1217A	12/17/14	1656
04	MB1217	MB1217	MB1217	12/17/14	1723
05	TRIP BLANK	ZO83D	ZO83D	12/17/14	1750
06	PAI-12GW	ZO83B	ZO83B0	12/18/14	0009
07	PAI-2GW	ZO83C	ZO83C0	12/18/14	0038
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: GEOENGINEERS

Lab Code: ARI Case No.: GAS WORKS PARK - PLAY AREA SDG No.: ZO83

Lab File ID: BFB1217 BFB Injection Date: 12/17/14

Instrument ID: NT3 BFB Injection Time: 0852

GC Column: RTXVMS ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	15.3
75	30.0 - 60.0% of mass 95	46.0
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.6
173	Less than 2.0% of mass 174	0.2 (0.3)1
174	50.0 - 100.0% of mass 95	70.0
175	5.0 - 9.0% of mass 174	5.6 (8.0)1
176	95.0 - 101.0% of mass 174	67.7 (96.7)1
177	5.0 - 9.0% of mass 176	4.2 (6.3)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD0.2	SCL0021-CAL1	SCL0021CAL1	12/17/14	0948
02	VSTD80	SCL0021-CAL8	SCL0021CAL8	12/17/14	1015
03	VSTD40	SCL0021-CAL7	SCL0021CAL7	12/17/14	1045
04	VSTD20	SCL0021-CAL6	SCL0021CAL6	12/17/14	1113
05	VSTD10	SCL0021-CAL5	SCL0021CAL5	12/17/14	1140
06	VSTD02	SCL0021-CAL4	SCL0021CAL4	12/17/14	1207
07	VSTD01	SCL0021-CAL3	SCL0021CAL3	12/17/14	1235
08	VSTD0.5	SCL0021-CAL2	SCL0021CAL2	12/17/14	1302
09	ICV10	SCL0021-SCV1	SCL0021SCV1	12/17/14	1329
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: GEOENGINEERS

Lab Code: ARI Case No.: GAS WORKS PARK - PLAY AREA SDG No.: ZO83

Lab File ID: BFB1218X BFB Injection Date: 12/18/14

Instrument ID: NT3 BFB Injection Time: 2058

GC Column: RTXVMS ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	15.3
75	30.0 - 60.0% of mass 95	45.3
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.7
173	Less than 2.0% of mass 174	0.4 (0.5)1
174	50.0 - 100.0% of mass 95	69.5
175	5.0 - 9.0% of mass 174	5.4 (7.8)1
176	95.0 - 101.0% of mass 174	69.3 (99.8)1
177	5.0 - 9.0% of mass 176	4.1 (5.9)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	CC1218	CC1218	CC1218X	12/18/14	2125
02	LCS1218	LCS1218	LCS1218X	12/18/14	2152
03	LCS1218	LCS1218	LCS1218XA	12/18/14	2220
04	MB1218	MB1218	MB1218X	12/18/14	2247
05	PAI-11GW	ZO83A	ZO83A2	12/18/14	2314
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY AREA

Instrument ID: NT2 Calibration Date: 12/17/14

LAB FILE ID: RF0.2: SCL0022CALRF0.5: SCL0022CALRF1: SCL0022CAL3
RF2: SCL0022CAL4 RF10: SCL0022CAL5

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
Chloromethane	1.419	1.452	1.414	1.282	1.374
Vinyl Chloride	0.988	1.144	1.137	1.095	1.174
Bromomethane	0.370	0.452	0.440	0.400	0.414
Chloroethane	0.539	0.648	0.608	0.552	0.585
Trichlorofluoromethane	0.499	0.660	0.604	0.626	0.761
Acrolein			0.098	0.090	0.098
112Trichloro122Trifluoroetha	0.557	0.676	0.654	0.642	0.645
Acetone			0.165	0.153	0.160
1,1-Dichloroethene	1.272	1.418	1.432	1.415	1.478
Bromoethane	0.427	0.535	0.544	0.513	0.540
Iodomethane	0.740	0.999	0.969	0.948	0.986
Methylene Chloride			1.225	0.930	0.759
Acrylonitrile			0.195	0.206	0.212
Carbon Disulfide	2.157	2.359	2.234	2.142	2.308
Trans-1,2-Dichloroethene	0.642	0.745	0.721	0.715	0.741
Vinyl Acetate	0.177	0.218	0.213	0.210	0.237
1,1-Dichloroethane	1.454	1.563	1.505	1.574	1.550
2-Butanone			0.250	0.262	0.265
2,2-Dichloropropane	0.608	0.648	0.611	0.640	0.705
Cis-1,2-Dichloroethene	0.602	0.698	0.722	0.707	0.730
Chloroform	1.047	1.138	1.082	1.097	1.130
Bromochloromethane	0.262	0.306	0.297	0.288	0.303
1,1,1-Trichloroethane	0.822	0.883	0.928	0.894	0.992
1,1-Dichloropropene	0.463	0.497	0.509	0.551	0.564
Carbon Tetrachloride	0.408	0.457	0.460	0.467	0.484
1,2-Dichloroethane	0.518	0.599	0.557	0.553	0.543
Benzene	1.374	1.569	1.579	1.585	1.579
Trichloroethene	0.311	0.355	0.363	0.356	0.371
1,2-Dichloropropane	0.403	0.435	0.438	0.439	0.438
Bromodichloromethane	0.354	0.413	0.381	0.414	0.425
Dibromomethane	0.162	0.196	0.185	0.182	0.182
2-Chloroethyl Vinyl Ether			0.118	0.118	0.130
4-Methyl-2-Pentanone		0.112	0.131	0.137	0.149
Cis 1,3-dichloropropene	0.327	0.401	0.413	0.430	0.484
Toluene	0.849	0.829	0.847	0.834	0.864
Trans 1,3-Dichloropropene	0.294	0.351	0.365	0.379	0.405
2-Hexanone		0.222	0.235	0.267	0.272

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY AREA

Instrument ID: NT2 Calibration Date: 12/17/14

LAB FILE ID: RF0.2: SCL0022CALRF0.5: SCL0022CALRF1: SCL0022CAL3
RF2: SCL0022CAL4 RF10: SCL0022CAL5

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
1,1,2-Trichloroethane	0.256	0.237	0.225	0.224	0.232
1,3-Dichloropropane	0.418	0.456	0.480	0.494	0.478
Tetrachloroethene	0.350	0.364	0.374	0.366	0.382
Chlorodibromomethane	0.252	0.242	0.251	0.263	0.293
1,2-Dibromoethane	0.168	0.223	0.219	0.218	0.212
Chlorobenzene	0.896	0.979	1.005	0.980	0.996
Ethyl Benzene	0.422	0.533	0.518	0.513	0.566
1,1,1,2-Tetrachloroethane	0.342	0.357	0.345	0.349	0.380
m,p-xylene	0.506	0.628	0.622	0.654	0.697
o-Xylene	0.413	0.618	0.605	0.652	0.728
Styrene	0.563	0.793	0.807	0.907	1.063
Bromoform	0.199	0.232	0.246	0.256	0.293
1,1,2,2-Tetrachloroethane	0.615	0.576	0.632	0.638	0.639
1,2,3-Trichloropropane	0.153	0.211	0.200	0.208	0.192
Trans-1,4-Dichloro 2-Butene			0.209	0.230	0.247
N-Propyl Benzene	2.955	3.180	3.263	3.473	3.652
Bromobenzene	0.721	0.703	0.694	0.713	0.677
Isopropyl Benzene	2.204	2.310	2.609	2.860	3.283
2-Chloro Toluene	2.026	2.357	2.328	2.520	2.659
4-Chloro Toluene	1.744	2.084	2.232	2.325	2.422
T-Butyl Benzene	1.308	1.647	1.856	2.068	2.366
1,3,5-Trimethyl Benzene	1.981	1.973	2.297	2.478	2.807
1,2,4-Trimethylbenzene	1.661	2.017	2.302	2.561	2.819
S-Butyl Benzene	2.045	2.581	2.778	3.155	3.435
4-Isopropyl Toluene	1.568	1.931	2.212	2.517	2.828
1,3-Dichlorobenzene	1.162	1.376	1.415	1.459	1.473
1,4-Dichlorobenzene	1.414	1.517	1.481	1.484	1.488
N-Butyl Benzene	1.740	1.932	2.074	2.313	2.620
1,2-Dichlorobenzene	1.438	1.415	1.395	1.393	1.415
1,2-Dibromo 3-Chloropropane		0.120	0.106	0.099	0.116
1,2,4-Trichlorobenzene		0.622	0.573	0.641	0.767
Hexachloro 1,3-Butadiene		0.496	0.449	0.438	0.396
Naphthalene		1.249	1.264	1.448	1.755
1,2,3-Trichlorobenzene		0.504	0.512	0.598	0.642
Dichlorodifluoromethane	0.504	0.585	0.585	0.541	0.647
Methyl tert butyl ether	1.412	1.661	1.714	1.726	1.823

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY AREA

Instrument ID: NT2 Calibration Date: 12/17/14

LAB FILE ID: RF0.2: SCL0022CALRF0.5: SCL0022CALRF1: SCL0022CAL3
RF2: SCL0022CAL4 RF10: SCL0022CAL5

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
d4-1,2-Dichloroethane	0.738	0.734	0.720	0.705	0.687
d8-Toluene	1.136	1.132	1.188	1.182	1.182
4-Bromofluorobenzene	0.525	0.570	0.556	0.570	0.544
d4-1,2-Dichlorobenzene	0.959	0.915	0.910	0.946	0.959
Dibromofluoromethane	0.568	0.566	0.561	0.548	0.540

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY AREA

Instrument ID: NT2 Calibration Date: 12/17/14

LAB FILE ID: RF20: SCL0022CAL6RF40: SCL0022CAL7RF80: SCL0022CAL8

COMPOUND	RF20	RF40	RF80
Chloromethane	1.325	1.352	1.410
Vinyl Chloride	1.073	1.044	1.178
Bromomethane	0.382	0.384	0.358
Chloroethane	0.504	0.453	0.377
Trichlorofluoromethane	0.775	0.756	0.779
Acrolein	0.101	0.101	0.116
112Trichloro122Trifluoroetha	0.616	0.590	0.759
Acetone	0.172	0.163	0.187
1,1-Dichloroethene	1.409	1.381	1.744
Bromoethane	0.522	0.525	0.615
Iodomethane	0.954	0.944	1.245
Methylene Chloride	0.708	0.682	0.679
Acrylonitrile	0.241	0.240	0.263
Carbon Disulfide	2.234	2.570	2.750
Trans-1,2-Dichloroethene	0.708	0.701	0.704
Vinyl Acetate	0.255	0.271	0.295
1,1-Dichloroethane	1.509	1.488	1.450
2-Butanone	0.275	0.275	0.282
2,2-Dichloropropane	0.693	0.676	0.634
Cis-1,2-Dichloroethene	0.712	0.712	0.694
Chloroform	1.082	1.080	1.048
Bromochloromethane	0.293	0.292	0.288
1,1,1-Trichloroethane	0.978	0.949	0.914
1,1-Dichloropropene	0.557	0.550	0.533
Carbon Tetrachloride	0.477	0.479	0.450
1,2-Dichloroethane	0.539	0.537	0.522
Benzene	1.542	1.480	1.376
Trichloroethene	0.366	0.360	0.346
1,2-Dichloropropane	0.440	0.438	0.423
Bromodichloromethane	0.435	0.436	0.434
Dibromomethane	0.178	0.177	0.170
2-Chloroethyl Vinyl Ether	0.150	0.152	0.161
4-Methyl-2-Pentanone	0.152	0.144	0.128
Cis 1,3-dichloropropene	0.515	0.520	0.521
Toluene	0.880	0.866	0.835
Trans 1,3-Dichloropropene	0.433	0.425	0.420
2-Hexanone	0.270	0.256	0.240

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY AREA

Instrument ID: NT2 Calibration Date: 12/17/14

LAB FILE ID: RF20: SCL0022CAL6RF40: SCL0022CAL7RF80: SCL0022CAL8

COMPOUND	RF20	RF40	RF80
1,1,2-Trichloroethane	0.235	0.236	0.228
1,3-Dichloropropane	0.498	0.502	0.504
Tetrachloroethene	0.398	0.388	0.369
Chlorodibromomethane	0.311	0.325	0.320
1,2-Dibromoethane	0.223	0.217	0.217
Chlorobenzene	0.998	0.972	0.909
Ethyl Benzene	0.558	0.550	0.512
1,1,1,2-Tetrachloroethane	0.386	0.387	0.366
m,p-xylene	0.696	0.673	0.602
o-Xylene	0.736	0.732	0.683
Styrene	1.101	1.102	1.034
Bromoform	0.309	0.324	0.341
1,1,2,2-Tetrachloroethane	0.636	0.651	0.651
1,2,3-Trichloropropane	0.196	0.195	0.188
Trans-1,4-Dichloro 2-Butene	0.265	0.270	0.280
N-Propyl Benzene	3.638	3.550	3.182
Bromobenzene	0.695	0.693	0.672
Isopropyl Benzene	3.276	3.299	2.991
2-Chloro Toluene	2.690	2.666	2.513
4-Chloro Toluene	2.416	2.399	2.335
T-Butyl Benzene	2.389	2.423	2.249
1,3,5-Trimethyl Benzene	2.775	2.751	2.464
1,2,4-Trimethylbenzene	2.809	2.793	2.565
S-Butyl Benzene	3.400	3.354	3.045
4-Isopropyl Toluene	2.832	2.828	2.597
1,3-Dichlorobenzene	1.469	1.456	1.406
1,4-Dichlorobenzene	1.488	1.478	1.417
N-Butyl Benzene	2.615	2.614	2.387
1,2-Dichlorobenzene	1.397	1.411	1.330
1,2-Dibromo 3-Chloropropane	0.114	0.121	0.123
1,2,4-Trichlorobenzene	0.787	0.820	0.786
Hexachloro 1,3-Butadiene	0.364	0.356	0.324
Naphthalene	1.803	1.853	1.729
1,2,3-Trichlorobenzene	0.635	0.629	0.605
Dichlorodifluoromethane	0.642	0.658	0.690
Methyl tert butyl ether	1.814	1.795	1.782

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY AREA

Instrument ID: NT2 Calibration Date: 12/17/14

LAB FILE ID: RF20: SCL0022CAL6RF40: SCL0022CAL7RF80: SCL0022CAL8

COMPOUND	RF20	RF40	RF80
d4-1,2-Dichloroethane	0.680	0.696	0.690
d8-Toluene	1.186	1.206	1.210
4-Bromofluorobenzene	0.550	0.554	0.555
d4-1,2-Dichlorobenzene	0.942	0.933	0.895
Dibromofluoromethane	0.526	0.528	0.513

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY AREA

Instrument ID: NT2 Calibration Date: 12/17/14

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
Chloromethane	AVRG	1.378	4.1
Vinyl Chloride	AVRG	1.104	6.0
Bromomethane	AVRG	0.400	8.3
Chloroethane	AVRG	0.533	16.4
Trichlorofluoromethane	AVRG	0.682	14.9
Acrolein	AVRG	0.101	8.6
112Trichloro122Trifluoroetha	AVRG	0.642	9.4
Acetone	AVRG	0.167	7.0
1,1-Dichloroethene	AVRG	1.444	9.3
Bromoethane	AVRG	0.528	9.7
Iodomethane	AVRG	0.973	14.0
Methylene Chloride	LINR		0.9993
Acrylonitrile	AVRG	0.226	11.4
Carbon Disulfide	AVRG	2.344	9.1
Trans-1,2-Dichloroethene	AVRG	0.710	4.5
Vinyl Acetate	AVRG	0.234	16.1
1,1-Dichloroethane	AVRG	1.512	3.1
2-Butanone	AVRG	0.268	4.3
2,2-Dichloropropane	AVRG	0.652	5.6
Cis-1,2-Dichloroethene	AVRG	0.697	5.8
Chloroform	AVRG	1.088	3.1
Bromochloromethane	AVRG	0.291	4.6
1,1,1-Trichloroethane	AVRG	0.920	6.0
1,1-Dichloropropene	AVRG	0.528	6.7
Carbon Tetrachloride	AVRG	0.460	5.2
1,2-Dichloroethane	AVRG	0.546	4.6
Benzene	AVRG	1.510	6.0
Trichloroethene	AVRG	0.353	5.3
1,2-Dichloropropane	AVRG	0.432	2.9
Bromodichloromethane	AVRG	0.412	7.1
Dibromomethane	AVRG	0.179	5.7
2-Chloroethyl Vinyl Ether	AVRG	0.138	13.6
4-Methyl-2-Pentanone	AVRG	0.136	10.2
Cis 1,3-dichloropropene	AVRG	0.451	15.6
Toluene	AVRG	0.851	2.1
Trans 1,3-Dichloropropene	AVRG	0.384	12.2
2-Hexanone	AVRG	0.252	7.7

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY AREA

Instrument ID: NT2 Calibration Date: 12/17/14

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
1,1,2-Trichloroethane	AVRG	0.234	4.3
1,3-Dichloropropane	AVRG	0.479	6.1
Tetrachloroethene	AVRG	0.374	4.0
Chlorodibromomethane	AVRG	0.282	12.1
1,2-Dibromoethane	AVRG	0.212	8.5
Chlorobenzene	AVRG	0.967	4.3
Ethyl Benzene	AVRG	0.521	8.7
1,1,1,2-Tetrachloroethane	AVRG	0.364	5.0
m,p-xylene	AVRG	0.635	9.8
o-Xylene	AVRG	0.646	16.6
Styrene	LINR		0.9988
Bromoform	AVRG	0.275	18.0
1,1,2,2-Tetrachloroethane	AVRG	0.630	3.9
1,2,3-Trichloropropane	AVRG	0.193	9.3
Trans-1,4-Dichloro 2-Butene	AVRG	0.250	10.8
N-Propyl Benzene	AVRG	3.362	7.5
Bromobenzene	AVRG	0.696	2.4
Isopropyl Benzene	AVRG	2.854	15.4
2-Chloro Toluene	AVRG	2.470	9.1
4-Chloro Toluene	AVRG	2.245	10.3
T-Butyl Benzene	AVRG	2.038	19.8
1,3,5-Trimethyl Benzene	AVRG	2.441	13.8
1,2,4-Trimethylbenzene	AVRG	2.441	17.2
S-Butyl Benzene	AVRG	2.974	16.2
4-Isopropyl Toluene	AVRG	2.414	19.5
1,3-Dichlorobenzene	AVRG	1.402	7.3
1,4-Dichlorobenzene	AVRG	1.471	2.5
N-Butyl Benzene	AVRG	2.287	14.8
1,2-Dichlorobenzene	AVRG	1.399	2.2
1,2-Dibromo 3-Chloropropane	AVRG	0.114	7.7
1,2,4-Trichlorobenzene	AVRG	0.714	13.8
Hexachloro 1,3-Butadiene	AVRG	0.403	15.0
Naphthalene	AVRG	1.586	16.3
1,2,3-Trichlorobenzene	AVRG	0.589	9.8
Dichlorodifluoromethane	AVRG	0.606	10.5
Methyl tert butyl ether	AVRG	1.716	7.9

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY AREA

Instrument ID: NT2 Calibration Date: 12/17/14

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
d4-1,2-Dichloroethane	AVRG	0.706	3.1
d8-Toluene	AVRG	1.178	2.5
4-Bromofluorobenzene	AVRG	0.553	2.6
d4-1,2-Dichlorobenzene	AVRG	0.932	2.5
Dibromofluoromethane	AVRG	0.544	3.7

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Calibration Date: 12/17/14

LAB FILE ID: RF0.2: SCL0021CALRF0.5: SCL0021CALRF1: SCL0021CAL3
RF2: SCL0021CAL4 RF10: SCL0021CAL5

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
Chloromethane	0.792	0.660	0.625	0.599	0.646
Vinyl Chloride	0.805	0.798	0.748	0.747	0.819
Bromomethane	0.360	0.398	0.433	0.433	0.497
Chloroethane	0.507	0.478	0.468	0.472	0.479
Trichlorofluoromethane	0.786	0.742	0.768	0.704	0.772
Acrolein	0.069	0.068	0.061	0.061	0.067
112Trichloro122Trifluoroetha	0.510	0.550	0.532	0.527	0.535
Acetone		0.119	0.122	0.116	0.107
1,1-Dichloroethene	0.438	0.455	0.562	0.554	0.586
Bromoethane	0.372	0.308	0.280	0.253	0.262
Iodomethane	0.354	0.598	0.576	0.570	0.610
Methylene Chloride			1.095	0.798	0.647
Acrylonitrile	0.240	0.195	0.178	0.173	0.169
Carbon Disulfide	2.095	2.067	2.044	1.941	2.051
Trans-1,2-Dichloroethene	0.638	0.631	0.636	0.596	0.630
Vinyl Acetate	0.200	0.217	0.218	0.206	0.192
1,1-Dichloroethane	0.937	1.066	1.048	1.057	1.072
2-Butanone	0.242	0.216	0.212	0.205	0.210
2,2-Dichloropropane	0.802	0.756	0.727	0.788	0.832
Cis-1,2-Dichloroethene	0.592	0.607	0.643	0.652	0.654
Chloroform	0.973	0.944	0.961	0.938	0.968
Bromochloromethane	0.260	0.295	0.266	0.248	0.282
1,1,1-Trichloroethane	0.826	0.780	0.800	0.786	0.802
1,1-Dichloropropene	0.444	0.503	0.452	0.452	0.472
Carbon Tetrachloride	0.361	0.334	0.337	0.337	0.366
1,2-Dichloroethane	0.393	0.387	0.387	0.360	0.372
Benzene	1.514	1.485	1.383	1.384	1.418
Trichloroethene	0.349	0.324	0.334	0.326	0.337
1,2-Dichloropropane	0.372	0.338	0.355	0.351	0.364
Bromodichloromethane	0.378	0.416	0.392	0.383	0.404
Dibromomethane	0.171	0.169	0.179	0.176	0.176
2-Chloroethyl Vinyl Ether		0.180	0.195	0.191	0.208
4-Methyl-2-Pentanone	0.263	0.267	0.268	0.256	0.280
Cis 1,3-dichloropropene	0.548	0.520	0.510	0.519	0.546
Toluene	0.947	0.934	0.907	0.892	0.900
Trans 1,3-Dichloropropene	0.462	0.468	0.445	0.439	0.488
2-Hexanone	0.169	0.186	0.198	0.187	0.209

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Calibration Date: 12/17/14

LAB FILE ID: RF0.2: SCL0021CALRF0.5: SCL0021CALRF1: SCL0021CAL3
RF2: SCL0021CAL4 RF10: SCL0021CAL5

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
1,1,2-Trichloroethane	0.264	0.258	0.271	0.273	0.279
1,3-Dichloropropane	0.594	0.580	0.564	0.550	0.551
Tetrachloroethene	0.313	0.337	0.327	0.327	0.334
Chlorodibromomethane	0.239	0.255	0.282	0.285	0.308
1,2-Dibromoethane	0.230	0.267	0.270	0.260	0.269
Chlorobenzene	1.424	1.135	1.072	1.043	1.018
Ethyl Benzene	1.962	1.851	1.762	1.761	1.786
1,1,1,2-Tetrachloroethane	0.285	0.297	0.291	0.297	0.319
m,p-xylene	0.702	0.690	0.699	0.685	0.698
o-Xylene	0.723	0.690	0.676	0.665	0.686
Styrene	1.066	1.044	1.096	1.080	1.135
Bromoform	0.293	0.292	0.263	0.292	0.324
1,1,2,2-Tetrachloroethane	0.825	0.750	0.698	0.749	0.737
1,2,3-Trichloropropane		0.233	0.212	0.215	0.214
Trans-1,4-Dichloro 2-Butene		0.208	0.210	0.185	0.207
N-Propyl Benzene	3.747	3.730	3.818	3.787	3.792
Bromobenzene	0.743	0.756	0.722	0.745	0.734
Isopropyl Benzene	3.502	3.397	3.349	3.294	3.249
2-Chloro Toluene	2.339	2.323	2.316	2.321	2.350
4-Chloro Toluene	2.463	2.517	2.413	2.510	2.489
T-Butyl Benzene	2.135	2.173	2.237	2.196	2.178
1,3,5-Trimethyl Benzene	2.597	2.677	2.596	2.630	2.669
1,2,4-Trimethylbenzene	2.669	2.684	2.656	2.685	2.703
S-Butyl Benzene	3.086	3.198	3.154	3.188	3.103
4-Isopropyl Toluene	2.468	2.412	2.496	2.547	2.569
1,3-Dichlorobenzene	1.478	1.452	1.466	1.460	1.456
1,4-Dichlorobenzene	1.505	1.561	1.485	1.542	1.489
N-Butyl Benzene	2.261	2.310	2.302	2.335	2.323
1,2-Dichlorobenzene	1.555	1.471	1.424	1.411	1.412
1,2-Dibromo 3-Chloropropane		0.126	0.124	0.114	0.123
1,2,4-Trichlorobenzene		0.869	0.794	0.808	0.787
Hexachloro 1,3-Butadiene		0.284	0.264	0.273	0.230
Naphthalene		2.058	2.089	2.074	2.059
1,2,3-Trichlorobenzene		0.719	0.716	0.715	0.673
Dichlorodifluoromethane	0.467	0.468	0.469	0.373	0.518
Methyl tert butyl ether	1.699	1.681	1.664	1.620	1.681

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Calibration Date: 12/17/14

LAB FILE ID: RF0.2: SCL0021CALRF0.5: SCL0021CALRF1: SCL0021CAL3
RF2: SCL0021CAL4 RF10: SCL0021CAL5

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
d4-1,2-Dichloroethane	0.541	0.537	0.545	0.528	0.531
d8-Toluene	1.243	1.249	1.250	1.232	1.260
4-Bromofluorobenzene	0.508	0.517	0.504	0.506	0.508
d4-1,2-Dichlorobenzene	0.900	0.914	0.921	0.915	0.917
Dibromofluoromethane	0.505	0.492	0.485	0.486	0.487

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Calibration Date: 12/17/14

LAB FILE ID: RF20: SCL0021CAL6RF40: SCL0021CAL7RF80: SCL0021CAL8

COMPOUND	RF20	RF40	RF80
Chloromethane	0.643	0.653	0.713
Vinyl Chloride	0.788	0.796	0.851
Bromomethane	0.517	0.525	0.523
Chloroethane	0.484	0.470	0.494
Trichlorofluoromethane	0.769	0.848	0.880
Acrolein	0.073	0.075	0.074
112Trichloro122Trifluoroetha	0.545	0.550	0.410
Acetone	0.108	0.110	0.109
1,1-Dichloroethene	0.576	0.585	0.488
Bromoethane	0.251	0.260	0.253
Iodomethane	0.468	0.449	0.475
Methylene Chloride	0.660	0.647	0.660
Acrylonitrile	0.173	0.180	0.180
Carbon Disulfide	2.024	2.067	1.572
Trans-1,2-Dichloroethene	0.631	0.646	0.654
Vinyl Acetate	0.220	0.228	0.223
1,1-Dichloroethane	1.078	1.106	1.104
2-Butanone	0.212	0.218	0.214
2,2-Dichloropropane	0.855	0.879	0.876
Cis-1,2-Dichloroethene	0.657	0.665	0.668
Chloroform	0.961	0.984	0.982
Bromochloromethane	0.276	0.281	0.282
1,1,1-Trichloroethane	0.808	0.828	0.824
1,1-Dichloropropene	0.457	0.472	0.463
Carbon Tetrachloride	0.361	0.373	0.374
1,2-Dichloroethane	0.361	0.369	0.366
Benzene	1.353	1.328	1.164
Trichloroethene	0.328	0.332	0.333
1,2-Dichloropropane	0.346	0.354	0.347
Bromodichloromethane	0.394	0.403	0.395
Dibromomethane	0.168	0.172	0.171
2-Chloroethyl Vinyl Ether	0.202	0.210	0.207
4-Methyl-2-Pentanone	0.265	0.259	0.227
Cis 1,3-dichloropropene	0.541	0.552	0.534
Toluene	0.866	0.861	0.802
Trans 1,3-Dichloropropene	0.479	0.488	0.481
2-Hexanone	0.205	0.205	0.194

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Calibration Date: 12/17/14

LAB FILE ID: RF20: SCL0021CAL6RF40: SCL0021CAL7RF80: SCL0021CAL8

COMPOUND	RF20	RF40	RF80
1,1,2-Trichloroethane	0.265	0.268	0.267
1,3-Dichloropropane	0.557	0.552	0.534
Tetrachloroethene	0.332	0.339	0.333
Chlorodibromomethane	0.309	0.317	0.314
1,2-Dibromoethane	0.262	0.270	0.265
Chlorobenzene	0.998	0.987	0.907
Ethyl Benzene	1.745	1.650	1.368
1,1,1,2-Tetrachloroethane	0.321	0.326	0.324
m,p-xylene	0.693	0.675	0.597
o-Xylene	0.675	0.682	0.652
Styrene	1.134	1.115	1.013
Bromoform	0.331	0.357	0.365
1,1,2,2-Tetrachloroethane	0.735	0.764	0.738
1,2,3-Trichloropropane	0.210	0.227	0.221
Trans-1,4-Dichloro 2-Butene	0.213	0.226	0.224
N-Propyl Benzene	3.697	3.522	2.908
Bromobenzene	0.728	0.760	0.751
Isopropyl Benzene	3.154	3.084	2.630
2-Chloro Toluene	2.302	2.293	2.083
4-Chloro Toluene	2.433	2.424	2.170
T-Butyl Benzene	2.159	2.160	1.952
1,3,5-Trimethyl Benzene	2.643	2.625	2.326
1,2,4-Trimethylbenzene	2.660	2.672	2.351
S-Butyl Benzene	3.056	3.019	2.560
4-Isopropyl Toluene	2.511	2.535	2.209
1,3-Dichlorobenzene	1.435	1.455	1.377
1,4-Dichlorobenzene	1.487	1.507	1.412
N-Butyl Benzene	2.321	2.332	2.060
1,2-Dichlorobenzene	1.366	1.388	1.314
1,2-Dibromo 3-Chloropropane	0.125	0.126	0.128
1,2,4-Trichlorobenzene	0.766	0.787	0.758
Hexachloro 1,3-Butadiene	0.230	0.224	0.209
Naphthalene	1.954	1.946	1.774
1,2,3-Trichlorobenzene	0.636	0.640	0.611
Dichlorodifluoromethane	0.524	0.545	0.555
Methyl tert butyl ether	1.685	1.668	1.621

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Calibration Date: 12/17/14

LAB FILE ID: RF20: SCL0021CAL6RF40: SCL0021CAL7RF80: SCL0021CAL8

COMPOUND	RF20	RF40	RF80
d4-1,2-Dichloroethane	0.531	0.530	0.518
d8-Toluene	1.226	1.223	1.239
4-Bromofluorobenzene	0.518	0.515	0.514
d4-1,2-Dichlorobenzene	0.913	0.914	0.917
Dibromofluoromethane	0.494	0.491	0.454

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Calibration Date: 12/17/14

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
Chloromethane	AVRG	0.666	9.0
Vinyl Chloride	AVRG	0.794	4.3
Bromomethane	AVRG	0.461	13.7
Chloroethane	AVRG	0.482	2.8
Trichlorofluoromethane	AVRG	0.784	7.2
Acrolein	AVRG	0.069	7.9
112Trichloro122Trifluoroetha	AVRG	0.520	8.9
Acetone	AVRG	0.113	5.2
1,1-Dichloroethene	AVRG	0.531	11.4
Bromoethane	AVRG	0.280	15.0
Iodomethane	AVRG	0.513	17.6
Methylene Chloride	LINR		0.9997
Acrylonitrile	AVRG	0.186	12.4
Carbon Disulfide	AVRG	1.983	8.7
Trans-1,2-Dichloroethene	AVRG	0.633	2.7
Vinyl Acetate	AVRG	0.213	5.8
1,1-Dichloroethane	AVRG	1.059	5.0
2-Butanone	AVRG	0.216	5.1
2,2-Dichloropropane	AVRG	0.814	6.8
Cis-1,2-Dichloroethene	AVRG	0.642	4.3
Chloroform	AVRG	0.964	1.7
Bromochloromethane	AVRG	0.274	5.5
1,1,1-Trichloroethane	AVRG	0.807	2.2
1,1-Dichloropropene	AVRG	0.464	4.0
Carbon Tetrachloride	AVRG	0.355	4.7
1,2-Dichloroethane	AVRG	0.374	3.4
Benzene	AVRG	1.379	7.8
Trichloroethene	AVRG	0.333	2.4
1,2-Dichloropropane	AVRG	0.353	3.0
Bromodichloromethane	AVRG	0.395	3.1
Dibromomethane	AVRG	0.173	2.2
2-Chloroethyl Vinyl Ether	AVRG	0.199	5.3
4-Methyl-2-Pentanone	AVRG	0.261	5.8
Cis 1,3-dichloropropene	AVRG	0.534	2.9
Toluene	AVRG	0.889	5.2
Trans 1,3-Dichloropropene	AVRG	0.469	4.0
2-Hexanone	AVRG	0.194	6.8

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Calibration Date: 12/17/14

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
1,1,2-Trichloroethane	AVRG	0.268	2.4
1,3-Dichloropropane	AVRG	0.560	3.4
Tetrachloroethene	AVRG	0.330	2.4
Chlorodibromomethane	AVRG	0.289	10.1
1,2-Dibromoethane	AVRG	0.262	5.1
Chlorobenzene	AVRG	1.073	14.6
Ethyl Benzene	AVRG	1.736	10.0
1,1,1,2-Tetrachloroethane	AVRG	0.308	5.4
m,p-xylene	AVRG	0.680	5.1
o-Xylene	AVRG	0.681	3.0
Styrene	AVRG	1.085	4.0
Bromoform	AVRG	0.315	11.2
1,1,2,2-Tetrachloroethane	AVRG	0.750	4.8
1,2,3-Trichloropropane	AVRG	0.219	3.9
Trans-1,4-Dichloro 2-Butene	AVRG	0.210	6.4
N-Propyl Benzene	AVRG	3.625	8.4
Bromobenzene	AVRG	0.742	1.8
Isopropyl Benzene	AVRG	3.207	8.4
2-Chloro Toluene	AVRG	2.291	3.8
4-Chloro Toluene	AVRG	2.428	4.6
T-Butyl Benzene	AVRG	2.149	4.0
1,3,5-Trimethyl Benzene	AVRG	2.595	4.3
1,2,4-Trimethylbenzene	AVRG	2.635	4.4
S-Butyl Benzene	AVRG	3.046	6.8
4-Isopropyl Toluene	AVRG	2.468	4.7
1,3-Dichlorobenzene	AVRG	1.447	2.1
1,4-Dichlorobenzene	AVRG	1.499	3.0
N-Butyl Benzene	AVRG	2.280	4.0
1,2-Dichlorobenzene	AVRG	1.418	5.0
1,2-Dibromo 3-Chloropropane	AVRG	0.124	3.7
1,2,4-Trichlorobenzene	AVRG	0.796	4.6
Hexachloro 1,3-Butadiene	AVRG	0.245	11.6
Naphthalene	AVRG	1.994	5.6
1,2,3-Trichlorobenzene	AVRG	0.673	6.7
Dichlorodifluoromethane	AVRG	0.490	12.0
Methyl tert butyl ether	AVRG	1.665	1.8

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Calibration Date: 12/17/14

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
d4-1,2-Dichloroethane	AVRG	0.533	1.6
d8-Toluene	AVRG	1.240	1.0
4-Bromofluorobenzene	AVRG	0.511	1.0
d4-1,2-Dichlorobenzene	AVRG	0.914	0.7
Dibromofluoromethane	AVRG	0.487	3.0

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY ARE

Instrument ID: NT2 Cont. Calib. Date: 12/17/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 1602

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Chloromethane	1.378	1.4144	0.100	AVRG	2.6
Vinyl Chloride	1.104	1.1627	0.010	AVRG	5.3
Bromomethane	0.400	0.4034	0.010	AVRG	0.8
Chloroethane	0.533	0.5616	0.010	AVRG	5.4
Trichlorofluoromethane	0.682	0.7654	0.010	AVRG	12.2
Acrolein	0.101	0.0865	0.010	AVRG	-14.4
112Trichloro122Trifluoroetha	0.642	0.6219	0.010	AVRG	-3.1
Acetone	0.167	0.1518	0.010	AVRG	-9.1
1,1-Dichloroethene	1.444	1.4766	0.010	AVRG	2.2
Bromoethane	0.528	0.5110	0.010	AVRG	-3.2
Iodomethane	0.973	0.9623	0.010	AVRG	-1.1
Methylene Chloride	10.000	10.571	0.010	LINR	5.7
Acrylonitrile	0.226	0.2091	0.010	AVRG	-7.5
Carbon Disulfide	2.344	2.2866	0.010	AVRG	-2.4
Trans-1,2-Dichloroethene	0.710	0.6862	0.010	AVRG	-3.4
Vinyl Acetate	0.234	0.2065	0.010	AVRG	-11.8
1,1-Dichloroethane	1.512	1.5008	0.100	AVRG	-0.7
2-Butanone	0.268	0.2426	0.010	AVRG	-9.5
2,2-Dichloropropane	0.652	0.6782	0.010	AVRG	4.0
Cis-1,2-Dichloroethene	0.697	0.6929	0.010	AVRG	-0.6
Chloroform	1.088	1.0902	0.010	AVRG	0.2
Bromochloromethane	0.291	0.2883	0.010	AVRG	-0.9
1,1,1-Trichloroethane	0.920	0.9481	0.010	AVRG	3.0
1,1-Dichloropropene	0.528	0.5351	0.010	AVRG	1.3
Carbon Tetrachloride	0.460	0.4930	0.010	AVRG	7.2
1,2-Dichloroethane	0.546	0.5527	0.010	AVRG	1.2
Benzene	1.510	1.5203	0.010	AVRG	0.7
Trichloroethene	0.354	0.3647	0.010	AVRG	3.0
1,2-Dichloropropane	0.432	0.4218	0.010	AVRG	-2.4
Bromodichloromethane	0.412	0.4208	0.010	AVRG	2.1
Dibromomethane	0.179	0.1777	0.010	AVRG	-0.7
2-Chloroethyl Vinyl Ether	0.138	0.1222	0.010	AVRG	-11.4
4-Methyl-2-Pentanone	0.136	0.1386	0.010	AVRG	1.9
Cis 1,3-dichloropropene	0.451	0.4569	0.010	AVRG	1.3
Toluene	0.850	0.8431	0.010	AVRG	-0.8
Trans 1,3-Dichloropropene	0.384	0.3950	0.010	AVRG	2.9
2-Hexanone	0.252	0.2534	0.010	AVRG	0.6

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII VOA

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY ARE

Instrument ID: NT2 Cont. Calib. Date: 12/17/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 1602

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
1,1,2-Trichloroethane	0.234	0.2171	0.010	AVRG	-7.2
1,3-Dichloropropane	0.479	0.4641	0.010	AVRG	-3.1
Tetrachloroethene	0.374	0.3997	0.010	AVRG	6.9
Chlorodibromomethane	0.282	0.2903	0.010	AVRG	2.9
1,2-Dibromoethane	0.212	0.2025	0.010	AVRG	-4.5
Chlorobenzene	0.967	1.0166	0.300	AVRG	5.1
Ethyl Benzene	0.522	0.5676	0.010	AVRG	8.7
1,1,1,2-Tetrachloroethane	0.364	0.3984	0.010	AVRG	9.4
m,p-xylene	0.635	0.7110	0.010	AVRG	12.0
o-Xylene	0.646	0.7374	0.010	AVRG	14.1
Styrene	10.000	10.330	0.010	LINR	3.3
Bromoform	0.275	0.2940	0.100	AVRG	6.9
1,1,2,2-Tetrachloroethane	0.630	0.6099	0.300	AVRG	-3.2
1,2,3-Trichloropropane	0.193	0.1962	0.010	AVRG	1.6
Trans-1,4-Dichloro 2-Butene	0.250	0.2430	0.010	AVRG	-2.8
N-Propyl Benzene	3.362	3.6692	0.010	AVRG	9.1
Bromobenzene	0.696	0.6938	0.010	AVRG	-0.3
Isopropyl Benzene	2.854	3.2411	0.010	AVRG	13.6
2-Chloro Toluene	2.470	2.6770	0.010	AVRG	8.4
4-Chloro Toluene	2.245	2.4092	0.010	AVRG	7.3
T-Butyl Benzene	2.038	2.3396	0.010	AVRG	14.8
1,3,5-Trimethyl Benzene	2.441	2.8312	0.010	AVRG	16.0
1,2,4-Trimethylbenzene	2.441	2.7964	0.010	AVRG	14.6
S-Butyl Benzene	2.974	3.3461	0.010	AVRG	12.5
4-Isopropyl Toluene	2.414	2.7910	0.010	AVRG	15.6
1,3-Dichlorobenzene	1.402	1.4868	0.010	AVRG	6.0
1,4-Dichlorobenzene	1.471	1.5147	0.010	AVRG	3.0
N-Butyl Benzene	2.287	2.4960	0.010	AVRG	9.1
1,2-Dichlorobenzene	1.399	1.4191	0.010	AVRG	1.4
1,2-Dibromo 3-Chloropropane	0.114	0.1044	0.010	AVRG	-8.4
1,2,4-Trichlorobenzene	0.714	0.7612	0.010	AVRG	6.6
Hexachloro 1,3-Butadiene	0.403	0.3619	0.010	AVRG	-10.2
Naphthalene	1.586	1.5878	0.010	AVRG	0.1
1,2,3-Trichlorobenzene	0.589	0.6343	0.010	AVRG	7.7
Dichlorodifluoromethane	0.606	0.6895	0.010	AVRG	13.8
Methyl tert butyl ether	1.716	1.6832	0.010	AVRG	-1.9

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII VOA

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY ARE

Instrument ID: NT2 Cont. Calib. Date: 12/17/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 1602

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
d4-1,2-Dichloroethane	0.706	0.6966	0.010	AVRG	-1.3
d8-Toluene	1.178	1.1671	0.010	AVRG	-0.9
4-Bromofluorobenzene	0.553	0.5507	0.010	AVRG	-0.4
d4-1,2-Dichlorobenzene	0.932	0.9080	0.010	AVRG	-2.6
Dibromofluoromethane	0.544	0.5363	0.010	AVRG	-1.4

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII VOA

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Cont. Calib. Date: 12/18/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 2125

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
Chloromethane	0.666	0.6738	0.100	AVRG	1.2	
Vinyl Chloride	0.794	0.7943	0.010	AVRG	0.0	
Bromomethane	0.461	0.4243	0.010	AVRG	-8.0	
Chloroethane	0.482	0.4934	0.010	AVRG	2.4	
Trichlorofluoromethane	0.784	0.7450	0.010	AVRG	-5.0	
Acrolein	0.068	0.0648	0.010	AVRG	-4.7	
112Trichloro122Trifluoroetha	0.520	0.5282	0.010	AVRG	1.6	
Acetone	0.113	0.1061	0.010	AVRG	-6.1	
1,1-Dichloroethene	0.530	0.5738	0.010	AVRG	8.3	
Bromoethane	0.280	0.2603	0.010	AVRG	-7.0	
Iodomethane	0.512	0.6261	0.010	AVRG	22.3	<-
Methylene Chloride	10.000	10.285	0.010	LINR	2.8	
Acrylonitrile	0.186	0.1635	0.010	AVRG	-12.1	
Carbon Disulfide	1.983	1.9934	0.010	AVRG	0.5	
Trans-1,2-Dichloroethene	0.633	0.6318	0.010	AVRG	-0.2	
Vinyl Acetate	0.213	0.2024	0.010	AVRG	-5.0	
1,1-Dichloroethane	1.058	1.0748	0.100	AVRG	1.6	
2-Butanone	0.216	0.2017	0.010	AVRG	-6.6	
2,2-Dichloropropane	0.814	0.7052	0.010	AVRG	-13.4	
Cis-1,2-Dichloroethene	0.642	0.6565	0.010	AVRG	2.2	
Chloroform	0.964	0.9501	0.010	AVRG	-1.4	
Bromochloromethane	0.274	0.2827	0.010	AVRG	3.2	
1,1,1-Trichloroethane	0.807	0.8065	0.010	AVRG	-0.1	
1,1-Dichloropropene	0.464	0.4567	0.010	AVRG	-1.6	
Carbon Tetrachloride	0.355	0.3618	0.010	AVRG	1.9	
1,2-Dichloroethane	0.374	0.3665	0.010	AVRG	-2.0	
Benzene	1.379	1.4144	0.010	AVRG	2.6	
Trichloroethene	0.333	0.3298	0.010	AVRG	-1.0	
1,2-Dichloropropane	0.353	0.3519	0.010	AVRG	-0.3	
Bromodichloromethane	0.396	0.3935	0.010	AVRG	-0.6	
Dibromomethane	0.173	0.1696	0.010	AVRG	-2.0	
2-Chloroethyl Vinyl Ether	0.199	0.1937	0.010	AVRG	-2.7	
4-Methyl-2-Pentanone	0.261	0.2600	0.010	AVRG	-0.4	
Cis 1,3-dichloropropene	0.534	0.5336	0.010	AVRG	-0.1	
Toluene	0.889	0.8859	0.010	AVRG	-0.3	
Trans 1,3-Dichloropropene	0.469	0.4594	0.010	AVRG	-2.0	
2-Hexanone	0.194	0.1939	0.010	AVRG	-0.0	

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII VOA

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Cont. Calib. Date: 12/18/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 2125

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
1,1,2-Trichloroethane	0.268	0.2675	0.010	AVRG	-0.2	
1,3-Dichloropropane	0.560	0.5415	0.010	AVRG	-3.3	
Tetrachloroethene	0.330	0.3220	0.010	AVRG	-2.4	
Chlorodibromomethane	0.289	0.2981	0.010	AVRG	3.1	
1,2-Dibromoethane	0.262	0.2651	0.010	AVRG	1.2	
Chlorobenzene	1.073	1.0048	0.300	AVRG	-6.4	
Ethyl Benzene	1.736	1.7605	0.010	AVRG	1.4	
1,1,1,2-Tetrachloroethane	0.308	0.3215	0.010	AVRG	4.4	
m,p-xylene	0.680	0.6922	0.010	AVRG	1.8	
o-Xylene	0.681	0.6777	0.010	AVRG	-0.5	
Styrene	1.085	1.1435	0.010	AVRG	5.4	
Bromoform	0.315	0.3147	0.100	AVRG	-0.1	
1,1,2,2-Tetrachloroethane	0.750	0.7192	0.300	AVRG	-4.1	
1,2,3-Trichloropropane	0.219	0.2082	0.010	AVRG	-4.9	
Trans-1,4-Dichloro 2-Butene	0.210	0.1881	0.010	AVRG	-10.4	
N-Propyl Benzene	3.625	3.6298	0.010	AVRG	0.1	
Bromobenzene	0.742	0.7279	0.010	AVRG	-1.9	
Isopropyl Benzene	3.207	3.2115	0.010	AVRG	0.1	
2-Chloro Toluene	2.291	2.2707	0.010	AVRG	-0.9	
4-Chloro Toluene	2.427	2.3863	0.010	AVRG	-1.7	
T-Butyl Benzene	2.149	2.1418	0.010	AVRG	-0.3	
1,3,5-Trimethyl Benzene	2.595	2.5731	0.010	AVRG	-0.8	
1,2,4-Trimethylbenzene	2.635	2.6262	0.010	AVRG	-0.3	
S-Butyl Benzene	3.046	2.9536	0.010	AVRG	-3.0	
4-Isopropyl Toluene	2.468	2.4069	0.010	AVRG	-2.5	
1,3-Dichlorobenzene	1.447	1.4248	0.010	AVRG	-1.5	
1,4-Dichlorobenzene	1.498	1.4507	0.010	AVRG	-3.2	
N-Butyl Benzene	2.280	2.0697	0.010	AVRG	-9.2	
1,2-Dichlorobenzene	1.418	1.3635	0.010	AVRG	-3.8	
1,2-Dibromo 3-Chloropropane	0.124	0.1133	0.010	AVRG	-8.6	
1,2,4-Trichlorobenzene	0.796	0.7014	0.010	AVRG	-11.9	
Hexachloro 1,3-Butadiene	0.245	0.1813	0.010	AVRG	-26.0	<-
Naphthalene	1.993	1.7144	0.010	AVRG	-14.0	
1,2,3-Trichlorobenzene	0.673	0.5692	0.010	AVRG	-15.4	
Dichlorodifluoromethane	0.490	0.4712	0.010	AVRG	-3.8	
Methyl tert butyl ether	1.665	1.6573	0.010	AVRG	-0.5	

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII VOA

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Instrument ID: NT3 Cont. Calib. Date: 12/18/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 2125

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
d4-1,2-Dichloroethane	0.533	0.5355	0.010	AVRG	0.5
d8-Toluene	1.240	1.2506	0.010	AVRG	0.8
4-Bromofluorobenzene	0.511	0.5033	0.010	AVRG	-1.5
d4-1,2-Dichlorobenzene	0.914	0.8988	0.010	AVRG	-1.7
Dibromofluoromethane	0.487	0.4787	0.010	AVRG	-1.7

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII VOA

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC | Client: GEOENGINEERS

ARI Job No: 20141217A | Project: GAS WORKS PARK- PLAY AREA

Ical Midpoint ID: SCL0022CAL5 | Ical Date: 12/17/14

Instrument ID: NT2 | Project Run Date: 12/17/14

		IS1(PFB) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CLB) AREA #	RT #
	ICAL MIDPT	249277	5.66	405685	6.05	346661	8.13
	UPPER LIMIT	498554	6.16	811370	6.55	693322	8.63
	LOWER LIMIT	124638	5.16	202842	5.55	173330	7.63
	Sample ID						
01	ICV10	236427	5.66	380123	6.05	327656	8.13
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC | Client: GEOENGINEERS

ARI Job No: 20141217A | Project: GAS WORKS PARK- PLAY AREA

Ical Midpoint ID: SCL0022CAL5 | Ical Date: 12/17/14

Instrument ID: NT2 | Project Run Date: 12/17/14

		IS4(DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	205825	9.84				
	UPPER LIMIT	411650	10.34				
	LOWER LIMIT	102912	9.34				
	Sample ID						
01	ICV10	195619	9.84				
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = d4-1,4-Dichlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: 20141217A Project: GAS WORKS PARK- PLAY AREA

Ical Midpoint ID: SCL0022CAL5 Ical Date: 12/17/14

Instrument ID: NT2 Project Run Date: 12/17/14

		IS1(PFB) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CLB) AREA #	RT #
	ICAL MIDPT	249277	5.66	405685	6.05	346661	8.13
	UPPER LIMIT	498554	6.16	811370	6.55	693322	8.63
	LOWER LIMIT	124638	5.16	202842	5.55	173330	7.63
	Sample ID						
01	LCS1217	226898	5.66	361652	6.05	304480	8.13
02	LCS1217	224905	5.66	354889	6.05	301263	8.13
03	MB1217	211917	5.66	339254	6.05	289693	8.13
04	TRIP BLANK	211574	5.66	335248	6.06	287692	8.13
05	PAI-12GW	198010	5.66	293117	6.05	224198	8.13
06	PAI-2GW	274639	5.66	346535	6.06	264760	8.13
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC | Client: GEOENGINEERS

ARI Job No: 20141217A | Project: GAS WORKS PARK- PLAY AREA

Ical Midpoint ID: SCL0022CAL5 | Ical Date: 12/17/14

Instrument ID: NT2 | Project Run Date: 12/17/14

		IS4 (DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	205825	9.84				
	UPPER LIMIT	411650	10.34				
	LOWER LIMIT	102912	9.34				
	Sample ID						
01	LCS1217	180163	9.84				
02	LCS1217	182145	9.84				
03	MB1217	168389	9.84				
04	TRIP BLANK	162904	9.84				
05	PAI-12GW	144047	9.84				
06	PAI-2GW	157988	9.84				
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = d4-1,4-Dichlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK - PLAY AREA

Ical Midpoint ID: SCL0021CAL5 Ical Date: 12/17/14

Instrument ID: NT3 Project Run Date: 12/17/14

		IS1(PFB) AREA	#	RT	#	IS2(DFB) AREA	#	RT	#	IS3(CLB) AREA	#	RT	#
	ICAL MIDPT	481627		4.76		847325		5.18		791316		7.46	
	UPPER LIMIT	963254		5.26		1694650		5.68		1582632		7.96	
	LOWER LIMIT	240814		4.26		423662		4.68		395658		6.96	
	Sample ID												
01	ICV10	479321		4.76		861758		5.18		803697		7.46	
02													
03													
04													
05													
06													
07													
08													
09													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC | Client: GEOENGINEERS

ARI Job No: ZO83 | Project: GAS WORKS PARK - PLAY AREA

Ical Midpoint ID: SCL0021CAL5 | Ical Date: 12/17/14

Instrument ID: NT3 | Project Run Date: 12/17/14

		IS4(DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	410348	9.33				
	UPPER LIMIT	820696	9.83				
	LOWER LIMIT	205174	8.83				
	Sample ID						
01	ICV10	409506	9.32				
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = d4-1,4-Dichlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC | Client: GEOENGINEERS

ARI Job No: ZO83 | Project: GAS WORKS PARK - PLAY AREA

Ical Midpoint ID: SCL0021CAL5 | Ical Date: 12/17/14

Instrument ID: NT3 | Project Run Date: 12/18/14

		IS1(PFB) AREA #	IS1(PFB) RT #	IS2(DFB) AREA #	IS2(DFB) RT #	IS3(CLB) AREA #	IS3(CLB) RT #
	ICAL MIDPT	481627	4.76	847325	5.18	791316	7.46
	UPPER LIMIT	963254	5.26	1694650	5.68	1582632	7.96
	LOWER LIMIT	240814	4.26	423662	4.68	395658	6.96
	Sample ID						
01	LCS1218	455310	4.76	798292	5.18	739644	7.46
02	LCS1218	455850	4.77	810834	5.18	744478	7.46
03	MB1218	448725	4.76	808179	5.18	742788	7.46
04	PAI-11GW	447343	4.76	788334	5.18	730635	7.46
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC | Client: GEOENGINEERS

ARI Job No: ZO83 | Project: GAS WORKS PARK - PLAY AREA

Ical Midpoint ID: SCL0021CAL5 | Ical Date: 12/17/14

Instrument ID: NT3 | Project Run Date: 12/18/14

		IS4 (DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	410348	9.33				
	UPPER LIMIT	820696	9.83				
	LOWER LIMIT	205174	8.83				
	Sample ID						
01	LCS1218	380884	9.32				
02	LCS1218	377632	9.32				
03	MB1218	382334	9.33				
04	PAI-11GW	381680	9.32				
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = d4-1,4-Dichlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

SIM PAH Analysis
Report and Summary QC Forms

ARI Job ID: ZO83

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-11GW**
Extraction Method: SW3520C **SAMPLE**

Lab Sample ID: ZO83A
LIMS ID: 14-27440
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 13:44
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**0.030**	**0.10**	**10 E**
208-96-8	Acenaphthylene	0.038	0.10	< 0.10 U
83-32-9	**Acenaphthene**	**0.030**	**0.10**	**0.05 J**
86-73-7	Fluorene	0.028	0.10	< 0.10 U
85-01-8	**Phenanthrene**	**0.028**	**0.10**	**0.06 J**
120-12-7	Anthracene	0.035	0.10	< 0.10 U
206-44-0	**Fluoranthene**	**0.035**	**0.10**	**0.06 J**
129-00-0	**Pyrene**	**0.043**	**0.10**	**0.06 J**
56-55-3	Benzo(a)anthracene	0.040	0.10	< 0.10 U
218-01-9	Chrysene	0.032	0.10	< 0.10 U
205-99-2	Benzo(b)fluoranthene	0.042	0.10	< 0.10 U
207-08-9	Benzo(k)fluoranthene	0.043	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.043	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.042	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.054	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.039	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.041	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	86.0%
d10-2-Methylnaphthalene	58.7%
d14-Dibenzo(a,h)anthracene	70.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: PAI-11GW
DILUTION

Lab Sample ID: ZO83A
LIMS ID: 14-27440
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 10:46
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 10.0

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**0.30**	**1.0**	**10**
208-96-8	Acenaphthylene	0.38	1.0	< 1.0 U
83-32-9	Acenaphthene	0.30	1.0	< 1.0 U
86-73-7	Fluorene	0.28	1.0	< 1.0 U
85-01-8	Phenanthrene	0.28	1.0	< 1.0 U
120-12-7	Anthracene	0.35	1.0	< 1.0 U
206-44-0	Fluoranthene	0.35	1.0	< 1.0 U
129-00-0	Pyrene	0.43	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	0.40	1.0	< 1.0 U
218-01-9	Chrysene	0.32	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	0.42	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	0.43	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	0.43	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.42	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	0.54	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	0.39	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	0.41	1.0	< 1.0 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	96.7%
d10-2-Methylnaphthalene	66.7%
d14-Dibenzo(a,h)anthracene	70.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-12GW**
Extraction Method: SW3520C **SAMPLE**

Lab Sample ID: ZO83B
LIMS ID: 14-27441
Matrix: Water
Data Release Authorized: MW
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/14/15 21:29
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	DL	LOQ	Result
91-20-3	Naphthalene	0.030	0.10	100 ES
208-96-8	Acenaphthylene	0.038	0.10	3.0
83-32-9	Acenaphthene	0.030	0.10	2.3
86-73-7	Fluorene	0.028	0.10	5.5
85-01-8	Phenanthrene	0.028	0.10	8.7
120-12-7	Anthracene	0.035	0.10	1.4
206-44-0	Fluoranthene	0.035	0.10	2.3
129-00-0	Pyrene	0.043	0.10	2.5
56-55-3	Benzo(a)anthracene	0.040	0.10	0.54
218-01-9	Chrysene	0.032	0.10	0.65
205-99-2	Benzo(b)fluoranthene	0.042	0.10	0.36
207-08-9	Benzo(k)fluoranthene	0.043	0.10	0.22
50-32-8	Benzo(a)pyrene	0.043	0.10	0.57
193-39-5	Indeno(1,2,3-cd)pyrene	0.042	0.10	0.32
53-70-3	Dibenz(a,h)anthracene	0.054	0.10	0.08 J
191-24-2	Benzo(g,h,i)perylene	0.039	0.10	0.44
TOTBFA	Total Benzofluoranthenes	0.041	0.10	0.79

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	70.0%
d10-2-Methylnaphthalene	40.0%
d14-Dibenzo(a,h)anthracene	39.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-12GW**
Extraction Method: SW3520C **DILUTION**

Lab Sample ID: ZO83B
LIMS ID: 14-27441
Matrix: Water
Data Release Authorized: MW
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 12:53
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 100

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**3.0**	**10**	**720**
208-96-8	Acenaphthylene	3.8	10	< 10 U
83-32-9	Acenaphthene	3.0	10	< 10 U
86-73-7	Fluorene	2.8	10	< 10 U
85-01-8	**Phenanthrene**	**2.8**	**10**	**8.4 J**
120-12-7	Anthracene	3.5	10	< 10 U
206-44-0	Fluoranthene	3.5	10	< 10 U
129-00-0	Pyrene	4.3	10	< 10 U
56-55-3	Benzo(a)anthracene	4.0	10	< 10 U
218-01-9	Chrysene	3.2	10	< 10 U
205-99-2	Benzo(b)fluoranthene	4.2	10	< 10 U
207-08-9	Benzo(k)fluoranthene	4.3	10	< 10 U
50-32-8	Benzo(a)pyrene	4.3	10	< 10 U
193-39-5	Indeno(1,2,3-cd)pyrene	4.2	10	< 10 U
53-70-3	Dibenz(a,h)anthracene	5.4	10	< 10 U
191-24-2	Benzo(g,h,i)perylene	3.9	10	< 10 U
TOTBFA	Total Benzofluoranthenes	4.1	10	< 10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	D
d10-2-Methylnaphthalene	D
d14-Dibenzo(a,h)anthracene	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-2GW**
Extraction Method: SW3520C **SAMPLE**

Lab Sample ID: ZO83C
LIMS ID: 14-27442
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 13:18
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 100

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**3.0**	**10**	**1,600 E**
208-96-8	**Acenaphthylene**	**3.8**	**10**	**7.8 J**
83-32-9	**Acenaphthene**	**3.0**	**10**	**7.2 J**
86-73-7	Fluorene	2.8	10	< 10 U
85-01-8	**Phenanthrene**	**2.8**	**10**	**7.2 J**
120-12-7	Anthracene	3.5	10	< 10 U
206-44-0	Fluoranthene	3.5	10	< 10 U
129-00-0	Pyrene	4.3	10	< 10 U
56-55-3	Benzo(a)anthracene	4.0	10	< 10 U
218-01-9	Chrysene	3.2	10	< 10 U
205-99-2	Benzo(b)fluoranthene	4.2	10	< 10 U
207-08-9	Benzo(k)fluoranthene	4.3	10	< 10 U
50-32-8	Benzo(a)pyrene	4.3	10	< 10 U
193-39-5	Indeno(1,2,3-cd)pyrene	4.2	10	< 10 U
53-70-3	Dibenz(a,h)anthracene	5.4	10	< 10 U
191-24-2	Benzo(g,h,i)perylene	3.9	10	< 10 U
TOTBFA	Total Benzofluoranthenes	4.1	10	< 10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	D
d10-2-Methylnaphthalene	D
d14-Dibenzo(a,h)anthracene	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-2GW**
Extraction Method: SW3520C **DILUTION**

Lab Sample ID: ZO83C
LIMS ID: 14-27442
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 19:13
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 300

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**8.9**	**30**	**1,800**
208-96-8	Acenaphthylene	11	30	< 30 U
83-32-9	Acenaphthene	9.1	30	< 30 U
86-73-7	Fluorene	8.3	30	< 30 U
85-01-8	Phenanthrene	8.4	30	< 30 U
120-12-7	Anthracene	11	30	< 30 U
206-44-0	Fluoranthene	10	30	< 30 U
129-00-0	Pyrene	13	30	< 30 U
56-55-3	Benzo(a)anthracene	12	30	< 30 U
218-01-9	Chrysene	9.6	30	< 30 U
205-99-2	Benzo(b)fluoranthene	13	30	< 30 U
207-08-9	Benzo(k)fluoranthene	13	30	< 30 U
50-32-8	Benzo(a)pyrene	13	30	< 30 U
193-39-5	Indeno(1,2,3-cd)pyrene	13	30	< 30 U
53-70-3	Dibenz(a,h)anthracene	16	30	< 30 U
191-24-2	Benzo(g,h,i)perylene	12	30	< 30 U
TOTBFA	Total Benzofluoranthenes	12	30	< 30 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	D
d10-2-Methylnaphthalene	D
d14-Dibenzo(a,h)anthracene	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-11GW**
Extraction Method: SW3520C **SAMPLE**

Lab Sample ID: ZO83E
LIMS ID: 14-27444
Matrix: Water
Data Release Authorized: MW
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/14/15 22:20
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**0.030**	**0.10**	**7.0**
208-96-8	Acenaphthylene	0.038	0.10	< 0.10 U
83-32-9	Acenaphthene	0.030	0.10	< 0.10 U
86-73-7	Fluorene	0.028	0.10	< 0.10 U
85-01-8	Phenanthrene	0.028	0.10	< 0.10 U
120-12-7	Anthracene	0.035	0.10	< 0.10 U
206-44-0	Fluoranthene	0.035	0.10	< 0.10 U
129-00-0	Pyrene	0.043	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.040	0.10	< 0.10 U
218-01-9	Chrysene	0.032	0.10	< 0.10 U
205-99-2	Benzo(b)fluoranthene	0.042	0.10	< 0.10 U
207-08-9	Benzo(k)fluoranthene	0.043	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.043	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.042	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.054	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.039	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.041	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	72.0%
d10-2-Methylnaphthalene	50.7%
d14-Dibenzo(a,h)anthracene	82.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-12GW**
Extraction Method: SW3520C **SAMPLE**
Page 1 of 1

Lab Sample ID: ZO83F
LIMS ID: 14-27445
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 11:12
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 10.0

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**0.30**	**1.0**	**550 ES**
208-96-8	**Acenaphthylene**	**0.38**	**1.0**	**2.6**
83-32-9	**Acenaphthene**	**0.30**	**1.0**	**2.4**
86-73-7	**Fluorene**	**0.28**	**1.0**	**5.8**
85-01-8	**Phenanthrene**	**0.28**	**1.0**	**8.2**
120-12-7	**Anthracene**	**0.35**	**1.0**	**0.97 J**
206-44-0	**Fluoranthene**	**0.35**	**1.0**	**0.83 J**
129-00-0	**Pyrene**	**0.43**	**1.0**	**0.74 J**
56-55-3	Benzo(a)anthracene	0.40	1.0	< 1.0 U
218-01-9	Chrysene	0.32	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	0.42	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	0.43	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	0.43	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.42	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	0.54	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	0.39	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	0.41	1.0	< 1.0 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	70.0%
d10-2-Methylnaphthalene	56.7%
d14-Dibenzo(a,h)anthracene	56.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-12GW**
Extraction Method: SW3520C **DILUTION**

Lab Sample ID: ZO83F
LIMS ID: 14-27445
Matrix: Water
Data Release Authorized: MW
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 15:00
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 50.0

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**1.5**	**5.0**	**890 E**
208-96-8	Acenaphthylene	1.9	5.0	< 5.0 U
83-32-9	Acenaphthene	1.5	5.0	< 5.0 U
86-73-7	**Fluorene**	**1.4**	**5.0**	**5.2**
85-01-8	**Phenanthrene**	**1.4**	**5.0**	**8.0**
120-12-7	Anthracene	1.8	5.0	< 5.0 U
206-44-0	Fluoranthene	1.7	5.0	< 5.0 U
129-00-0	Pyrene	2.2	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	2.0	5.0	< 5.0 U
218-01-9	Chrysene	1.6	5.0	< 5.0 U
205-99-2	Benzo(b)fluoranthene	2.1	5.0	< 5.0 U
207-08-9	Benzo(k)fluoranthene	2.2	5.0	< 5.0 U
50-32-8	Benzo(a)pyrene	2.1	5.0	< 5.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	2.1	5.0	< 5.0 U
53-70-3	Dibenz(a,h)anthracene	2.7	5.0	< 5.0 U
191-24-2	Benzo(g,h,i)perylene	1.9	5.0	< 5.0 U
TOTBFA	Total Benzofluoranthenes	2.0	5.0	< 5.0 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	D
d10-2-Methylnaphthalene	D
d14-Dibenzo(a,h)anthracene	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-12GW**
Extraction Method: SW3520C **DILUTION2**

Lab Sample ID: ZO83F
LIMS ID: 14-27445
Matrix: Water
Data Release Authorized: MW
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 15:50
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 150

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**4.4**	**15**	**920**
208-96-8	Acenaphthylene	5.7	15	< 15 U
83-32-9	Acenaphthene	4.6	15	< 15 U
86-73-7	Fluorene	4.2	15	< 15 U
85-01-8	Phenanthrene	4.2	15	< 15 U
120-12-7	Anthracene	5.3	15	< 15 U
206-44-0	Fluoranthene	5.2	15	< 15 U
129-00-0	Pyrene	6.5	15	< 15 U
56-55-3	Benzo(a)anthracene	6.0	15	< 15 U
218-01-9	Chrysene	4.8	15	< 15 U
205-99-2	Benzo(b)fluoranthene	6.3	15	< 15 U
207-08-9	Benzo(k)fluoranthene	6.5	15	< 15 U
50-32-8	Benzo(a)pyrene	6.4	15	< 15 U
193-39-5	Indeno(1,2,3-cd)pyrene	6.3	15	< 15 U
53-70-3	Dibenz(a,h)anthracene	8.0	15	< 15 U
191-24-2	Benzo(g,h,i)perylene	5.8	15	< 15 U
TOTBFA	Total Benzofluoranthenes	6.2	15	< 15 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	D
d10-2-Methylnaphthalene	D
d14-Dibenzo(a,h)anthracene	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-2GW**
Extraction Method: SW3520C **SAMPLE**

Lab Sample ID: ZO83G
LIMS ID: 14-27446
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 11:37
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 10.0

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**0.30**	**1.0**	**620 ES**
208-96-8	**Acenaphthylene**	**0.38**	**1.0**	**5.0**
83-32-9	**Acenaphthene**	**0.30**	**1.0**	**6.7**
86-73-7	**Fluorene**	**0.28**	**1.0**	**3.4**
85-01-8	**Phenanthrene**	**0.28**	**1.0**	**5.2**
120-12-7	Anthracene	0.35	1.0	< 1.0 U
206-44-0	**Fluoranthene**	**0.35**	**1.0**	**0.56 J**
129-00-0	Pyrene	0.43	1.0	< 1.0 U
56-55-3	Benzo(a)anthracene	0.40	1.0	< 1.0 U
218-01-9	Chrysene	0.32	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	0.42	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	0.43	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	0.43	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.42	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	0.54	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	0.39	1.0	< 1.0 U
TOTBFA	Total Benzofluoranthenes	0.41	1.0	< 1.0 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	56.7%
d10-2-Methylnaphthalene	56.7%
d14-Dibenzo(a,h)anthracene	16.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-2GW**
Extraction Method: SW3520C **DILUTION**

Lab Sample ID: ZO83G
LIMS ID: 14-27446
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 15:25
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 50.0

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**1.5**	**5.0**	**1,200 ES**
208-96-8	**Acenaphthylene**	**1.9**	**5.0**	**4.6 J**
83-32-9	**Acenaphthene**	**1.5**	**5.0**	**5.8**
86-73-7	**Fluorene**	**1.4**	**5.0**	**3.2 J**
85-01-8	**Phenanthrene**	**1.4**	**5.0**	**5.1**
120-12-7	Anthracene	1.8	5.0	< 5.0 U
206-44-0	Fluoranthene	1.7	5.0	< 5.0 U
129-00-0	Pyrene	2.2	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	2.0	5.0	< 5.0 U
218-01-9	Chrysene	1.6	5.0	< 5.0 U
205-99-2	Benzo(b)fluoranthene	2.1	5.0	< 5.0 U
207-08-9	Benzo(k)fluoranthene	2.2	5.0	< 5.0 U
50-32-8	Benzo(a)pyrene	2.1	5.0	< 5.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	2.1	5.0	< 5.0 U
53-70-3	Dibenz(a,h)anthracene	2.7	5.0	< 5.0 U
191-24-2	Benzo(g,h,i)perylene	1.9	5.0	< 5.0 U
TOTBFA	Total Benzofluoranthenes	2.0	5.0	< 5.0 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	D
d10-2-Methylnaphthalene	D
d14-Dibenzo(a,h)anthracene	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-2GW**
Extraction Method: SW3520C **DILUTION2**

Lab Sample ID: ZO83G
LIMS ID: 14-27446
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 16:16
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 150

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**4.4**	**15**	**1,400**
208-96-8	Acenaphthylene	5.7	15	< 15 U
83-32-9	Acenaphthene	4.6	15	< 15 U
86-73-7	Fluorene	4.2	15	< 15 U
85-01-8	Phenanthrene	4.2	15	< 15 U
120-12-7	Anthracene	5.3	15	< 15 U
206-44-0	Fluoranthene	5.2	15	< 15 U
129-00-0	Pyrene	6.5	15	< 15 U
56-55-3	Benzo(a)anthracene	6.0	15	< 15 U
218-01-9	Chrysene	4.8	15	< 15 U
205-99-2	Benzo(b)fluoranthene	6.3	15	< 15 U
207-08-9	Benzo(k)fluoranthene	6.5	15	< 15 U
50-32-8	Benzo(a)pyrene	6.4	15	< 15 U
193-39-5	Indeno(1,2,3-cd)pyrene	6.3	15	< 15 U
53-70-3	Dibenz(a,h)anthracene	8.0	15	< 15 U
191-24-2	Benzo(g,h,i)perylene	5.8	15	< 15 U
TOTBFA	Total Benzofluoranthenes	6.2	15	< 15 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	D
d10-2-Methylnaphthalene	D
d14-Dibenzo(a,h)anthracene	D

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520

Client ID	FLN	MNP	DBA	TOT OUT
MB-121814	70.7%	52.3%	72.0%	0
LCS-121814	74.7%	55.0%	70.3%	0
LCSD-121814	75.3%	56.0%	79.7%	0
PAI-11GW	86.0%	58.7%	70.0%	0
PAI-11GW DL	96.7%	66.7%	70.0%	0
PAI-12GW	70.0%	40.0%	39.3%	0
PAI-12GW DL	D	D	D	0
PAI-2GW	D	D	D	0
PAI-2GW DL	D	D	D	0
PAI-11GW	72.0%	50.7%	82.7%	0
PAI-12GW	70.0%	56.7%	56.7%	0
PAI-12GW DL	D	D	D	0
PAI-12GW DL2	D	D	D	0
PAI-2GW	56.7%	56.7%	16.7%	0
PAI-2GW DL	D	D	D	0
PAI-2GW DL2	d	D	D	0

	LCS/MB LIMITS	QC LIMITS
(FLN) = d10-Fluoranthene	(46-121)	(46-121)
(MNP) = d10-2-Methylnaphthalene	(31-120)	(31-120)
(DBA) = d14-Dibenzo(a,h)anthracene	(10-125)	(10-125)

Prep Method: SW3520C
Log Number Range: 14-27440 to 14-27446

FORM-II SIM SW8270

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Page 1 of 1

Sample ID: LCS-121814
LAB CONTROL SAMPLE

Lab Sample ID: LCS-121814
LIMS ID: 14-27440
Matrix: Water
Data Release Authorized: MW
Reported: 01/16/15

QC Report No: Z083-Geoengineers
Project: Gas Works Park-Play Area Investigat
Event: 0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 12/18/14

Date Analyzed LCS: 01/14/15 06:11
LCSD: 01/14/15 20:13
Instrument/Analyst LCS: NT8/JZ
LCSD: NT8/JZ

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Naphthalene	1.62	3.00	54.0%	1.62	3.00	54.0%	0.0%
Acenaphthylene	1.44	3.00	48.0%	1.48	3.00	49.3%	2.7%
Acenaphthene	1.62	3.00	54.0%	1.64	3.00	54.7%	1.2%
Fluorene	1.85	3.00	61.7%	1.85	3.00	61.7%	0.0%
Phenanthrene	2.10	3.00	70.0%	2.12	3.00	70.7%	0.9%
Anthracene	1.80	3.00	60.0%	1.99	3.00	66.3%	10.0%
Fluoranthene	2.16	3.00	72.0%	2.24	3.00	74.7%	3.6%
Pyrene	2.18	3.00	72.7%	2.22	3.00	74.0%	1.8%
Benzo(a)anthracene	2.15	3.00	71.7%	2.17	3.00	72.3%	0.9%
Chrysene	2.09	3.00	69.7%	2.13	3.00	71.0%	1.9%
Benzo(b)fluoranthene	2.47	3.00	82.3%	2.64	3.00	88.0%	6.7%
Benzo(k)fluoranthene	2.29	3.00	76.3%	2.41	3.00	80.3%	5.1%
Benzo(a)pyrene	2.13	3.00	71.0%	2.12	3.00	70.7%	0.5%
Indeno(1,2,3-cd)pyrene	2.43	3.00	81.0%	2.39	3.00	79.7%	1.7%
Dibenz(a,h)anthracene	2.50	3.00	83.3%	2.51	3.00	83.7%	0.4%
Benzo(g,h,i)perylene	2.44	3.00	81.3%	2.46	3.00	82.0%	0.8%
Total Benzofluoranthenes	6.52	9.00	72.4%	6.98	9.00	77.6%	6.8%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

SIM Semivolatile Surrogate Recovery

	LCS	LCSD
d10-Fluoranthene	74.7%	75.3%
d10-2-Methylnaphthalene	55.0%	56.0%
d14-Dibenzo(a,h)anthracene	70.3%	79.7%

4B

SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

ZO83MBW1

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: ZO83

Project: GAS WORKS PARK-PLAY

Lab File ID: 01131545

Date Extracted: 12/18/14

Instrument ID: NT8

Date Analyzed: 01/14/15

Matrix: LIQUID

Time Analyzed: 0546

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	ZO53LCSW1	ZO53LCSW1	01131546	01/14/15
02	ZO53LCSDW1	ZO53LCSDW1	01141524	01/14/15
03	PAI-12GW	ZO83B	01141527	01/14/15
04	PAI-11GW	ZO83E	01141529	01/14/15
05	PAI-11GW	ZO83A	01151504	01/15/15
06	PAI-12GW	ZO83F	01151505	01/15/15
07	PAI-2GW	ZO83G	01151506	01/15/15
08	PAI-12GW	ZO83B	01151509	01/15/15
09	PAI-2GW	ZO83C	01151510	01/15/15
10	PAI-11GW	ZO83A	01151511	01/15/15
11	PAI-12GW	ZO83F	01151514	01/15/15
12	PAI-2GW	ZO83G	01151515	01/15/15
13	PAI-12GW	ZO83F	01151516	01/15/15
14	PAI-2GW	ZO83G	01151517	01/15/15
15	PAI-2GW	ZO83C	01151524	01/15/15
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

FORM IV SV

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: MB-121814**
Extraction Method: SW3520C **METHOD BLANK**

Lab Sample ID: MB-121814 QC Report No: ZO83-Geoengineers
LIMS ID: 14-27440 Project: Gas Works Park-Play Area Investigat
Matrix: Water 0186-846-01 Task 1520
Data Release Authorized: YMW Date Sampled: NA
Reported: 01/16/15 Date Received: NA

Date Extracted: 12/18/14 Sample Amount: 500 mL
Date Analyzed: 01/14/15 05:46 Final Extract Volume: 0.50 mL
Instrument/Analyst: NT8/JZ Dilution Factor: 1.00

CAS Number	Analyte	DL	LOQ	Result
91-20-3	Naphthalene	0.030	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.038	0.10	< 0.10 U
83-32-9	Acenaphthene	0.030	0.10	< 0.10 U
86-73-7	Fluorene	0.028	0.10	< 0.10 U
85-01-8	Phenanthrene	0.028	0.10	< 0.10 U
120-12-7	Anthracene	0.035	0.10	< 0.10 U
206-44-0	Fluoranthene	0.035	0.10	< 0.10 U
129-00-0	Pyrene	0.043	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.040	0.10	< 0.10 U
218-01-9	Chrysene	0.032	0.10	< 0.10 U
205-99-2	Benzo(b)fluoranthene	0.042	0.10	< 0.10 U
207-08-9	Benzo(k)fluoranthene	0.043	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.043	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.042	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.054	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.039	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.041	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	70.7%
d10-2-Methylnaphthalene	52.3%
d14-Dibenzo(a,h)anthracene	72.0%

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

Instrument ID: NT8 Project: GAS WORKS PARK-PLAY

DFTPP Injection Date: 01/05/15 DFTPP Injection Time: 1510

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	10.0 - 80.0% of mass 198	25.9
68	Less than 2.0% of mass 69	1.0 (1.9)1
69	Mass 69 relative abundance	50.7
70	Less than 2.0% of mass 69	0.3 (0.5)1
127	10.0 - 80.0% of mass 198	51.2
197	Less than 2.0% of mass 198	0.7
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.7
275	10.0 - 60.0% of mass 198	31.2
365	Greater than 1.0% of mass 198	4.12
441	0.0 - 24.0% of mass 442	8.7 (14.6)2
442	50.0 - 200.0% of mass 198	59.9
443	15.0 - 24.0% of mass 442	12.1 (20.2)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	IC250105	SDA0002-CAL4	01051502	01/05/15	1523
02	IC010105	SDA0002-CAL1	01051503	01/05/15	1548
03	IC050105	SDA0002-CAL2	01051504	01/05/15	1614
04	IC10105	SDA0002-CAL3	01051505	01/05/15	1639
05	IC50105	SDA0002-CAL5	01051506	01/05/15	1704
06	IC100105	SDA0002-CAL6	01051507	01/05/15	1730
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM V SV

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

Instrument ID: NT8 Project: GAS WORKS PARK-PLAY

DFTPP Injection Date: 01/13/15 DFTPP Injection Time: 1833

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	10.0 - 80.0% of mass 198	18.6
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	48.6
70	Less than 2.0% of mass 69	0.3 (0.7)1
127	10.0 - 80.0% of mass 198	48.3
197	Less than 2.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.7
275	10.0 - 60.0% of mass 198	31.4
365	Greater than 1.0% of mass 198	3.71
441	0.0 - 24.0% of mass 442	9.0 (16.2)2
442	50.0 - 200.0% of mass 198	55.7
443	15.0 - 24.0% of mass 442	12.0 (21.6)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	ICV0113	ICV0113	01131519	01/13/15	1846
02	ZO53MBW1	ZO53MBW1	01131545	01/14/15	0546
03	ZO53LCSW1	ZO53LCSW1	01131546	01/14/15	0611
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM V SV

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

Instrument ID: NT8 Project: GAS WORKS PARK-PLAY

DFTPP Injection Date: 01/14/15 DFTPP Injection Time: 1044

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	10.0 - 80.0% of mass 198	17.9
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	51.9
70	Less than 2.0% of mass 69	0.4 (0.7)1
127	10.0 - 80.0% of mass 198	48.8
197	Less than 2.0% of mass 198	0.3
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.6
275	10.0 - 60.0% of mass 198	31.3
365	Greater than 1.0% of mass 198	3.42
441	0.0 - 24.0% of mass 442	9.3 (15.9)2
442	50.0 - 200.0% of mass 198	58.5
443	15.0 - 24.0% of mass 442	11.7 (20.1)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	ICV0114	ICV0114	01141502	01/14/15	1057
02	ZO53LCSDW1	ZO53LCSDW1	01141524	01/14/15	2013
03	PAI-12GW	ZO83B	01141527	01/14/15	2129
04	PAI-11GW	ZO83E	01141529	01/14/15	2220
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM V SV

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

Instrument ID: NT8 Project: GAS WORKS PARK-PLAY

DFTPP Injection Date: 01/15/15 DFTPP Injection Time: 0943

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	10.0 - 80.0% of mass 198	18.6
68	Less than 2.0% of mass 69	0.1 (0.2)1
69	Mass 69 relative abundance	53.4
70	Less than 2.0% of mass 69	0.4 (0.7)1
127	10.0 - 80.0% of mass 198	49.3
197	Less than 2.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.5
275	10.0 - 60.0% of mass 198	32.6
365	Greater than 1.0% of mass 198	4.13
441	0.0 - 24.0% of mass 442	9.9 (15.8)2
442	50.0 - 200.0% of mass 198	62.6
443	15.0 - 24.0% of mass 442	12.8 (20.5)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	ICV0115	ICV0115	01151502	01/15/15	0956
02	PAI-11GW	ZO83A	01151504	01/15/15	1046
03	PAI-12GW	ZO83F	01151505	01/15/15	1112
04	PAI-2GW	ZO83G	01151506	01/15/15	1137
05	PAI-12GW	ZO83B	01151509	01/15/15	1253
06	PAI-2GW	ZO83C	01151510	01/15/15	1318
07	PAI-11GW	ZO83A	01151511	01/15/15	1344
08	PAI-12GW	ZO83F	01151514	01/15/15	1500
09	PAI-2GW	ZO83G	01151515	01/15/15	1525
10	PAI-12GW	ZO83F	01151516	01/15/15	1550
11	PAI-2GW	ZO83G	01151517	01/15/15	1616
12	PAI-2GW	ZO83C	01151524	01/15/15	1913
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

6B

SEMIVOLATILE 8270-D INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK-PLAY

Instrument ID: NT8 Calibration Date: 01/05/15

LAB FILE ID: RRF0.1=01051503 RRF0.5=01051504 RRF1 =01051505
RRF2.5=01051502 RRF5 =01051506 RRF10 =01051507

COMPOUND	RRF 0.1	RRF 0.5	RRF 1	RRF 2.5	RRF 5	RRF 10	___ RRF	%RSD /R^2
Naphthalene	1.287	1.037	1.113	1.164	1.171	1.130	1.150	7.2
2-Methylnaphthalene	0.696	0.647	0.656	0.676	0.688	0.677	0.673	2.8
1-methylnaphthalene	0.648	0.568	0.601	0.633	0.644	0.635	0.622	5.0
Biphenyl	1.613	1.336	1.461	1.458	1.497	1.427	1.465	6.2
2,6-Dimethylnaphthalene	1.126	0.951	1.049	1.067	1.127	1.098	1.070	6.2
Acenaphthylene	1.781	1.498	1.694	1.772	1.848	1.753	1.724	7.0
Acenaphthene	1.328	1.058	1.140	1.164	1.182	1.155	1.171	7.5
Dibenzofuran	1.794	1.531	1.643	1.636	1.687	1.578	1.645	5.6
1,6,7-Trimethylnaphthalene	1.087	0.974	1.024	1.062	1.129	1.096	1.062	5.2
Fluorene	1.478	1.160	1.297	1.320	1.398	1.346	1.333	8.0
Dibenzothiophene	1.146	1.001	1.029	1.071	1.053	1.020	1.053	4.9
Phenanthrene	1.202	1.023	1.069	1.073	1.102	1.062	1.088	5.6
Anthracene	1.134	0.976	1.061	1.091	1.123	1.086	1.078	5.2
Carbazole	1.020	0.888	0.942	0.986	1.014	0.999	0.975	5.2
1-Methylphenanthrene	0.961	0.774	0.829	0.878	0.898	0.905	0.874	7.4
Fluoranthene	1.538	1.197	1.268	1.293	1.317	1.283	1.316	8.8
Pyrene	1.314	1.129	1.223	1.236	1.274	1.211	1.231	5.1
Benzo(a)anthracene	1.328	1.077	1.193	1.226	1.248	1.237	1.218	6.8
Chrysene	1.289	1.088	1.165	1.181	1.186	1.183	1.182	5.4
Benzo(b)fluoranthene	1.240	1.022	1.046	1.142	1.188	1.158	1.133	7.4
Benzo(k)fluoranthene	1.300	1.045	1.104	1.189	1.210	1.223	1.178	7.7
Benzo(j)fluoranthene	1.335	1.032	1.084	1.162	1.166	1.180	1.160	8.9
Benzo(e)pyrene	1.219	1.047	1.073	1.118	1.136	1.134	1.121	5.3
Benzo(a)pyrene	1.215	0.964	1.069	1.099	1.174	1.172	1.116	8.2
Perylene	1.258	0.999	1.057	1.106	1.163	1.152	1.122	8.0
Indeno(1,2,3-cd)pyrene	1.192	1.112	1.178	1.260	1.329	1.373	1.241	7.9
Dibenzo(a,h)anthracene	0.945	0.909	0.970	1.014	1.138	1.170	1.024	10.4
Benzo(g,h,i)perylene	1.167	0.985	0.981	1.047	1.121	1.136	1.073	7.5
2-Methylnaphthalene-d10	0.784	0.640	0.682	0.694	0.721	0.720	0.707	6.8
Dibenzo(a,h)anthracene-d14	0.826	0.724	0.769	0.814	0.874	0.910	0.820	8.3

<- Outside QC limits: %RSD <20% or R^2 > 0.990

7B

SEMIVOLATILE 8270-D CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK-PLAY

Instrument ID: NT8 Cont. Calib. Date: 01/13/15

Init. Calib. Date: 01/05/15 Cont. Calib. Time: 1846

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Naphthalene	1.150	1.113	0.700	AVRG	-3.2
2-Methylnaphthalene	0.673	0.702	0.400	AVRG	4.3
Acenaphthylene	1.724	1.772	0.900	AVRG	2.8
Acenaphthene	1.171	1.177	0.900	AVRG	0.5
Dibenzofuran	1.645	1.576	0.800	AVRG	-4.2
Fluorene	1.333	1.339	0.900	AVRG	0.4
Phenanthrene	1.088	1.104	0.700	AVRG	1.5
Anthracene	1.078	1.115	0.700	AVRG	3.4
Fluoranthene	1.316	1.281	0.600	AVRG	-2.6
Pyrene	1.231	1.262	0.600	AVRG	2.5
Benzo(a)anthracene	1.218	1.209	0.800	AVRG	-0.7
Chrysene	1.182	1.148	0.700	AVRG	-2.9
Benzo(b)fluoranthene	1.133	1.166	0.700	AVRG	2.9
Benzo(k)fluoranthene	1.178	1.150	0.700	AVRG	-2.4
Benzo(j)fluoranthene	1.160	1.090	0.010	AVRG	-6.0
Benzo(a)pyrene	1.116	1.099	0.700	AVRG	-1.5
Indeno(1,2,3-cd)pyrene	1.241	1.348	0.500	AVRG	8.6
Dibenzo(a,h)anthracene	1.024	1.134	0.400	AVRG	10.7
Benzo(g,h,i)perylene	1.073	1.166	0.500	AVRG	8.7
1-methylnaphthalene	0.622	0.663	0.010	AVRG	6.6
Perylene	1.122	1.096	0.010	AVRG	-2.3
2-Methylnaphthalene-d10	0.707	0.711	0.010	AVRG	0.6
Dibenzo(a,h)anthracene-d14	0.820	0.959	0.010	AVRG	17.0
Fluoranthene-d10	1.185	1.179	0.010	AVRG	-0.5

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII SV-1

7B

SEMIVOLATILE 8270-D CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK-PLAY

Instrument ID: NT8 Cont. Calib. Date: 01/14/15

Init. Calib. Date: 01/05/15 Cont. Calib. Time: 1057

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Naphthalene	1.150	1.077	0.700	AVRG	-6.3
2-Methylnaphthalene	0.673	0.697	0.400	AVRG	3.6
Acenaphthylene	1.724	1.820	0.900	AVRG	5.6
Acenaphthene	1.171	1.195	0.900	AVRG	2.0
Dibenzofuran	1.645	1.642	0.800	AVRG	-0.2
Fluorene	1.333	1.370	0.900	AVRG	2.8
Phenanthrene	1.088	1.086	0.700	AVRG	-0.2
Anthracene	1.078	1.099	0.700	AVRG	1.9
Fluoranthene	1.316	1.297	0.600	AVRG	-1.4
Pyrene	1.231	1.231	0.600	AVRG	0.0
Benzo(a)anthracene	1.218	1.210	0.800	AVRG	-0.6
Chrysene	1.182	1.141	0.700	AVRG	-3.5
Benzo(b)fluoranthene	1.133	1.174	0.700	AVRG	3.6
Benzo(k)fluoranthene	1.178	1.196	0.700	AVRG	1.5
Benzo(j)fluoranthene	1.160	1.131	0.010	AVRG	-2.5
Benzo(a)pyrene	1.116	1.106	0.700	AVRG	-0.9
Indeno(1,2,3-cd)pyrene	1.241	1.246	0.500	AVRG	0.4
Dibenzo(a,h)anthracene	1.024	1.045	0.400	AVRG	2.0
Benzo(g,h,i)perylene	1.073	1.077	0.500	AVRG	0.4
1-methylnaphthalene	0.622	0.675	0.010	AVRG	8.5
Perylene	1.122	1.108	0.010	AVRG	-1.2
2-Methylnaphthalene-d10	0.707	0.697	0.010	AVRG	-1.4
Dibenzo(a,h)anthracene-d14	0.820	0.893	0.010	AVRG	8.9
Fluoranthene-d10	1.185	1.194	0.010	AVRG	0.8

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII SV-1

7B

SEMIVOLATILE 8270-D CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK-PLAY

Instrument ID: NT8 Cont. Calib. Date: 01/15/15

Init. Calib. Date: 01/05/15 Cont. Calib. Time: 0956

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Naphthalene	1.150	1.107	0.700	AVRG	-3.7
2-Methylnaphthalene	0.673	0.686	0.400	AVRG	1.9
Acenaphthylene	1.724	1.794	0.900	AVRG	4.1
Acenaphthene	1.171	1.195	0.900	AVRG	2.0
Dibenzofuran	1.645	1.657	0.800	AVRG	0.7
Fluorene	1.333	1.358	0.900	AVRG	1.9
Phenanthrene	1.088	1.092	0.700	AVRG	0.4
Anthracene	1.078	1.077	0.700	AVRG	-0.1
Fluoranthene	1.316	1.318	0.600	AVRG	0.2
Pyrene	1.231	1.257	0.600	AVRG	2.1
Benzo(a)anthracene	1.218	1.211	0.800	AVRG	-0.6
Chrysene	1.182	1.158	0.700	AVRG	-2.0
Benzo(b)fluoranthene	1.133	1.153	0.700	AVRG	1.8
Benzo(k)fluoranthene	1.178	1.200	0.700	AVRG	1.9
Benzo(j)fluoranthene	1.160	1.191	0.010	AVRG	2.7
Benzo(a)pyrene	1.116	1.134	0.700	AVRG	1.6
Indeno(1,2,3-cd)pyrene	1.241	1.262	0.500	AVRG	1.7
Dibenzo(a,h)anthracene	1.024	1.076	0.400	AVRG	5.1
Benzo(g,h,i)perylene	1.073	1.074	0.500	AVRG	0.1
1-methylnaphthalene	0.622	0.658	0.010	AVRG	5.8
Perylene	1.122	1.151	0.010	AVRG	2.6
2-Methylnaphthalene-d10	0.707	0.705	0.010	AVRG	-0.3
Dibenzo(a,h)anthracene-d14	0.820	0.880	0.010	AVRG	7.3
Fluoranthene-d10	1.185	1.193	0.010	AVRG	0.7

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII SV-1

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK-PLAY

Ical Midpoint ID: 01051502 Ical Date: 01/05/15

Instrument ID: NT8 Cont. Cal Date: 01/13/15

		IS1(NPT) AREA #	RT #	IS2(ANT) AREA #	RT #	IS3(PHN) AREA #	RT #
	ICAL MIDPT	387555	4.71	258447	6.97	456948	8.98
	UPPER LIMIT	775110		516894		913896	
	LOWER LIMIT	193778		129224		228474	
	CCAL	393798	4.60	262932	6.86	448261	8.87
	UPPER LIMIT		5.10		7.36		9.37
	LOWER LIMIT		4.10		6.36		8.37
01	ZO53MBW1	419217	4.60	279466	6.86	476274	8.88
02	ZO53LCSW1	436630	4.60	287344	6.86	489369	8.88
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

FORM VIII SV-1

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC | Client: GEOENGINEERS

ARI Job No: ZO83 | Project: GAS WORKS PARK-PLAY

Ical Midpoint ID: 01051502 | Ical Date: 01/05/15

Instrument ID: NT8 | Cont. Cal Date: 01/13/15

		IS4(CRY) AREA #	RT #	IS5(PRY) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	492500	13.72	485582	17.52		
	UPPER LIMIT	985000		971164			
	LOWER LIMIT	246250		242791			
	CCAL	482100	13.53	484352	17.30		
	UPPER LIMIT		14.03		17.80		
	LOWER LIMIT		13.03		16.80		
01	ZO53MBW1	515142	13.54	531933	17.31		
02	ZO53LCSW1	549867	13.54	523541	17.31		
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

IS4 = Chrysene-d12
IS5 = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

FORM VIII SV-2

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK-PLAY

Ical Midpoint ID: 01051502 Ical Date: 01/05/15

Instrument ID: NT8 Cont. Cal Date: 01/14/15

		IS1(NPT) AREA #	RT #	IS2(ANT) AREA #	RT #	IS3(PHN) AREA #	RT #
	ICAL MIDPT	387555	4.71	258447	6.97	456948	8.98
	UPPER LIMIT	775110		516894		913896	
	LOWER LIMIT	193778		129224		228474	
	CCAL	432716	4.59	285009	6.85	514676	8.85
	UPPER LIMIT		5.09		7.35		9.35
	LOWER LIMIT		4.09		6.35		8.35
01	ZO53LCSDW1	412151	4.58	272668	6.85	470766	8.85
02	PAI-12GW	567151	4.62	280508	6.85	477822	8.86
03	PAI-11GW	409023	4.58	268621	6.84	469699	8.85
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

FORM VIII SV-1

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK-PLAY

Ical Midpoint ID: 01051502 Ical Date: 01/05/15

Instrument ID: NT8 Cont. Cal Date: 01/14/15

		IS4(CRY) AREA #	RT #	IS5(PRY) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	492500	13.72	485582	17.52		
	UPPER LIMIT	985000		971164			
	LOWER LIMIT	246250		242791			
	CCAL	561143	13.51	529600	17.27		
	UPPER LIMIT		14.01		17.77		
	LOWER LIMIT		13.01		16.77		
01	ZO53LCSDW1	528600	13.51	439033	17.27		
02	PAI-12GW	521133	13.51	476306	17.27		
03	PAI-11GW	526438	13.51	447864	17.27		
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

IS4 = Chrysene-d12
IS5 = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

FORM VIII SV-2

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK-PLAY

Ical Midpoint ID: 01051502 Ical Date: 01/05/15

Instrument ID: NT8 Cont. Cal Date: 01/15/15

		IS1(NPT) AREA #	RT #	IS2(ANT) AREA #	RT #	IS3(PHN) AREA #	RT #
	ICAL MIDPT	387555	4.71	258447	6.97	456948	8.98
	UPPER LIMIT	775110		516894		913896	
	LOWER LIMIT	193778		129224		228474	
	CCAL	363073	4.59	238241	6.84	432531	8.85
	UPPER LIMIT		5.09		7.34		9.35
	LOWER LIMIT		4.09		6.34		8.35
01	PAI-11GW	363272	4.59	237344	6.85	416854	8.85
02	PAI-12GW	343408	4.59	231116	6.85	408112	8.85
03	PAI-2GW	360545	4.59	226931	6.85	409808	8.85
04	PAI-12GW	374861	4.59	255614	6.85	440531	8.85
05	PAI-2GW	367031	4.59	249775	6.85	436879	8.85
06	PAI-11GW	337490	4.58	221210	6.84	398918	8.85
07	PAI-12GW	343987	4.59	234514	6.85	401104	8.85
08	PAI-2GW	358006	4.59	232699	6.85	409774	8.85
09	PAI-12GW	335506	4.59	227404	6.85	383109	8.85
10	PAI-2GW	321887	4.59	221517	6.84	388662	8.86
11	PAI-2GW	357090	4.59	231980	6.84	410852	8.85
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

FORM VIII SV-1

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO83 Project: GAS WORKS PARK-PLAY

Ical Midpoint ID: 01051502 Ical Date: 01/05/15

Instrument ID: NT8 Cont. Cal Date: 01/15/15

		IS4(CRY) AREA #	RT #	IS5(PRY) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	492500	13.72	485582	17.52		
	UPPER LIMIT	985000		971164			
	LOWER LIMIT	246250		242791			
	CCAL	471355	13.51	427266	17.27		
	UPPER LIMIT		14.01		17.77		
	LOWER LIMIT		13.01		16.77		
01	PAI-11GW	475787	13.51	415447	17.27		
02	PAI-12GW	455368	13.51	395935	17.27		
03	PAI-2GW	461071	13.51	402246	17.26		
04	PAI-12GW	491457	13.51	439555	17.27		
05	PAI-2GW	485949	13.51	429245	17.27		
06	PAI-11GW	440283	13.51	383338	17.26		
07	PAI-12GW	451486	13.51	401801	17.27		
08	PAI-2GW	463810	13.51	409681	17.27		
09	PAI-12GW	429797	13.50	382491	17.26		
10	PAI-2GW	440799	13.50	381278	17.26		
11	PAI-2GW	462829	13.50	404412	17.26		
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

IS4 = Chrysene-d12
IS5 = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

FORM VIII SV-2

Metals Analysis
Report and Summary QC Forms

ARI Job ID: ZO83

Cover Page

INORGANIC ANALYSIS DATA PACKAGE

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO83

CLIENT ID	ARI ID	ARI LIMS ID	REPREP
PAI-11GW	ZO83A	14-27440	
PAI-11GWD	ZO83ADUP	14-27440	
PAI-11GWS	ZO83ASPK	14-27440	
PAI-12GW	ZO83B	14-27441	
PBW	ZO83MB1	14-27441	
LCSW	ZO83MB1SPK	14-27441	
PAI-2GW	ZO83C	14-27442	

Were ICP interelement corrections applied ?	Yes/No	YES
Were ICP background corrections applied ?	Yes/No	YES
If yes - were raw data generated before application of background corrections ?	Yes/No	NO

Comments: _____

THIS DATA PACKAGE HAS BEEN REVIEWED AND AUTHORIZED FOR RELEASE BY:

Signature: _____ Name: Jay Kuhn

Date: 12/30/14 Title: Inorganics Director

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PAI-11GW
SAMPLE

Lab Sample ID: ZO83A
LIMS ID: 14-27440
Matrix: Water
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/L	Q
6010C	12/17/14	6010C	12/26/14	**7440-38-2**	**Arsenic**	0.003	0.05	**0.12**	
6010C	12/17/14	6010C	12/26/14	**7440-70-2**	**Calcium**	0.011	0.05	**60.5**	
6010C	12/17/14	6010C	12/26/14	**7439-89-6**	**Iron**	0.008	0.05	**0.39**	
6010C	12/17/14	6010C	12/26/14	**7439-95-4**	**Magnesium**	0.010	0.05	**14.2**	
6010C	12/17/14	6010C	12/26/14	**7439-96-5**	**Manganese**	0.0003	0.001	**0.483**	
6010C	12/17/14	6010C	12/26/14	**7440-09-7**	**Potassium**	0.07	0.5	**4.4**	
6010C	12/17/14	6010C	12/26/14	**7440-23-5**	**Sodium**	0.01	0.5	**20.9**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Detection Limit

Results reported below the LOQ are for statistical purposes only and have not been evaluated by either an analyst or data reviewer.

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PAI-12GW
SAMPLE

Lab Sample ID: ZO83B
LIMS ID: 14-27441
Matrix: Water
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/L	Q
6010C	12/17/14	6010C	12/26/14	**7440-38-2**	**Arsenic**	0.003	0.05	**2.03**	
6010C	12/17/14	6010C	12/26/14	**7440-70-2**	**Calcium**	0.011	0.05	**63.6**	
6010C	12/17/14	6010C	12/26/14	**7439-89-6**	**Iron**	0.008	0.05	**3.66**	
6010C	12/17/14	6010C	12/26/14	**7439-95-4**	**Magnesium**	0.010	0.05	**4.87**	
6010C	12/17/14	6010C	12/26/14	**7439-96-5**	**Manganese**	0.0003	0.001	**0.200**	
6010C	12/17/14	6010C	12/26/14	**7440-09-7**	**Potassium**	0.07	0.5	**2.0**	
6010C	12/17/14	6010C	12/26/14	**7440-23-5**	**Sodium**	0.01	0.5	**15.1**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Detection Limit

Results reported below the LOQ are for statistical purposes only and have not been evaluated by either an analyst or data reviewer.

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PAI-2GW
SAMPLE

Lab Sample ID: ZO83C
LIMS ID: 14-27442
Matrix: Water
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/L	Q
6010C	12/17/14	6010C	12/26/14	**7440-38-2**	**Arsenic**	0.02	0.2	**50.2**	
6010C	12/17/14	6010C	12/26/14	**7440-70-2**	**Calcium**	0.06	0.2	**45.9**	
6010C	12/17/14	6010C	12/26/14	**7439-89-6**	**Iron**	0.04	0.2	**0.8**	
6010C	12/17/14	6010C	12/26/14	**7439-95-4**	**Magnesium**	0.05	0.2	**5.6**	
6010C	12/17/14	6010C	12/26/14	**7439-96-5**	**Manganese**	0.0014	0.005	**0.120**	
6010C	12/17/14	6010C	12/26/14	**7440-09-7**	**Potassium**	0.3	2	**3**	
6010C	12/17/14	6010C	12/26/14	**7440-23-5**	**Sodium**	0.1	2	**166**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Detection Limit

Results reported below the LOQ are for statistical purposes only and have not been evaluated by either an analyst or data reviewer.

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PAI-11GW
MATRIX SPIKE

Lab Sample ID: ZO83A
LIMS ID: 14-27440
Matrix: Water
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010C	120	2,290	2,000	108%	
Calcium	6010C	60,500	70,400	10,000	99.0%	H
Iron	6010C	390	2,400	2,000	100%	
Magnesium	6010C	14,200	24,800	10,000	106%	
Manganese	6010C	483	954	500	94.2%	
Potassium	6010C	4,350	14,600	10,000	102%	
Sodium	6010C	20,900	31,000	10,000	101%	

Reported in µg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PAI-11GW
DUPLICATE

Lab Sample ID: ZO83A
LIMS ID: 14-27440
Matrix: Water
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010C	120	120	0.0%	+/- 50	L
Calcium	6010C	60,500	61,000	0.8%	+/- 20%	
Iron	6010C	390	390	0.0%	+/- 20%	
Magnesium	6010C	14,200	14,200	0.0%	+/- 20%	
Manganese	6010C	483	483	0.0%	+/- 20%	
Potassium	6010C	4,350	4,370	0.5%	+/- 20%	
Sodium	6010C	20,900	21,100	1.0%	+/- 20%	

Reported in µg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: ZO83LCS
LIMS ID: 14-27441
Matrix: Water
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	2180	2000	109%	
Calcium	6010C	9910	10000	99.1%	
Iron	6010C	2050	2000	102%	
Magnesium	6010C	10200	10000	102%	
Manganese	6010C	485	500	97.0%	
Potassium	6010C	10100	10000	101%	
Sodium	6010C	10100	10000	101%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: ZO83MB
LIMS ID: 14-27441
Matrix: Water
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO83-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/L	Q
6010C	12/17/14	6010C	12/26/14	7440-38-2	Arsenic	0.003	0.05	0.05	U
6010C	12/17/14	6010C	12/26/14	7440-70-2	Calcium	0.011	0.05	0.05	U
6010C	12/17/14	6010C	12/26/14	7439-89-6	Iron	0.008	0.05	0.05	U
6010C	12/17/14	6010C	12/26/14	7439-95-4	Magnesium	0.010	0.05	0.05	U
6010C	12/17/14	6010C	12/26/14	7439-96-5	Manganese	0.0003	0.001	0.001	U
6010C	12/17/14	6010C	12/26/14	7440-09-7	Potassium	0.07	0.5	0.5	U
6010C	12/17/14	6010C	12/26/14	**7440-23-5**	**Sodium**	0.01	0.50	**0.15**	**J**

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Detection Limit

Results reported below the LOQ are for statistical purposes only and have not been evaluated by either an analyst or data reviewer.

Calibration Verification

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO83

UNITS:ug/L

ANALYTE	EL	M	RUN	ICVTV	ICV	%R	CCVTV	CCV1	%R	CCV2	%R	CCV3	%R	CCV4	%R	CCV5	%R
Arsenic	AS	ICP	IP122671	2000.0	2047.58	**102.4**	2000.0	2054.14	**102.7**	2052.94	**102.6**	2056.18	**102.8**				
Calcium	CA	ICP	IP122671	2000.0	2002.75	**100.1**	2000.0	1989.73	**99.5**	1986.28	**99.3**	1978.80	**98.9**				
Iron	FE	ICP	IP122671	2000.0	2082.66	**104.1**	2000.0	2066.14	**103.3**	2035.73	**101.8**	2030.86	**101.5**				
Magnesium	MG	ICP	IP122671	2000.0	1999.58	**100.0**	2000.0	1997.19	**99.9**	1998.36	**99.9**	1984.39	**99.2**				
Manganese	MN	ICP	IP122671	1000.0	987.78	**98.8**	1000.0	976.10	**97.6**	966.38	**96.6**	968.38	**96.8**				
Potassium	K	ICP	IP122671	20000.0	20262.32	**101.3**	20000.0	20110.05	**100.6**	20059.90	**100.3**	20100.01	**100.5**				
Sodium	NA	ICP	IP122671	50000.0	51488.78	**103.0**	50000.0	50999.11	**102.0**	51142.82	**102.3**	50731.04	**101.5**				

Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (1)

CRDL Standard

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

UNITS: ug/L

SDG: Z083

ANALYTE	EL	M	RUN	CRA/I TV	CR-1	%R	CR-2	%R	CR-3	%R	CR-4	%R	CR-5	%R	CR-6	%R
Arsenic	AS	ICP	IP122671	50.0	51.18	**102.4**										
Calcium	CA	ICP	IP122671	50.0	44.91	**89.8**										
Iron	FE	ICP	IP122671	50.0	51.08	**102.2**										
Magnesium	MG	ICP	IP122671	50.0	52.11	**104.2**										
Manganese	MN	ICP	IP122671	1.0	1.07	**107.0**										
Potassium	K	ICP	IP122671	500.0	522.16	**104.4**										
Sodium	NA	ICP	IP122671	500.0	461.73	**92.3**										

Control Limits: no control limits have been established by the EPA at this time.

Calibration Blanks

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

UNITS: ug/L

SDG: Z083

ANALYTE	EL	METH	RUN	CRDL	IDL	ICB	C	CCB1	C	CCB2	C	CCB3	C	CCB4	C	CCB5	C
Arsenic	AS	ICP	IP122671	10.0	50.0	50.0	U	50.0	U	50.0	U	50.0	U				
Calcium	CA	ICP	IP122671	5000.0	50.0	50.0	U	50.0	U	50.0	U	50.0	U				
Iron	FE	ICP	IP122671	100.0	50.0	50.0	U	50.0	U	50.0	U	50.0	U				
Magnesium	MG	ICP	IP122671	5000.0	50.0	50.0	U	50.0	U	50.0	U	50.0	U				
Manganese	MN	ICP	IP122671	15.0	1.0	1.0	U	1.0	U	1.0	U	1.0	U				
Potassium	K	ICP	IP122671	5000.0	500.0	500.0	U	500.0	U	500.0	U	500.0	U				
Sodium	NA	ICP	IP122671	5000.0	500.0	500.0	U	500.0	U	500.0	U	500.0	U				

ICP Interference Check Sample

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO83

ICS SOURCE: I.V.

RUNID: IP122671

INSTRUMENT ID: OPTIMA ICP 2

UNITS: ug/L

ANALYTE	ICSA TV	ICSAB TV	ICSA1	ICSAB1	%R	ICSA2	ICSAB2	%R	ICSA3	ICSAB3	%R
Aluminum	200000	200000	201994.8	203508.1	**101.8**						
Antimony		1000	14.7	1068.8	**106.9**						
Arsenic		1000	25.4	1079.3	**107.9**						
Barium		1000	-0.4	1064.7	**106.5**						
Beryllium		1000	0.1	1027.6	**102.8**						
Boron			-3.8	-3.7							
Cadmium		1000	0.7	1049.5	**105.0**						
Calcium	100000	100000	103106.5	103136.0	**103.1**						
Chromium		1000	-1.4	1051.7	**105.2**						
Cobalt		1000	2.5	990.9	**99.1**						
Copper		1000	0.0	1073.4	**107.3**						
Iron	200000	200000	201409.4	202663.2	**101.3**						
Lead		1000	-12.5	1014.0	**101.4**						
Magnesium	100000	100000	104937.3	100979.2	**101.0**						
Manganese		1000	0.2	990.2	**99.0**						
Molybdenum			3.7	3.2							
Nickel		1000	0.6	1004.7	**100.5**						
Potassium			5.1	22.0							
Selenium		1000	37.1	1095.5	**109.6**						
Silicon			4.6	4.1							
Silver		1000	-1.0	1108.2	**110.8**						
Sodium			-41.4	-47.9							
Strontium			3.0	3.0							
Thallium		1000	2.1	978.9	**97.9**						
Tin			-20.1	-21.3							
Titanium			0.8	0.5							
Vanadium		1000	-1.3	1020.8	**102.1**						
Zinc		1000	2.7	1004.9	**100.5**						

ZO83_SDG.xls 6/16

IDLs and ICP Linear Ranges

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO83 UNITS: ug/L

ANALYTE	EL	METH	INSTRUMENT	WAVELENTH (nm)	GFA BACK-GROUND	CLP CRDL	RL	RL DATE	ICP LINEAR RANGE (ug/L)	ICP LR DATE
Arsenic	AS	ICP	OPTIMA ICP 2	197.20		10	50.0	4/1/2012	30000.0	6/10/2014
Calcium	CA	ICP	OPTIMA ICP 2	317.93		5000	50.0	4/1/2012	500000.0	6/10/2014
Iron	FE	ICP	OPTIMA ICP 2	259.94		100	50.0	4/1/2012	250000.0	6/10/2014
Magnesium	MG	ICP	OPTIMA ICP 2	279.08		5000	50.0	4/1/2012	500000.0	6/10/2014
Manganese	MN	ICP	OPTIMA ICP 2	257.61		15	1.0	4/1/2012	30000.0	6/10/2014
Potassium	K	ICP	OPTIMA ICP 2	766.49		5000	500.0	4/1/2012	500000.0	6/10/2014
Sodium	NA	ICP	OPTIMA ICP 2	589.00		5000	500.0	4/1/2012	5000000.0	6/10/2014

ICP Interelement Correction Factors

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: Z083

IEC DATE: 10/27/2014

INSTRUMENT ID: OPTIMA ICP 2

ANALYTE	WAVELENGTH	AL	AS	BA	BE	CA	CD	CO	CR	CU	FE
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	14.0198100	0.0000000	0.0000000
Arsenic	188.98	0.0000000	0.0000000	0.0000000	0.0000000	0.0764100	0.0000000	-1.0860250	1.6016350	0.0000000	0.0000000
Barium	233.53	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.1911190	0.0000000	0.0000000	0.1532030
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0098370	0.0000000	0.0000000
Boron	249.67	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	2.1785010	0.0000000	0.0000000	0.0000000
Cadmium	228.80	0.0000000	5.7686950	0.0000000	0.0000000	0.0000000	0.0000000	0.1134910	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0105610	0.0000000	0.0000000	0.0000000	0.0000000	-0.0413720
Cobalt	228.62	0.0000000	0.0000000	0.0853470	0.0000000	0.0000000	0.0000000	0.0000000	-0.0421260	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0021980	0.0000000	-0.1622490	-0.0152760	0.0000000	-0.0447290
Iron	273.96	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.9508650	0.0000000	0.0000000
Lead	220.35	-0.2096680	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-1.7516130	1.5325290	0.0499030
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.1119060	0.0000000	-1.6746270	-1.1710960	0.0000000	0.6610200
Manganese	257.61	0.0060150	0.0000000	0.0000000	0.0000000	0.0041750	0.0000000	0.0137770	0.0000000	0.0000000	-0.0046620
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0156160	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.5290750	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-3.5634780	0.0000000	-0.5863590	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.80	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	6.1573050	0.4310930	0.0000000	-0.1254120
Tin	189.93	0.0000000	0.0000000	0.0000000	0.0000000	-0.1475120	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0797880	0.0000000	0.0000000	0.1965610	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-3.7864850	0.0000000	0.0538250
Zinc	206.20	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

ICP Interelement Correction Factors

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: Z083

IEC DATE: 10/27/2014

INSTRUMENT ID: OPTIMA ICP 2

ANALYTE	WAVELENGTH	MG	MN	MO	NI	PB	SB	TI	TL	V	ZN
Aluminum	308.22	0.0000000	0.0000000	15.2105350	0.0000000	0.0000000	0.0000000	1.9181250	0.0000000	14.9692830	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.6574750	0.0000000	-4.0497020	0.0000000
Arsenic	188.98	0.0000000	0.0000000	3.6569730	0.0000000	0.0000000	0.0000000	-26.2017890	0.0000000	0.0000000	0.0000000
Barium	233.53	0.0000000	0.0000000	0.0000000	0.1112510	0.0000000	0.0000000	0.0000000	0.0000000	0.2137080	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0122940	0.0000000	0.2849470	0.0000000
Boron	249.67	0.0000000	0.0000000	-1.1347080	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	228.80	0.0000000	0.0000000	0.0000000	-0.9151470	0.0000000	0.0000000	0.0000000	0.0000000	0.0642140	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.1073910	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.3457620	0.0000000
Cobalt	228.62	0.0000000	0.0000000	-0.1331780	0.1621790	0.0000000	0.0000000	1.7359160	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0055170	0.0000000	0.3194440	0.0000000	0.0000000	0.0000000	0.1761040	0.0000000	0.0000000	0.0000000
Iron	273.96	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	7.5009230	0.0000000
Lead	220.35	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	-5.2575470	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	-0.1944900	0.0000000	0.0000000	0.0000000	-0.0205160	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.5357680	0.0000000	0.4509940	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.6217450	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	-0.2780320	0.0000000
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	257.1408130	0.0000000	0.0000000	281.4212140
Thallium	190.80	0.0000000	0.0000000	-1.4387970	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	3.7649150	0.0000000
Tin	189.93	0.0000000	0.0000000	0.0000000	0.0000000	-0.0427690	-0.5371860	-0.2280960	0.0000000	0.0000000	0.0000000
Titanium	334.90	0.0000000	0.0000000	0.9643590	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	-0.1516390	-0.4437580	0.0000000	0.0000000	0.0000000	0.5348410	0.0000000	0.0000000	0.0000000
Zinc	206.20	0.0000000	0.0000000	0.2610130	0.0000000	-0.0494060	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Z083 : 091221

Preparation Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO83

ANALYSIS METHOD: ICP

ARI PREP CODE: WMN

PREPDATE: 12/17/2014

CLIENT ID	ARI ID	MASS (g)	INITIAL VOLUME (mL)	FINAL VOLUME (mL)
PAI-11GW	ZO83A	0.000	50.0	50.0
PAI-11GWD	ZO83ADUP	0.000	50.0	50.0
PAI-11GWS	ZO83ASPK	0.000	50.0	50.0
PAI-12GW	ZO83B	0.000	50.0	50.0
PAI-2GW	ZO83C	0.000	50.0	50.0
PBW	ZO83MB1	0.000	50.0	50.0
LCSW	ZO83MB1SPK	0.000	50.0	50.0

Analysis Run Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play | INSTRUMENT ID: OPTIMA ICP 2 | START DATE: 12/26/2014

SDG: ZO83 | RUNID: IP122671 | METHOD: ICP | END DATE: 12/26/2014

CLIENT ID	ARI ID	DIL.	TIME	%R	AG	AL	AS	B	BA	BE	CA	CD	CO	CR	CU	FE	HG	K	MG	MN	MO	NA	NI	PB	SB	SE	SI	SN	TI	TL	U	V	ZN
S0	S0	1.00	09160				X				X					X		X	X	X		X											
S2	S2	1.00	09200																	X													
S3	S3	1.00	09220				X																										
S4	S4	1.00	09243																														
S5	S5	1.00	09264								X					X		X	X			X											
ICV	ICV	1.00	09292				X				X					X		X	X	X		X											
ICB	ICB	1.00	09351				X				X					X		X	X	X		X											
CRI	CRII	1.00	09392				X				X					X		X	X	X		X											
ICSA	ICSAI	1.00	09434				X				X					X		X	X	X		X											
ICSAB	ICSABI	1.00	09475				X				X					X		X	X	X		X											
CCV	CCV1	1.00	09532				X				X					X		X	X	X		X											
CCB	CCB1	1.00	09573				X				X					X		X	X	X		X											
ZZZZZZ	ZP16MB2	1.00	10014																														
ZZZZZZ	ZP15MB1	1.00	10060																														
PAI-2GW	ZO83C	5.00	10101				X				X					X		X	X	X		X											
ZZZZZZ	ZZZZZZ	5.00	10180																														
ZZZZZZ	ZP15ADUP	5.00	10275																														
ZZZZZZ	ZP15A	5.00	10364																														
ZZZZZZ	ZP15ASPK	5.00	10451																														
ZZZZZZ	ZP49B	2.00	10570																														
ZZZZZZ	ZP16MB2SPK	1.00	11014																														
ZZZZZZ	ZP15MB1SPK	1.00	11054																														
CCV	CCV2	1.00	11094				X				X					X		X	X	X		X											
CCB	CCB2	1.00	11135				X				X					X		X	X	X		X											
PBW	ZO83MB1	1.00	11180				X				X					X		X	X	X		X											
ZZZZZZ	ZP16VDUP	1.00	11222																														
ZZZZZZ	ZP16V	1.00	11263																														
ZZZZZZ	ZP16VSPK	1.00	11305																														
PAI-11GWD	ZO83ADUP	1.00	11345				X				X					X		X	X	X		X											
PAI-11GW	ZO83A	1.00	11390				X				X					X		X	X	X		X											
PAI-11GWS	ZO83ASPK	1.00	11432				X				X					X		X	X	X		X											
ZZZZZZ	ZP15B	1.00	11472																														
PAI-12GW	ZO83B	1.00	11514				X				X					X		X	X	X		X											
LCSW	ZO83MB1SPK	1.00	11555				X				X					X		X	X	X		X											
CCV	CCV3	1.00	11595				X				X					X		X	X	X		X											

FORM XIV

Analysis Run Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play | INSTRUMENT ID: OPTIMA ICP 2 | START DATE: 12/26/2014

SDG: Z083 | RUNID: IP122671 | METHOD: ICP | END DATE: 12/26/2014

CLIENT ID	ARI ID	DIL.	TIME	%R	AG	AL	AS	B	BA	BE	CA	CD	CO	CR	CU	FE	HG	K	MG	MN	MO	NA	NI	PB	SB	SE	SI	SN	TI	TL	U	V	ZN
CCB	CCB3	1.00	12040				X				X					X		X	X	X		X											

Z083:091221

General Chemistry Analysis
Report and Summary QC Forms

ARI Job ID: ZO83

SAMPLE RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Groundwater
Data Release Authorized:
Reported: 01/20/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Client ID: PAI-11GW
ARI ID: 14-27440 Z083A

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	12/17/14 121714#1	SM 2320	mg/L CaCO3	1.0	244
Carbonate	12/17/14	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	12/17/14	SM 2320	mg/L CaCO3	1.0	244
Hydroxide	12/17/14	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Total Dissolved Solids	12/18/14 121814#1	SM2540C	mg/L	5.0	154
Ferrous Iron	12/12/14 121214#1	SM3500 FeD	mg/L	0.040	0.388
Chloride	12/17/14 121714#1	EPA 300.0	mg/L	0.5	7.6
N-Nitrate	12/13/14 121314#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
Sulfate	12/17/14 121714#1	EPA 300.0	mg/L	0.5	1.4
Sulfide	12/17/14 121714#1	SM4500-S2D	mg/L	0.100	1.66

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Groundwater
Data Release Authorized:
Reported: 01/20/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Client ID: PAI-12GW
ARI ID: 14-27441 Z083B

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	12/17/14 121714#1	SM 2320	mg/L CaCO3	1.0	74.4
Carbonate	12/17/14	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	12/17/14	SM 2320	mg/L CaCO3	1.0	74.4
Hydroxide	12/17/14	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Total Dissolved Solids	12/18/14 121814#1	SM2540C	mg/L	5.0	302
Ferrous Iron	12/12/14 121214#1	SM3500 FeD	mg/L	0.080	3.72
Chloride	12/17/14 121714#1	EPA 300.0	mg/L	0.5	3.2
N-Nitrate	12/13/14 121314#1	EPA 300.0	mg-N/L	0.1	1.1
Sulfate	12/17/14 121714#1	EPA 300.0	mg/L	5.0	122
Sulfide	12/17/14 121714#1	SM4500-S2D	mg/L	2.50	38.5

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Groundwater
Data Release Authorized:
Reported: 01/20/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Client ID: PAI-2GW
ARI ID: 14-27442 Z083C

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	12/17/14 121714#1	SM 2320	mg/L CaCO3	1.0	306
Carbonate	12/17/14	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	12/17/14	SM 2320	mg/L CaCO3	1.0	306
Hydroxide	12/17/14	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Total Dissolved Solids	12/18/14 121814#1	SM2540C	mg/L	10.0	801
Ferrous Iron	12/12/14 121214#1	SM3500 FeD	mg/L	0.040	0.551
Chloride	12/17/14 121714#1	EPA 300.0	mg/L	2.0	8.5
N-Nitrate	12/13/14 121314#1	EPA 300.0	mg-N/L	1.0	< 1.0 U
Sulfate	12/17/14 121714#1	EPA 300.0	mg/L	5.0	202
Sulfide	12/17/14 121714#1	SM4500-S2D	mg/L	10.0	84.4

RL Analytical reporting limit
U Undetected at reported detection limit

MS/MSD RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Groundwater
Data Release Authorized:
Reported: 01/20/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: Z083A Client ID: PAI-11GW							
Ferrous Iron	SM3500 FeD	12/12/14	mg/L	0.388	0.788	0.400	100.0%
Sulfide	SM4500-S2D	12/17/14	mg/L	1.66	3.94	0.500	456.0%

REPLICATE RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Groundwater
Data Release Authorized:
Reported: 01/20/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: Z083A Client ID: PAI-11GW						
Alkalinity	SM 2320	12/17/14	mg/L CaCO3	244	242	0.8%
Carbonate	SM 2320	12/17/14	mg/L CaCO3	< 1.0	< 1.0	NA
Bicarbonate	SM 2320	12/17/14	mg/L CaCO3	244	242	0.8%
Hydroxide	SM 2320	12/17/14	mg/L CaCO3	< 1.0	< 1.0	NA
Ferrous Iron	SM3500 FeD	12/12/14	mg/L	0.388	0.392	1.0%
Sulfide	SM4500-S2D	12/17/14	mg/L	1.66	1.50	10.1%
ARI ID: Z083B Client ID: PAI-12GW						
Alkalinity	SM 2320	12/17/14	mg/L CaCO3	74.4	73.8	0.8%
Carbonate	SM 2320	12/17/14	mg/L CaCO3	< 1.0	< 1.0	NA
Bicarbonate	SM 2320	12/17/14	mg/L CaCO3	74.4	73.8	0.8%
Hydroxide	SM 2320	12/17/14	mg/L CaCO3	< 1.0	< 1.0	NA

LAB CONTROL RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Groundwater
Data Release Authorized:
Reported: 01/20/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Total Dissolved Solids SM2540C	ICVL	12/18/14	mg/L	488	500	97.6%
Ferrous Iron SM3500 FeD	ICVL	12/12/14	mg/L	0.500	0.500	100.0%
Sulfide SM4500-S2D	ICVL	12/17/14	mg/L	0.521	0.501	104.0%

METHOD BLANK RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Groundwater
Data Release Authorized: [signature]
Reported: 01/20/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Total Dissolved Solids	SM2540C	12/18/14	mg/L	< 5.0 U	
Ferrous Iron	SM3500 FeD	12/12/14	mg/L	< 0.040 U	
Chloride	EPA 300.0	12/17/14	mg/L	< 0.1 U	
N-Nitrate	EPA 300.0	12/13/14	mg-N/L	< 0.1 U	
Sulfate	EPA 300.0	12/17/14	mg/L	< 0.1 U	
Sulfide	SM4500-S2D	12/17/14	mg/L	< 0.050 U	

STANDARD REFERENCE RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Groundwater
Data Release Authorized:
Reported: 01/20/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Alkalinity	SM 2320	12/17/14	mg/L CaCO3	61.7	61.7	100.0%
ERA #P114506		12/17/14		58.5	61.7	94.8%
Chloride	EPA 300.0	12/17/14	mg/L	2.8	3.0	93.3%
ERA #290313						
N-Nitrate	EPA 300.0	12/13/14	mg-N/L	2.8	3.0	93.3%
ERA #320614						
Sulfate	EPA 300.0	12/17/14	mg/L	3.0	3.0	100.0%
ERA 131013						

SAMPLE RESULTS-CONVENTIONALS
ZO83-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 01/06/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Client ID: PAI-12-8.5-9.0
ARI ID: 14-27447 ZO83H

Analyte	Date	Method	Units	RL	Sample
Preserved Total Solids	12/16/14 121614#1	SM2540G	Percent	0.01	77.58
Sulfide	12/22/14 122214#1	SM4500-S2D	mg/kg	1.28	4.40

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 01/06/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Client ID: PAI-12-13.5-14.0
ARI ID: 14-27448 Z083I

Analyte	Date	Method	Units	RL	Sample
Preserved Total Solids	12/16/14 121614#1	SM2540G	Percent	0.01	63.72
Sulfide	12/22/14 122214#1	SM4500-S2D	mg/kg	1.57	5.46

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 01/06/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Client ID: PAI-2-17.5-18.0
ARI ID: 14-27449 Z083J

Analyte	Date	Method	Units	RL	Sample
Preserved Total Solids	12/16/14 121614#1	SM2540G	Percent	0.01	66.47
Sulfide	12/22/14 122214#1	SM4500-S2D	mg/kg	300	2,880

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 01/06/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Client ID: PAI-2-19.0-19.5
ARI ID: 14-27450 Z083K

Analyte	Date	Method	Units	RL	Sample
Preserved Total Solids	12/16/14 121614#1	SM2540G	Percent	0.01	84.94
Sulfide	12/22/14 122214#1	SM4500-S2D	mg/kg	235	918

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 01/06/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Client ID: PAI-3-33.5-34.0
ARI ID: 14-27451 Z083L

Analyte	Date	Method	Units	RL	Sample
Preserved Total Solids	12/16/14 121614#1	SM2540G	Percent	0.01	61.60
Sulfide	12/22/14 122214#1	SM4500-S2D	mg/kg	16.1	105

RL Analytical reporting limit
U Undetected at reported detection limit

MS/MSD RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 01/06/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: Z083H Client ID: PAI-12-8.5-9.0						
Sulfide	12/22/14	mg/kg	4.40	126	176	69.1%

REPLICATE RESULTS-CONVENTIONALS
ZO83-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 01/06/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: 12/12/14
Date Received: 12/12/14

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: ZO83H Client ID: PAI-12-8.5-9.0					
Sulfide	12/22/14	mg/kg	4.40	< 1.26	NA

LAB CONTROL RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 01/06/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide SM4500-S2D	PREP	12/22/14	mg/kg	7.13	6.95	102.6%

METHOD BLANK RESULTS-CONVENTIONALS
Z083-Geoengineers

ANALYTICAL RESOURCES INCORPORATED

Matrix: Soil
Data Release Authorized:
Reported: 01/06/15

Project: Gas Works Park-Play Area Inv
Event: 0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank	QC ID
Preserved Total Solids	12/16/14	Percent	< 0.01 U	ICB
Sulfide	12/22/14	mg/kg	< 1.00 U	PREP

Subcontracted Results
Metals (Sub) Analyzed by Applied Speciation & Consulting

ARI Job ID: ZO83

APPLIED SPECIATION AND CONSULTING, LLC

18804 Northcreek Parkway Bothell, WA 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

January 15, 2015

Cheronne Oreiro
Analytical Resources Inc.
4611 S. 134th Place Suite 100
Tukwila, WA 98168
(206) 695-6200

Re: SDG A141217S1 (Gas Works Park – Play Area Investigation)

Ms. Oreiro,

Attached is the report associated with six (6) aqueous samples submitted for arsenite, arsenate, monomethylarsonic acid, and dimethylarsinic acid quantitation on December 17, 2014. The samples were received on the day of submittal in a sealed cooler at 0.3°C. Arsenite, arsenate, monomethylarsonic acid, and dimethylarsinic acid quantitation was performed via ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). Any issues associated with the analyses are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Ben Wozniak

Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Cheronne Oreiro
Analytical Resources Inc.
4611 S. 134th Place Suite 100
Tukwila, WA 98168

January 15, 2015

1. Sample Reception

Six (6) aqueous samples were submitted for arsenite, arsenate, monomethylarsonic acid, and dimethylarsinic acid quantitation on December 17, 2014. The samples were received on the day of submittal in a sealed cooler at 0.3°C, as indicated on the attached chain of custody (COC) forms.

The samples were received in a laminar flow clean hood, void of trace metals contamination and ultra-violet radiation, and assigned discrete sample identifiers. All samples were then stored in a secure, monitored refrigerator (maintained at a temperature of 4°C) until the analyses could occur.

It should be noted that one aqueous sample, identified as PAI-10GW, was included in the sample shipment but was not originally listed on any of the COC forms submitted with the samples. The client was contacted and submitted a new COC for this sample. Both the original COCs and this additional COC have been included in this report.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are also monitored for contamination to account for any biases associated with the sample results.

Arsenic Speciation Analysis by IC-ICP-CRC-MS Each sample submitted in an evacuated vial containing an EDTA preservative (provided by Applied Speciation and Consulting) was analyzed as received, without further chemical preservation.

3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimum interval of every ten analytical runs.

Arsenic Speciation Analysis by IC-ICP-CRC-MS All samples for arsenite, arsenate, monomethylarsonic acid, and dimethylarsinic acid quantitation were analyzed by ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS) on December 17-18, 2014. Aliquots of each sample are injected onto an anion exchange column and are mobilized by an alkaline (pH > 7) gradient. The eluting arsenic species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (CRC) containing a specific collision gas. Polyatomic interferences, due to their inherently larger size, collide more frequently with the collision gas and therefore may be separated from the analyte of interest via kinetic energy discrimination (KED). A solid-state detector detects ions transmitted through the mass analyzer on the basis of their mass-to-charge ratio (m/z), and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

No significant analytical issues were encountered during the requested analyses. All quality control parameters associated with these samples were within acceptance limits.

It should be noted that several additional arsenic-containing species were detected in the submitted samples during the speciation analyses. While the identities of these species could not be confirmed at this time, the estimated concentration of arsenic associated with each detected species has been provided for each sample in the attached results table. Applied Speciation and Consulting may be able to pursue identification of these additional species upon client request.

The estimated method detection limits (eMDLs) for arsenite, arsenate, and dimethylarsinic acid are generated from replicate analyses of the lowest standard in the calibration curve. Not all arsenic species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks may be artificially biased low for individual arsenic species.

The eMDL for monomethylarsonic acid is calculated using the average eMDL of the species present in the calibration curve (*i.e.*, arsenite, arsenate, and dimethylarsinic acid). The ICP-CRC-MS determinative method exhibits a species-independent response, which is confirmed by the analysis of ICV standards for each species. Monomethylarsonic acid is not included

in the calibration standards, CCV standards, and matrix spikes due to impurities which would bias the results for other arsenic species.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Ben Wozniak

Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Arsenic Speciation Results for ARI
SDG: A141217S1
Contact: Cheronne Oreiro

Report Date: January 15, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

ARI Sample ID	Date Sampled	Dilution	As(III)	As(V)	MMAs	DMAs	Unk 8.4*	Unk 9.2*	Unk 10.2*	Unk 13.1*
14-27440-ZO83A	12/12/14	50	28.9	1.74	< 0.21 U	< 0.23 U	14.2	2.94	52.5	7.60
14-27441-ZO83B	12/12/14	500	702	141	< 2.1 U	< 2.3 U	144	7.9 J	120	19.4
14-27442-ZO83C	12/12/14	25000	42900	1200	< 110 U	< 120 U	1100	620	10500	680
14-27173-ZO53A	12/11/14	1000	482	15.4 J	< 4.2 U	< 4.6 U	102	128	2240	8.2 J
14-27518-ZP15A	12/15/14	50000	39700	790 J	< 210 U	< 230 U	3920	1210	19400	18700
14-27519-ZP15B	12/15/14	100	37.7	6.41	< 0.42 U	< 0.46 U	< 0.42 U	< 0.42 U	< 0.42 U	1.65 J

All results reflect the applied dilution and are reported in µg/L

U = Sample concentration is less than the estimated Method Detection Limit (eMDL)

J = Sample concentration is between the eMDL and the Reporting Limit (RL)

* Unknown arsenical species; please see narrative

Arsenic Speciation Results for ARI
SDG. A141217S1
Contact: Cheronne Oreiro

Report Date: January 15, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blanks

Analyte	Units	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL* at 1x	RL at 1x	eMDL* at 50x	RL at 50x
As(III)	µg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.020	0.13	1.0
As(V)	µg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.020	0.27	1.0
MMAs	µg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.020	0.21	1.0
DMAs	µg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.021	0.23	1.0

eMDL = Estimated Method Detection Limit; RL = Reporting Limit
*Please see narrative regarding eMDL calculations

Quality Control Summary - Certified Reference Materials

Analyte	Units	CRM	True Value	Result	Recovery
As(III)	µg/L	ICV	5.000	5.079	101.6
As(V)	µg/L	ICV	5.000	4.736	94.7
MMAs	µg/L	ICV	4.610	4.680	101.5
DMAs	µg/L	ICV	3.625	3.682	101.6

Arsenic Speciation Results for ARI
SDG: A141217S1
Contact: Cheronne Oreiro

Report Date: January 15, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Matrix Duplicate

Analyte	Units	Sample ID	Rep 1	Rep 2	Mean	RPD
As(III)	µg/L	14-27519-ZP15B	37.72	37.36	37.54	1.0
As(V)	µg/L	14-27519-ZP15B	6.41	6.24	6.33	2.8
MMAs	µg/L	14-27519-ZP15B	< 0.42 U	< 0.42 U	NC	NC
DMAs	µg/L	14-27519-ZP15B	< 0.46 U	< 0.46 U	NC	NC

NC = Value was not calculated due to one or more concentrations below the eMDL

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte	Units	Sample ID	MS Spike Conc	MS Result	MS Recovery	MSD Spike Conc	MSD Result	MSD Recovery	RPD
As(III)	µg/L	14-27519-ZP15B	100.0	139.5	102.0	100.0	138.2	100.7	0.9
As(V)	µg/L	14-27519-ZP15B	100.0	105.3	99.0	100.0	103.9	97.6	1.3
DMAs	µg/L	14-27519-ZP15B	104.9	106.9	101.9	104.9	105.3	100.4	1.5

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/15/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: ZP16

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

ARI Client: Geoengineers
Project ID: Gas Works Park-Play Area Investigat
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around:
Email Results (Y/N): **Yes**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
14-27414-ZP16F	PAI-10-31.5-32.0	12/11/14 12:30	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As,Fe					
14-27415-ZP16G	PAI-11-12.0-12.5	12/11/14 13:50	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As,Fe					
14-27416-ZP16H	PAI-11-22-22.5	12/11/14 14:20	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As,Fe					

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/17/14	Time 1330
Received by	Company ACS	Date 12/17/14	Time 13:34

@ 0.3°C

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/15/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: Z083

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

Analytical Protocol: In-house
Special Instructions:

ARI Client: Geoengineers
Project ID: Gas Works Park-Play Area Investigat
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Requested Turn Around:
Email Results (Y/N): **email**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
14-27440-Z083A	PAI-11GW	12/12/14 10:00	Water	1	Metals (Sub)
Special Instructions: Speciated As 6800					
14-27441-Z083B	PAI-12GW	12/12/14 12:30	Water	1	Metals (Sub)
Special Instructions: Speciated As 6800					
14-27442-Z083C	PAI-2GW	12/12/14 14:00	Water	1	Metals (Sub)
Special Instructions: Speciated As 6800					
14-27447-Z083H	PAI-12-8.5-9.0	12/12/14 09:55	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					
14-27448-Z083I	PAI-12-13.5-14.0	12/12/14 10:15	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					
14-27449-Z083J	PAI-2-17.5-18.0	12/12/14 12:00	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					
14-27450-Z083K	PAI-2-19.0-19.5	12/12/14 11:50	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					

Sample not included on COC. 12/17/14
• PAI-10GW

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/17/14	Time 1330
Received by	Company ACS	Date 12/17/14	Time 13:34 @ 0.3°

Subcontractor Custody Form - Z083
Page 1 of 10

Z083:00152

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/15/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: Z083

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads

ARI Client: Geoengineers
Project ID: 0186-846-01 Task 1520

ARI Sample ID	Client Sample ID/ Add'l Sample ID	Sampled	Matrix	Bottles	Analyses
14-27451-Z083L	PAI-3-33.5-34.0	12/12/14 14:30	Soil	1	Metals (Sub)

Special Instructions: Sequential Extraction As, Fe

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/12/14	Time 1330
Received by	Company ACS	Date 12/12/14	Time 13:34

@ 0.3°

Subcontractor Custody Form - Z083
Page 2 of 2

Z083:00153

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/16/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: ZP15

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

ARI Client: Geoengineers
Project ID: Gas Works Park-Paly Area Investigat
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around:
Email Results (Y/N): **email**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
14-27518-ZP15A	MW-36D-141215	12/15/14 10:00	Water	1	Metals (Sub)
Special Instructions: Arsenic Speciation 6800					
14-27519-ZP15B	MW-36S-141215	12/15/14 11:30	Water	1	Metals (Sub)
Special Instructions: Arsenic Speciation 6800					

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/17/14	Time 1330
Received by	Company ACS	Date 12/17/14	Time 13:34

@ 0.3°

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/12/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: Z053

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

ARI Client: Geoengineers
Project ID: 0186-846-01 Task 1520
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around:
Email Results (Y/N): **email**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
14-27173-Z053A	PAI-10GW	12/11/14 15:00	Water	1	Arsenic Speciation

Special Instructions: None

Carrier		Airbill		Date	
Relinquished by	Company		Date		Time
Received by	Company		Date		Time

APPLIED SPECIATION AND CONSULTING, LLC

18804 Northcreek Parkway Bothell, WA, 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

January 20, 2015

Cheronne Oreiro
Analytical Resources Inc.
4611 S. 134th Place Suite 100
Tukwila, WA 98168
(206) 695-6200

Re: SDG A141217S2 (Gas Works Park – Play Area Investigation)

Ms. Oreiro,

Attached is the report associated with eight (8) soil core samples submitted for arsenic sequential extraction on December 17, 2014. The samples were received on the day of submittal in a sealed cooler at 0.3°C. Any issues associated with the analyses are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Ben Wozniak

Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Cheronne Oreiro
Analytical Resources Inc.
4611 S. 134th Place Suite 100
Tukwila, WA 98168

January 20, 2015

1. Sample Reception

Eight (8) soil core samples were submitted for arsenic sequential extraction on December 17, 2014. The samples were received on the day of submittal in a sealed cooler at 0.3°C, as indicated on the attached chain of custody (COC) forms.

All samples were received in a laminar flow clean hood, void of trace metals contamination and ultra-violet radiation. Immediately upon reception all samples were designated discrete sample identifiers and then stored in a secure, monitored freezer (maintained at a temperature of $\leq$ -10°C) until sample preparation could be performed.

2. Sample Preparation

All applied water for dilutions and sample reagents are monitored for contamination to account for any biases associated with the sample results.

Arsenic Sequential Extraction (Wenzel et al.) A sequential extraction method, based on Wenzel *et al.*, was employed for correlation between arsenic and different substrate properties. In accordance with the client's request, all handling of the submitted soil core samples and preparation of the first four extracts (*i.e.,* all extracts except the HNO_3 / H_2O_2 extraction) was performed in a glove box maintained under anoxic conditions.

A known mass of each soil sample was transferred to polypropylene vial and an aliquot of 0.05 M $(NH_4)_2SO_4$ was added to each vial. Each vial was capped and shaken on an inverting shaker for 4 hours at room temperature at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis, an aliquot of reagent water was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The reagent water rinse was decanted and discarded.

An aliquot of 0.05 M $NH_4H_2PO_4$ was added to each vial. Each vial was capped and shaken on an inverting shaker for 16 hours at room temperature at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis, an aliquot of reagent water was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The reagent water rinse was decanted and discarded.

All sample vials were wrapped in aluminum foil to prevent photo-oxidation and then an aliquot of 0.2M ammonium oxalate buffer (pH=3.25) was added to each vial. Each vial was capped and shaken on an inverting shaker for 4 hours at room temperature at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis, an aliquot of 0.2M ammonium oxalate buffer was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

An aliquot of 0.2M ammonium oxalate buffer with 0.1M ascorbic acid was added to each vial. The vials were then placed in a hotblock digestion apparatus at 96°C for 30 minutes.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis, an aliquot of 0.2M ammonium oxalate buffer with 0.1M ascorbic acid was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

The residual solid pellets remaining in the vials were then digested via with aliquots of concentrated HNO_3 and H_2O_2 (in accordance with EPA Method 3050B).

In accordance with the client's request, all extracts were analyzed for iron in addition to arsenic.

3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimum interval of every ten analytical runs.

Arsenic and Iron Quantitation by ICP-QQQ-MS All sample fractions for arsenic and iron quantitation were analyzed by inductively coupled plasma triple quadrupole mass

spectrometry (ICP-QQQ-MS). An aliquot of each sample extract is introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through an initial quadrupole (Q1), which filters the target masses prior to their entrance into a second chamber. The second chamber contains specific reactive gasses or collision gasses that preferentially react either with interfering ions of the same target mass to charge ratios (m/z) or with the target analyte, producing an entirely different mass to charge ratio (m/z) which can then be differentiated from the initial interferences. The ions then exit the collision/reaction chamber into the mass analyzer (Q2). A solid-state detector detects ions transmitted through the mass analyzer, on the basis of their mass-to-charge ratio (m/z), and the resulting current is processed by a data handling system.

Total Solids Analysis A known mass of each sample was placed into a pre-weighed pan, and the combined mass of the sample and pan was recorded. All samples were then placed into a convection oven maintained at a temperature of 60°C. After drying for a minimum of twelve (12) hours, all samples were briefly cooled and reweighed. The total solids percentage of each sample was calculated by dividing the weight of the dried sample by the weight of the original sample.

4. Analytical Discussion

No significant issues were encountered with the requested analyses. All quality control parameters associated with the samples were within acceptance limits.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,

Ben Wozniak

Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

14-27414-ZP16F

Fraction	Fraction Description	As	Fe
0.05 M $(NH_4)_2SO_4$	Non-specifically adsorbed arsenic	4.68	17.1
0.05 M $(NH_4)H_2PO_4$	Specifically-sorbed arsenic	1.60	159
0.2M $(NH_4)_2C_2O_4$	Amorphous Fe oxyhydroxide	1.11	1480
0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	Crystalline Fe oxyhydroxide	0.493	715
HNO_3 / H_2O_2	Residual	3.71	6640

All analyte results are reported in µg/g on a dry weight (DW) basis

U = Sample concentration is less than the estimated Method Detection Limit (eMDL)

J = Sample concentration is between the eMDL and the Reporting Limit (RL)

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

14-27415-ZP16G

Fraction	Fraction Description	As	Fe
0.05 M $(NH_4)_2SO_4$	Non-specifically adsorbed arsenic	0.556 J	208
0.05 M $(NH_4)H_2PO_4$	Specifically-sorbed arsenic	2.03	508
0.2M $(NH_4)_2C_2O_4$	Amorphous Fe oxyhydroxide	1.47	2430
0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	Crystalline Fe oxyhydroxide	0.565 J	731
HNO_3 / H_2O_2	Residual	19.2	12700

All analyte results are reported in µg/g on a dry weight (DW) basis

U = Sample concentration is less than the estimated Method Detection Limit (eMDL)

J = Sample concentration is between the eMDL and the Reporting Limit (RL)

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

14-27416-ZP16H

Fraction	Fraction Description	As	Fe
0.05 M $(NH_4)_2SO_4$	Non-specifically adsorbed arsenic	1.93	36.8
0.05 M $(NH_4)H_2PO_4$	Specifically-sorbed arsenic	3.75	392
0.2M $(NH_4)_2C_2O_4$	Amorphous Fe oxyhydroxide	0.790	1170
0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	Crystalline Fe oxyhydroxide	0.845	834
HNO_3 / H_2O_2	Residual	35.4	13800

All analyte results are reported in µg/g on a dry weight (DW) basis

U = Sample concentration is less than the estimated Method Detection Limit (eMDL)

J = Sample concentration is between the eMDL and the Reporting Limit (RL)

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

14-27447-ZO83H

Fraction	Fraction Description	As	Fe
0.05 M $(NH_4)_2SO_4$	Non-specifically adsorbed arsenic	18.5	35.0
0.05 M $(NH_4)H_2PO_4$	Specifically-sorbed arsenic	40.6	19.2 J
0.2M $(NH_4)_2C_2O_4$	Amorphous Fe oxyhydroxide	108	542
0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	Crystalline Fe oxyhydroxide	26.8	1380
HNO_3 / H_2O_2	Residual	93.0	1630

All analyte results are reported in µg/g on a dry weight (DW) basis

U = Sample concentration is less than the estimated Method Detection Limit (eMDL)

J = Sample concentration is between the eMDL and the Reporting Limit (RL)

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

14-27448-ZO83I

Fraction	Fraction Description	As	Fe
0.05 M $(NH_4)_2SO_4$	Non-specifically adsorbed arsenic	20.3	5.6 J
0.05 M $(NH_4)H_2PO_4$	Specifically-sorbed arsenic	908	32.6
0.2M $(NH_4)_2C_2O_4$	Amorphous Fe oxyhydroxide	4790	19200
0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	Crystalline Fe oxyhydroxide	2620	4300
HNO_3 / H_2O_2	Residual	750	4870

All analyte results are reported in µg/g on a dry weight (DW) basis

U = Sample concentration is less than the estimated Method Detection Limit (eMDL)

J = Sample concentration is between the eMDL and the Reporting Limit (RL)

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

14-27449-ZO83J

Fraction	Fraction Description	As	Fe
0.05 M $(NH_4)_2SO_4$	Non-specifically adsorbed arsenic	354	55.1
0.05 M $(NH_4)H_2PO_4$	Specifically-sorbed arsenic	180	255
0.2M $(NH_4)_2C_2O_4$	Amorphous Fe oxyhydroxide	24.7	718
0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	Crystalline Fe oxyhydroxide	78.5	532
HNO_3 / H_2O_2	Residual	9110	6120

All analyte results are reported in µg/g on a dry weight (DW) basis

U = Sample concentration is less than the estimated Method Detection Limit (eMDL)

J = Sample concentration is between the eMDL and the Reporting Limit (RL)

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

14-27450-ZO83K

Fraction	Fraction Description	As	Fe
0.05 M $(NH_4)_2SO_4$	Non-specifically adsorbed arsenic	7.86	12.1 J
0.05 M $(NH_4)H_2PO_4$	Specifically-sorbed arsenic	8.07	180
0.2M $(NH_4)_2C_2O_4$	Amorphous Fe oxyhydroxide	3.10	799
0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	Crystalline Fe oxyhydroxide	2.89	491
HNO_3 / H_2O_2	Residual	37.6	11900

All analyte results are reported in µg/g on a dry weight (DW) basis

U = Sample concentration is less than the estimated Method Detection Limit (eMDL)

J = Sample concentration is between the eMDL and the Reporting Limit (RL)

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

14-27451-ZO83L

Fraction	Fraction Description	As	Fe
0.05 M $(NH_4)_2SO_4$	Non-specifically adsorbed arsenic	6.84	4.6 J
0.05 M $(NH_4)H_2PO_4$	Specifically-sorbed arsenic	0.832	338
0.2M $(NH_4)_2C_2O_4$	Amorphous Fe oxyhydroxide	0.721	1200
0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	Crystalline Fe oxyhydroxide	0.578	715
HNO_3 / H_2O_2	Residual	3.23	5970

All analyte results are reported in µg/g on a dry weight (DW) basis

U = Sample concentration is less than the estimated Method Detection Limit (eMDL)

J = Sample concentration is between the eMDL and the Reporting Limit (RL)

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Total Solids Results

Sample ID	Total Solids	Units
14-27414-ZP16F	91.4	%
14-27415-ZP16G	67.7	%
14-27416-ZP16H	82.4	%
14-27447-ZO83H	77.2	%
14-27448-ZO83I	57.6	%
14-27449-ZO83J	70.8	%
14-27450-ZO83K	90.3	%
14-27451-ZO83L	89.5	%

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blank Summary

Analyte	Units	Fraction	PB1	PB2	PB3	PB4	Mean	StdDev	eMDL*	RL
As	µg/g DW	0.05 M $(NH_4)_2SO_4$	0.028	0.042	0.033	0.025	0.032	0.007	0.022	0.40
As	µg/g DW	0.05 M $(NH_4)H_2PO_4$	0.054	0.032	0.017	0.028	0.033	0.015	0.046	0.40
As	µg/g DW	0.2M $(NH_4)_2C_2O_4$	0.039	0.031	0.049	0.083	0.051	0.023	0.069	0.40
As	µg/g DW	0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	0.057	0.064	0.082	0.097	0.075	0.018	0.054	0.40
As	µg/g DW	HNO_3/H_2O_2	0.06	0.09	0.05	0.25	0.11	0.09	0.28	0.50
Fe	µg/g DW	0.05 M $(NH_4)_2SO_4$	0.9	0.7	-0.2	0.5	0.5	0.5	1.5	16
Fe	µg/g DW	0.05 M $(NH_4)H_2PO_4$	-0.14	-0.26	0.06	0.09	-0.06	0.17	0.50	16
Fe	µg/g DW	0.2M $(NH_4)_2C_2O_4$	1.6	1.8	2.8	2.9	2.3	0.7	2.0	16
Fe	µg/g DW	0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	2.5	3.4	3.6	2.8	3.1	0.5	1.5	16
Fe	µg/g DW	HNO_3/H_2O_2	0.4	-0.2	-0.1	1.6	0.4	0.8	2.5	20

eMDL = Estimated Method Detection Limit; RL = Reporting Limit

*Please see narrative regarding eMDL calculations

Arsenic Sequential Extraction Results for ARI
SDG: A141217S2
Contact: Cheronne Oreiro

Date: January 20, 2015
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Matrix Duplicate (MD)

Analyte	Units	Fraction	Sample ID	Rep 1	Rep 2	Mean	RPD
As	µg/g DW	0.05 M $(NH_4)_2SO_4$	14-27416-ZP16H	1.934	2.210	2.072	13.3
As	µg/g DW	0.05 M $(NH_4)H_2PO_4$	14-27416-ZP16H	3.749	3.744	3.746	0.1
As	µg/g DW	0.2M $(NH_4)_2C_2O_4$	14-27416-ZP16H	0.790	0.732	0.761	7.7
As	µg/g DW	0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	14-27416-ZP16H	0.845	0.763	0.804	10.2
As	µg/g DW	HNO_3/H_2O_2	14-27416-ZP16H	35.38	41.84	38.61	16.7
Fe	µg/g DW	0.05 M $(NH_4)_2SO_4$	14-27416-ZP16H	36.8	42.3	39.6	13.8
Fe	µg/g DW	0.05 M $(NH_4)H_2PO_4$	14-27416-ZP16H	391.7	415.9	403.8	6.0
Fe	µg/g DW	0.2M $(NH_4)_2C_2O_4$	14-27416-ZP16H	1171	1480	1326	23.3
Fe	µg/g DW	0.2M $(NH_4)_2C_2O_4$ + 0.1M Ascorbic acid	14-27416-ZP16H	834.5	955.8	895.1	13.6
Fe	µg/g DW	HNO_3/H_2O_2	14-27416-ZP16H	13810	13900	13860	0.6
Total Solids	%	-	14-27416-ZP16H	82.40	84.64	83.52	2.7

NC = Value was not calculated due to one or more concentrations below the eMDL

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/15/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: ZP16

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

ARI Client: Geoengineers
Project ID: Gas Works Park-Play Area Investigat
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around:
Email Results (Y/N): **Yes**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
14-27414-ZP16F	PAI-10-31.5-32.0	12/11/14 12:30	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As,Fe					
14-27415-ZP16G	PAI-11-12.0-12.5	12/11/14 13:50	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As,Fe					
14-27416-ZP16H	PAI-11-22-22.5	12/11/14 14:20	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As,Fe					

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/17/14	Time 1330
Received by	Company ACS	Date 12/17/14	Time 13:34

@ 0.3°C

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/15/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: Z083

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

ARI Client: Geoengineers
Project ID: Gas Works Park-Play Area Investigat
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around:
Email Results (Y/N): **email**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
• 14-27440-Z083A	PAI-11GW	12/12/14 10:00	Water	1	Metals (Sub)
Special Instructions: Speciated As 6800					
• 14-27441-Z083B	PAI-12GW	12/12/14 12:30	Water	1	Metals (Sub)
Special Instructions: Speciated As 6800					
• 14-27442-Z083C	PAI-2GW	12/12/14 14:00	Water	1	Metals (Sub)
Special Instructions: Speciated As 6800					
• 14-27447-Z083H	PAI-12-8.5-9.0	12/12/14 09:55	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					
• 14-27448-Z083I	PAI-12-13.5-14.0	12/12/14 10:15	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					
• 14-27449-Z083J	PAI-2-17.5-18.0	12/12/14 12:00	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					
• 14-27450-Z083K	PAI-2-19.0-19.5	12/12/14 11:50	Soil	1	Metals (Sub)
Special Instructions: Sequential Extraction As, Fe					

Sample not included on COC. 12/17/14
• PAI-10GW

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/17/14	Time 1330
Received by	Company ACS	Date 12/17/14	Time 13:34 @ 0.3°

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/15/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: Z083

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads

ARI Client: Geoengineers
Project ID: 0186-846-01 Task 1520

ARI Sample ID	Client Sample ID/ Add'l Sample ID	Sampled	Matrix	Bottles	Analyses
14-27451-Z083L	PAI-3-33.5-34.0	12/12/14 14:30	Soil	1	Metals (Sub)

Special Instructions: Sequential Extraction As, Fe

Carrier	Airbill		Date
Relinquished by	Company ARI	Date 12/12/14	Time 1330
Received by	Company ACS	Date 12/12/14	Time 13:54

@ 0.3°C

SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 12/16/14

ANALYTICAL RESOURCES INCORPORATED

ARI Project: ZP15

Laboratory: Applied Speciation & Consulting
Lab Contact: Russell Gerads
Lab Address: 18804 Northcreek Parkway
Bothell, WA 98011
Phone: 425-483-3300
Fax: 425-483-9818

ARI Client: Geoengineers
Project ID: Gas Works Park-Paly Area Investiga
ARI PM: Cheronne Oreiro
Phone: 206-695-6214
Fax: 206-695-6201
Email: subdata@arilabs.com

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around:
Email Results (Y/N): **email**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
14-27518-ZP15A	MW-36D-141215	12/15/14 10:00	Water	1	Metals (Sub)
Special Instructions: Arsenic Speciation 6800					
14-27519-ZP15B	MW-36S-141215	12/15/14 11:30	Water	1	Metals (Sub)
Special Instructions: Arsenic Speciation 6800					

Carrier	Airbill		Date	
Relinquished by	Company ARI	Date 12/17/14	Time 1330	
Received by	Company ACS	Date 12/17/14	Time 13:34 @ 0.3°	

Subcontracted Results
Sulfur Analyzed by Horizon Labs

ARI Job ID: ZO83

General Offices: P.O. Box 995 Price, Utah 84501 435-637-4343
Laboratory: 545 East 100 North Price, Utah 84501

Submitted to:
Analytical Resources Inc.
Mark Harris
4611 S. 134th Place
Suite 100
Tukwila, WA 98168-3240

December 31, 2014

Date Sampled: 12/11-12/2014
Date Received: 12/18/2014

Sampled By: ARI
Identification By: ARI

Analysis Report #: See Below

Sample Identification:

See Below

CERTIFICATE OF ANALYSIS

Analysis #	ARI ID	Sulfur (Acid Insoluble)
90188	14-27452 ZO83M	0.37
90189	14-27453 ZO83N	0.63
90190	14-27454 ZO83O	1.31
90191	14-27455 ZO83P	0.28
90192	14-27456 ZO83Q	0.03
90193	14-27418 ZP16J	0.04
90194	14-27419 ZP16K	0.56
90195	14-27420 ZP16L	0.12

Respectfully Submitted,
HORIZON LABORATORIES

Laboratory Manager

Name	Analysis Date		
Blank	12/29/2014 14:06		
	Sample Mass	Operator	Sulfur Concentration
	1.0000 g	Francesca	0.00%
	1.0000 g	Francesca	0.00%
Name	Analysis Date		
3.25 std	12/29/2014 14:21		
	Sample Mass	Operator	Sulfur Concentration
	0.2036 g	Francesca	3.12%
	0.2049 g	Francesca	3.24%
	0.2598 g	Francesca	3.26%
Name	Analysis Date		
90188	12/29/2014 14:25		
	Sample Mass	Operator	Sulfur Concentration
	0.1170 g	Francesca	0.37%
Name	Analysis Date		
90189	12/29/2014 14:27		
	Sample Mass	Operator	Sulfur Concentration
	0.1197 g	Francesca	0.63%
Name	Analysis Date		
90190	12/29/2014 14:29		
	Sample Mass	Operator	Sulfur Concentration
	0.1228 g	Francesca	1.31%
Name	Analysis Date		
90191	12/29/2014 14:32		
	Sample Mass	Operator	Sulfur Concentration
	0.1084 g	Francesca	0.27%
Name	Analysis Date		
90192	12/29/2014 14:34		
	Sample Mass	Operator	Sulfur Concentration
	0.1442 g	Francesca	0.03%
Name	Analysis Date		
90193	12/29/2014 14:40		
	Sample Mass	Operator	Sulfur Concentration
	0.1820 g	Francesca	0.04%
Name	Analysis Date		
90194	12/29/2014 14:42		
	Sample Mass	Operator	Sulfur Concentration
	0.1086 g	Francesca	0.56%
Name	Analysis Date		
90195	12/29/2014 14:44		
	Sample Mass	Operator	Sulfur Concentration
	0.1644 g	Francesca	0.12%
Name	Analysis Date		
90191	12/29/2014 14:46		
	Sample Mass	Operator	Sulfur Concentration
	0.1097 g	Francesca	0.29%
Name	Analysis Date		
STD BL-4a	12/29/2014 14:48		
	Sample Mass	Operator	Sulfur Concentration
	0.1592 g	Francesca	0.21%

Sample I.D.	Pan Weight	Pan & Sample Wt.	Pan & Dry Sample Wt.	Air Dry Loss (Moisture) %
90188	224.7	289.9	279.8	15.49
90189	227.3	290.9	273.2	27.83
90190	222.2	291.9	279.5	17.79
90191	225	335.7	312.4	21.04
90192	220.8	360.1	345.4	10.55
90193	222.2	445.6	417.7	12.49
90194	222.9	354.9	313.1	31.67
90195	223.6	403.4	352.5	28.31

Analytical Resources, Incorporated
Analytical Chemists and Consultants

January 21, 2015

Zanna Satterwhite
GeoEngineers, Inc.
Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, WA 98101

RE: Client Project: Gas Works Park-Play Area Investigation, 0186-846-01 Task 1520
ARI Job Nos.: ZP06 & ZP11

Dear Zanna:

Please find enclosed the Chain of Custody records (COCs), sample receipt documentation, and the final data package for samples from the project referenced above.

Sample receipt and details of these analyses are discussed in the Case Narrative.

An electronic copy of this package will remain on file with ARI. Should you have any questions or problems, please feel free to contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Chéronne Oreiro
Project Manager
(206) 695-6214
cheronneo@arilabs.com
www.arilabs.com

cc: eFile: ZP06_ZP11

Enclosures

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Documentation

ARI Job ID: ZP06, ZP11

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 7053	Turn-around Requested:
ARI Client Company: GeoEngineers	Phone: 206-239-3231
Client Contact: Zanna Satterwhite	
Client Project Name: Gas Works Park-Play Area Investigation	
Client Project #: 0186-846-01	Samplers: Robert Miyahira + Claudia DeLaVia

Page: 1	of 1
Date: 12/11/14	Ice Present? Y
No. of Coolers: 1	Cooler Temps: 4.0

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested	Notes/Comments
PAI-10GW	12/11/14	1500	GW	15	X	
PAI-11-9.5-10		1540	Soil	5		
PAI-11-19.5-19		1545	Soil	5		

Comments/Special Instructions	Relinquished by: (Signature)	Received by (Signature)	Relinquished by. (Signature)	Received by: (Signature)
	Printed Name: Hannah McDonough	Printed Name: A. Volgardsen	Printed Name.	Printed Name:
	Company: GeoEngineers	Company: ARI	Company.	Company:
	Date & Time. 12/11/14 1715	Date & Time. 12/11/14 1715	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

TAS Revisions 12-12-14

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: 7053	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: GeoEngineers	Phone: 206-239-3231	Date: 12/11/14	Ice Present? Y
Client Contact: Zanna Satterwhite		No. of Coolers: 1 (2)	Cooler Temps: 4.0
Client Project Name: Gas Works Park-Play Area Investigation			
Client Project #: 0186-846-01 Task 1520	Samplers: Robert Mijahirat Claudia DeLaVia		

Sample ID	Date	Time	Matrix	No. Containers	Arsenic Speciation EPA Modified Method 6800	PAHs by EPA 8270SIM (after glass filter)	PAHs by EPA 8270SIM (no filtering)	BTEX EPA 8260 low Level	Arsenic EPA 200.8	Sulfide, Sulfate, Chloride, Alkalinity, TDS, Nitrate, Ferrous Iron, Ions (Ca, Mg, Mn, K, Na)	Total Iron	Hold	Notes/Comments
PA1-10GW *	12/11/14	1500	GW	15	X	X	X	X	X	X		~~X~~	XRF >10000 ppm As
PA1-11-9.5-10		1540	Soil	5								X	
PA1-11-18.0-~~19~~ 18.5		1545	Soil	5								X	

TAS 12/12/14

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
* 4 ambers were collected for PAH analysis, but two were accidentally field-filtered. Please only use the unfiltered volume.	Printed Name: Hannah McDonough	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
	Company: GeoEngineers	Company: ARI	Company:	Company:
	Date & Time: 12/11/14 @ 1715	Date & Time: 12/11/14 1715	Date & Time:	Date & Time

** Use Methods specified in email dated 12-10-14.

ZP05 : 00005

Chain of Custody Record & Laboratory Analysis Request

TAS Revision 12-12-14

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: ~~ZPO-2053~~	Turn-around Requested: Standard
ARI Client Company: GeoEngineers	Phone: 206-239-3231
Client Contact: Zanna Satterwhite	
Client Project Name: Gas Works Park-Play Area Investigation	
Client Project #: 0186-846-01 Task 1520	Samplers: Robert Mijabrat Claudia DeLaVia
Page: 1 of 1	
Date: 12/11/14	Ice Present? Y
No. of Coolers: 1 (2)	Cooler Temps: 4.0

Sample ID	Date	Time	Matrix	No. Containers	Arsenic Speciation EPA Modified Method 6800	PAHs by EPA 8270SIM (silica gel cleanup)	PAHs by EPA 8270SIM (no silica gel)	BTEX EPA 8260 low level	Arsenic EPA 200.8	Sulfide, Sulfate, Chloride, Alkalinity, TDS, Nitrate, **	Ferrous Iron, Ions (Ca, Mg, Mn, K, Na), Total Iron	Hold	Notes/Comments
PA1-10GW *	12/11/14	1500	GW	15	X	X	X	X	X	X		~~Hold~~	XRF 71000ppm As
PA1-11-9.5-10		1540	Soil	5			X	X	X			X	
PA1-11-~~18.0-18.5~~ 15		1545	Soil	5			X	X				X	

TAS 12/12/14

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
* 4 ambers were collected for PAH analysis, but two were accidentally field-filtered. Please only use the unfiltered volume.	Printed Name: Hannah McDonough	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
	Company: GeoEngineers	Company: ARI	Company:	Company:
	Date & Time: 12/11/14 @ 1715	Date & Time: 12/11/14 1715	Date & Time:	Date & Time:

** Use methods specified in quote dated 12-10-14.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: GeoEngineers — Project Name: Gas Works Park - PAI

COC No(s): _____ (NA) — Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: ZP06 — Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? (YES) NO

Were custody papers properly filled out (ink, signed, etc.) (YES) NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.0

Time: 1715

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: 90877952

Cooler Accepted by: AV Date: 12/11/14 Time: 1715

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? Bubble Wrap (Wet Ice) Gel Packs (Baggies) Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		(YES)	NO
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	(NA)	YES	NO
Were all VOC vials free of air bubbles?	NA	(YES)	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	12/10/14	

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

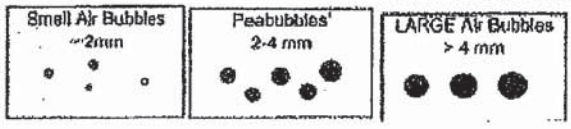
Samples Logged by: AV Date: 12/15/14 Time: 1136

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 1 of 3	
ARI Client Company: GeoEngineers	Phone: 206-239-3231	Date: 12/10/14	Ice Present?
Client Contact: Zama Satterwhite		No. of Coolers:	Cooler Temps:
Client Project Name: Gas Works Park - Play Area Investigation			
Client Project #: 0186-846-01	Samplers: Robert Miyahira + Claudia DeLaVara		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No Containers	Analysis Requested: Hold								Notes/Comments
PAI-4-4.5-5.0	12/10	0850	Soil	4	X								
PAI-4-9.5-10.0	12/10	0900	Soil	4	X								
PAI-4-13.0-13.5	12/10	0930	Soil	5	X								
PAI-4-16.0-16.5	12/10	1000	Soil	5	X								
PAI-4-24.5-25.0	12/10	1025	Soil	5	X								
PAI-4-27.5-28.0	12/10	1050	Soil	5	X								
PAI-3-4.5-5.0	12/10	1200	Soil	4	X								
PAI-3-9.5-10.0	12/10	1210	Soil	4	X								
PAI-3-12.0-12.5	12/10	1230	Soil	4	X								
PAI-3-13.0-13.5	12/10	1235	Soil	5	X								

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
	Printed Name: Claudia DeLaVara	Printed Name: A Volgardsen	Printed Name	Printed Name:
	Company: GeoEngineers	Company: ARI	Company:	Company:
	Date & Time: 12/11/14 1525	Date & Time: 12/11/14 1525	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Zip95 : 99999

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 2 of 3
ARI Client Company: GeoEngineers	Phone: 206-239-3231	Date: 12/10/14 — Ice Present?
Client Contact: Zanna Satterwhite		No. of Coolers: — Cooler Temps:
Client Project Name: Gas Works Park - Play Area Investigation		
Client Project #: 0186-846-01	Samplers: Robert Miyahira + Claudia DeLaVia	

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No Containers	HOLD								Notes/Comments
PAI-3-15.5-16.0	12/10	1250	Soil	5	X								
PAI-3-22.0-22.5	12/10	1310	Soil	4	X								
PAI-3-27.5-28.0	12/10	1340	Soil	6	X								
PAI-3-33.5-34.0	12/10	1400	Soil	6	X								
PAI-8-4.5-5.0	12/10	1500	Soil	6	X								
PAI-8-8.5-9.0	12/10	1520	Soil	6	X								
PAI-8-10.0-10.5	12/10	1545	Soil	6	X								
PAI-8-14.5-15.0	12/10	1600	Soil	6	X								
PAI-8-16.0-16.5	12/10	1630	Soil	6	X								
PAI-8-22.5-23.0	12/10	1650	Soil	6	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Claudia DeLaVia	Printed Name: A. Volgardsen	Printed Name:	Printed Name
	Company: GeoEngineers	Company: ARI	Company	Company:
	Date & Time: 12/11/14 1525	Date & Time: 12/11/14 1525	Date & Time.	Date & Time

ZP06 : 00009

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 3 of 3	
ARI Client Company: GeoEngineers	Phone: 206-239-3231	Date: 12/10/14	Ice Present?
Client Contact: Zanna Satterwhite		No. of Coolers:	Cooler Temps:
Client Project Name: Gas Works Park - Play Area Investigation			
Client Project #: 0186-846-01	Samplers: Robert Miyahira + Claudia DeLaVa		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No Containers	Analysis Requested: Hold								Notes/Comments
PAI-8-27.5-28.0	12/10	1710	Soil	6	X								
TRIP BLANK			Water	2	X								

Comments/Special Instructions	Relinquished by: (Signature)	Received by (Signature)	Relinquished by: (Signature)	Received by (Signature)
	Printed Name: Claudia DeLaVa	Printed Name: A. Volgardsen	Printed Name	Printed Name
	Company: GeoEngineers	Company: ARI	Company	Company
	Date & Time: 12/11/14 1525	Date & Time: 12/11/14 1525	Date & Time	Date & Time

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody & Laboratory Analysis Request

ZAS Revisions 12-11-14

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number: 2011	Turn-around Requested: standard
ARI Client Company: GeoEngineers	Phone: 206-239-3231
Client Contact: Zanna Satterwhite	
Client Project Name: Gas Works Park - Play Area Investigation	
Client Project #: 0186-846-01 Task 1520	Samplers: Robert Niyahira + Claudia DeLaVia

Page: 1 of 3
Date: 12/10/14 Ice Present?
No. of Coolers: Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Hold	Arsenic 6010	PAHs EPA 8270SIM (ow level)	BTEX EPA 8260 (ow level)					Notes/Comments
PAI-4-4.5-5.0	12/10	0850	Soil	4	X								XRF >1000 ppm As
PAI-4-9.5-10.0	12/10	0900	Soil	4	X	X							
PAI-4-13.0-13.5	12/10	0930	Soil	5	X	X							
PAI-4-16.0-16.5	12/10	1000	Soil	5	X	X	X	X					
PAI-4-24.5-25.0	12/10	1025	Soil	5	X								
PAI-4-27.5-28.0	12/10	1050	Soil	5	X								
PAI-3-4.5-5.0	12/10	1200	Soil	4	X								
PAI-3-9.5-10.0	12/10	1210	Soil	4	X								
PAI-3-12.0-12.5	12/10	1230	Soil	4	X								
PAI-3-13.0-13.5	12/10	1235	Soil	5	X	X	X	X					

Comments/Special Instructions

Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Claudia DeLaVia	Printed Name: A Volgarden	Printed Name:	Printed Name:
Company: GeoEngineers	Company: ARI	Company:	Company:
Date & Time: 12/11/14 1525	Date & Time: 12/11/14 1525	Date & Time:	Date & Time:

ZPSS: 99912

TAS Revisions 12-11-14

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 2 of 3	
ARI Client Company: GeoEngineers	Phone: 206-239-3231	Date: 12/10/14	Ice Present?
Client Contact: Zanna Satterwhite		No. of Coolers:	Cooler Temps:
Client Project Name: Gas Works Park - Play Area Investigation			
Client Project #: 0186-846-01 Task 1520	Samplers: Robert Miyahira + Claudia DeLaVia		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No Containers	Analysis Requested: Hold	Arsenic 6010	PAHs EPA 8270 SIM low level	BTEX EPA 8260 low level					Notes/Comments
PAI-3-15.5-16.0	12/10	1250	Soil	5	X	X							XRF > 1000 ppm As
PAI-3-22.0-22.5	12/10	1310	Soil	4	X								
PAI-3-27.5-28.0	12/10	1340	Soil	6	X	X							
PAI-3-33.5-34.0	12/10	1400	Soil	6	X	X	X	X					
PAI-8-4.5-5.0	12/10	1500	Soil	6	X								
PAI-8-8.5-9.0	12/10	1530	Soil	6	X	X							X
PAI-8-10.0-10.5	12/10	1545	Soil	6	X								
PAI-8-14.5-15.0	12/10	1600	Soil	6	X	X	X	X					
PAI-8-16.0-16.5	12/10	1630	Soil	6	X								
PAI-8-22.5-23.0	12/10	1650	Soil	6	X								

Comments/Special Instructions

	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name:	Claudia DeLaVia	A. Volgarden		
Company:	GeoEngineers	ARI		
Date & Time:	12/11/14 1525	12/11/14 1530		

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate

ZP95:99913

TAS Revisions 12-11-14

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

ARI Assigned Number:	Turn-around Requested: standard
ARI Client Company: Geoengineers	Phone: 206-239-3231
Client Contact: Zonna Satterwhite	
Client Project Name: Gas Works Park - Play Area Investigation	
Client Project #: 0186-846-01 Task 1520	Samplers: Robert Miyahira + Claudia DeLaVia

Page: 3 of 3
Date: 12/10/14 Ice Present?
No. of Coolers: Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	Hold	Arsenic 6010	PAHs EPA 8270 SIM (low level)	BTEX EPA 8260 (low level)					Notes/Comments
PAI-8-27.5-28.0	12/10	1710	Soil	6	■	X							XRF > 1000 ppm As
TRIP BLANK			Water	2	■								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Claudia DeLaVia	Printed Name: A. Nogarder	Printed Name:	Printed Name:
	Company: Geoengineers	Company: ARI	Company:	Company:
	Date & Time: 12/11/14 1525	Date & Time: 12/11/14 1525	Date & Time:	Date & Time:

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: GeoEngineers
Project Name: GasWorks Park - PAT
COC No(s): _____ (NA)
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
Assigned ARI Job No: ZP11
Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2 0-6.0 °C for chemistry): 6.0 +8 5.5 4.6
Time: 1030
If cooler temperature is out of compliance fill out form 00070F
Temp Gun ID#: 90877952
Cooler Accepted by: AV Date: 12/11/14 Time: 1525

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap (Wet Ice) (Gel Packs) (Baggies) Foam Block Paper Other: Box			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	12/10/14	

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

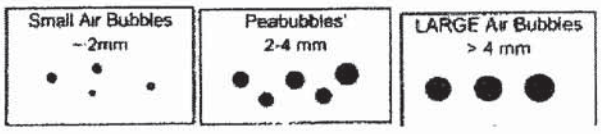
Samples Logged by: AV Date: 12/15/14 Time: 1332

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: ZP06, ZP11

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Client: GeoEngineers, Inc.
Project: Gas Works Park-Play Area Investigation, 0186-846-01 Task 1520
ARI Job Nos.: ZP06 & ZP11

Sample Receipt

Two soil samples and a trip blank were received on December 11, 2014 under ARI job ZP06. The water sample results have been reported under a separate cover. The cooler temperature measured by IR thermometer following ARI SOP was 4.0°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

Twenty-one soil samples and a trip blank were received on December 11, 2014 under ARI job ZP11. Select samples were archived upon receipt. The cooler temperatures measured by IR thermometer following ARI SOP were -1.8, 4.6, 5.5, and 6.0°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

BETX by SW8260C

The samples were analyzed within the method recommended holding times.

Initial and continuing calibrations were within method requirements. Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blanks were clean at the reporting limits. The LCS and LCSD percent recoveries were within control limits.

PAHs by SW8270-SIM

The samples and associated laboratory QC were extracted and analyzed within method recommended holding times for samples stored frozen.

Initial and continuing calibrations were within method requirements. Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

Naphthalene was present in **MB-122414** at a level that was greater than ½ the reporting limit. All detected results for this compound have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS/LCSD percent recoveries of Pyrene, Benzo(a)pyrene, and Benzo(g,h,i)perylene fell outside the control limits low for **LCS-010815** due to an extraction clean-up error. Associated sample results may be biased low for these compounds. Due to high Naphthalene results, samples were not re-extracted. No corrective action was taken.

Several matrix spike and matrix spike duplicate percent recoveries were outside control limits for samples **PAI-11-18.0-18.5** and **PAI-8-14.5-15.0**. No corrective action is required for matrix QC.

Arsenic by SW6010C

The samples and associated laboratory QC were digested and analyzed within recommended holding times.

The method blank was clean at the reporting limits. The LCS percent recovery was control limits.

The matrix spike percent recovery and duplicate RPD were within control limits.

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ZP11
Client: Geoengineers
Project Event: 0186-846-01 Task 1520
Project Name: Gas Works Park-Play Area Invsetigat

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	PAI-4-9.5-10.0	ZP11A	14-27361	Soil	12/10/14 09:00	12/11/14 15:25
2.	PAI-4-13.0-13.5	ZP11B	14-27362	Soil	12/10/14 09:30	12/11/14 15:25
3.	PAI-4-16.0-16.5	ZP11C	14-27363	Soil	12/10/14 10:00	12/11/14 15:25
4.	PAI-3-13.0-13.5	ZP11D	14-27364	Soil	12/10/14 12:35	12/11/14 15:25
5.	PAI-3-15.5-16.0	ZP11E	14-27365	Soil	12/10/14 12:50	12/11/14 15:25
6.	PAI-3-27.5-28.0	ZP11F	14-27366	Soil	12/10/14 13:40	12/11/14 15:25
7.	PAI-3-33.5-34.0	ZP11G	14-27367	Soil	12/10/14 14:00	12/11/14 15:25
8.	PAI-8-8.5-9.0	ZP11H	14-27368	Soil	12/10/14 15:20	12/11/14 15:25
9.	PAI-8-14.5-15.0	ZP11I	14-27369	Soil	12/10/14 16:00	12/11/14 15:25
10.	PAI-8-27.5-28.0	ZP11J	14-27370	Soil	12/10/14 17:10	12/11/14 15:25
11.	TRIP BLANK	ZP11K	14-27371	Water	12/10/14	12/11/14 15:25
12.	PAI-4-4.5-5.0	ZP11L	14-27372	Soil	12/10/14 08:50	12/11/14 15:25
13.	PAI-4-24.5-25.0	ZP11M	14-27373	Soil	12/10/14 10:25	12/11/14 15:25
14.	PAI-4-27.5-28.0	ZP11N	14-27374	Soil	12/10/14 10:50	12/11/14 15:25
15.	PAI-3-4.5-5.0	ZP11O	14-27375	Soil	12/10/14 12:00	12/11/14 15:25
16.	PAI-3-9.5-10.0	ZP11P	14-27376	Soil	12/10/14 12:10	12/11/14 15:25
17.	PAI-3-12.0-12.5	ZP11Q	14-27377	Soil	12/10/14 12:30	12/11/14 15:25
18.	PAI-3-22.0-22.5	ZP11R	14-27378	Soil	12/10/14 13:10	12/11/14 15:25
19.	PAI-8-4.5-5.0	ZP11S	14-27379	Soil	12/10/14 15:00	12/11/14 15:25
20.	PAI-8-10.0-10.5	ZP11T	14-27380	Soil	12/10/14 15:45	12/11/14 15:25
21.	PAI-8-16.0-16.5	ZP11U	14-27381	Soil	12/10/14 16:30	12/11/14 15:25
22.	PAI-8-22.5-23.0	ZP11V	14-27382	Soil	12/10/14 16:50	12/11/14 15:25

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ZP06
Client: Geoengineers
Project Event: 0186-846-01 Task 1520
Project Name: Gas Works Park-Play Area Investigat

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	PAI-11-9.5-10	ZP06A	14-27337	Soil	12/11/14 15:40	12/11/14 17:15
2.	PAI-11-18.0-18.5	ZP06B	14-27338	Soil	12/11/14 15:45	12/11/14 17:15
3.	TRIP BLANK	ZP06C	14-27339	Water	12/11/14	12/11/14 17:15

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8260C VOA Solid in Solid (EPA 8260C)								
Preservation: NaHSO4, MeOH, Cool <6°C								
Container: VOA Vial, Clear, 40 mL, Na2S2O3		**Amount Required:** 15 g				**Hold Time:** 14 days		
Dichlorodifluoromethane	0.207	1.00 ug/kg		30	67 - 142	30	67 - 142	30
Chloromethane	0.263	1.00 ug/kg		30	65 - 129	30	65 - 129	30
Vinyl Chloride	0.235	1.00 ug/kg		30	74 - 134	30	74 - 134	30
Bromomethane	0.187	1.00 ug/kg		30	40 - 172	30	40 - 172	30
Chloroethane	0.462	1.00 ug/kg		30	53 - 154	30	53 - 154	30
Trichlorofluoromethane	0.266	1.00 ug/kg		30	57 - 161	30	57 - 161	30
Acrolein	3.81	50.0 ug/kg		30	60 - 130	30	60 - 130	30
Acetone	0.482	5.00 ug/kg		30	48 - 132	30	48 - 132	30
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.287	2.00 ug/kg		30	72 - 142	30	72 - 142	30
1,1-Dichloroethene	0.336	1.00 ug/kg		30	73 - 138	30	73 - 138	30
Bromoethane	0.440	2.00 ug/kg		30	74 - 132	30	74 - 132	30
Iodomethane	0.215	1.00 ug/kg		30	34 - 181	30	34 - 181	30
Methylene Chloride	0.635	2.00 ug/kg		30	61 - 128	30	61 - 128	30
Carbon Disulfide	0.559	1.00 ug/kg		30	72 - 146	30	72 - 146	30
Acrylonitrile	1.03	5.00 ug/kg		30	59 - 124	30	59 - 124	30
Methyl tert-butyl Ether	0.231	1.00 ug/kg		30	68 - 124	30	68 - 124	30
trans-1,2-Dichloroethene	0.266	1.00 ug/kg		30	73 - 131	30	73 - 131	30
Vinyl Acetate	0.381	5.00 ug/kg		30	54 - 138	30	54 - 138	30
1,1-Dichloroethane	0.203	1.00 ug/kg		30	65 - 139	30	65 - 139	30
2-Butanone	0.513	5.00 ug/kg		30	64 - 120	30	64 - 120	30
2,2-Dichloropropane	0.292	1.00 ug/kg		30	77 - 137	30	77 - 137	30
cis-1,2-Dichloroethene	0.240	1.00 ug/kg		30	75 - 124	30	75 - 124	30
Chloroform	0.234	1.00 ug/kg		30	75 - 126	30	75 - 126	30
Bromochloromethane	0.323	1.00 ug/kg		30	69 - 133	30	69 - 133	30
1,1,1-Trichloroethane	0.226	1.00 ug/kg		30	78 - 133	30	78 - 133	30
1,1-Dichloropropene	0.312	1.00 ug/kg		30	80 - 123	30	80 - 123	30
Carbon tetrachloride	0.213	1.00 ug/kg		30	76 - 136	30	76 - 136	30
1,2-Dichloroethane	0.191	1.00 ug/kg		30	77 - 120	30	77 - 120	30
Benzene	0.296	1.00 ug/kg		30	80 - 120	30	80 - 120	30
Trichloroethene	0.212	1.00 ug/kg		30	80 - 120	30	80 - 120	30
1,2-Dichloropropane	0.162	1.00 ug/kg		30	74 - 120	30	74 - 120	30
Bromodichloromethane	0.254	1.00 ug/kg		30	80 - 122	30	80 - 122	30
Dibromomethane	0.147	1.00 ug/kg		30	80 - 120	30	80 - 120	30
2-Chloroethyl vinyl ether	0.276	5.00 ug/kg		30	20 - 157	30	20 - 157	30
4-Methyl-2-Pentanone	0.420	5.00 ug/kg		30	70 - 124	30	70 - 124	30
cis-1,3-Dichloropropene	0.226	1.00 ug/kg		30	80 - 124	30	80 - 124	30
Toluene	0.151	1.00 ug/kg		30	78 - 120	30	78 - 120	30
trans-1,3-Dichloropropene	0.216	1.00 ug/kg		30	80 - 126	30	80 - 126	30
1,1,2-Trichloroethane	0.286	1.00 ug/kg		30	77 - 120	30	77 - 120	30
1,2-Dibromoethane	0.176	1.00 ug/kg		30	79 - 120	30	79 - 120	30
2-Hexanone	0.439	5.00 ug/kg		30	62 - 128	30	62 - 128	30
1,3-Dichloropropane	0.209	1.00 ug/kg		30	77 - 120	30	77 - 120	30
Tetrachloroethene	0.257	1.00 ug/kg		30	76 - 131	30	76 - 131	30
Dibromochloromethane	0.266	1.00 ug/kg		30	77 - 123	30	77 - 123	30
Chlorobenzene	0.219	1.00 ug/kg		30	80 - 120	30	80 - 120	30
1,1,1,2-Tetrachloroethane	0.233	1.00 ug/kg		30	80 - 120	30	80 - 120	30

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Ethylbenzene	0.202	1.00 ug/kg		30	80 - 120	30	80 - 120	30
m,p-Xylene	0.392	1.00 ug/kg		30	80 - 123	30	80 - 123	30
o-Xylene	0.224	1.00 ug/kg		30	80 - 120	30	80 - 120	30
Styrene	0.138	1.00 ug/kg		30	80 - 122	30	80 - 122	30
Bromoform	0.297	1.00 ug/kg		30	63 - 120	30	63 - 120	30
Isopropyl Benzene	0.233	1.00 ug/kg		30	77 - 127	30	77 - 127	30
1,1,2,2-Tetrachloroethane	0.253	1.00 ug/kg		30	71 - 120	30	71 - 120	30
1,2,3-Trichloropropane	0.517	2.00 ug/kg		30	75 - 120	30	75 - 120	30
trans-1,4-Dichloro 2-Butene	0.437	5.00 ug/kg		30	62 - 127	30	62 - 127	30
n-Propylbenzene	0.272	1.00 ug/kg		30	76 - 126	30	76 - 126	30
Bromobenzene	0.153	1.00 ug/kg		30	75 - 120	30	75 - 120	30
1,3,5-Trimethylbenzene	0.254	1.00 ug/kg		30	77 - 126	30	77 - 126	30
2-Chlorotoluene	0.300	1.00 ug/kg		30	76 - 120	30	76 - 120	30
4-Chlorotoluene	0.277	1.00 ug/kg		30	75 - 121	30	75 - 121	30
t-Butylbenzene	0.306	1.00 ug/kg		30	77 - 125	30	77 - 125	30
1,2,4-Trimethylbenzene	0.230	1.00 ug/kg		30	77 - 125	30	77 - 125	30
s-Butylbenzene	0.240	1.00 ug/kg		30	77 - 127	30	77 - 127	30
4-Isopropyl Toluene	0.236	1.00 ug/kg		30	78 - 131	30	78 - 131	30
1,3-Dichlorobenzene	0.227	1.00 ug/kg		30	76 - 120	30	76 - 120	30
1,4-Dichlorobenzene	0.232	1.00 ug/kg		30	75 - 120	30	75 - 120	30
n-Butylbenzene	0.262	1.00 ug/kg		30	75 - 134	30	75 - 134	30
1,2-Dichlorobenzene	0.293	1.00 ug/kg		30	77 - 120	30	77 - 120	30
1,2-Dibromo-3-Chloropropane	0.586	5.00 ug/kg		30	61 - 128	30	61 - 128	30
1,2,4-Trichlorobenzene	0.332	5.00 ug/kg		30	75 - 130	30	75 - 130	30
Hexachloro-1,3-Butadiene	0.410	5.00 ug/kg		30	72 - 135	30	72 - 135	30
Naphthalene	0.429	5.00 ug/kg		30	71 - 122	30	71 - 122	30
1,2,3-Trichlorobenzene	0.305	5.00 ug/kg		30	76 - 122	30	76 - 122	30
surr: 1,2-Dichloroethane-d4			80 - 149					
surr: 1,2-Dichlorobenzene-d4			80 - 120					
surr: Toluene-d8			77 - 120					
surr: 4-Bromofluorobenzene			80 - 120					
surr: Dibromofluoromethane			80 - 120					
Pentafluorobenzene								
Chlorobenzene-d5								
1,4-Difluorobenzene								
1,4-Dichlorobenzene-d4								

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8270D-SIM PAH (5 ug/kg) in Solid (EPA 8270D-SIM)								
Preservation: Cool <6°C								
Container: Glass WM, Clear, 8 oz		**Amount Required:** 150 g				**Hold Time:** 14 days		
Naphthalene	2.26	5.00 ug/kg		30	36 - 120	30	36 - 120	30
2-Methylnaphthalene	1.69	5.00 ug/kg		30	35 - 120	30	35 - 120	30
1-Methylnaphthalene	1.61	5.00 ug/kg		30	39 - 120	30	39 - 120	30
Biphenyl	1.44	5.00 ug/kg		30	30 - 160	30	30 - 160	30
2,6-Dimethylnaphthalene	0.750	5.00 ug/kg		30	30 - 160	30	30 - 160	30
Acenaphthylene	1.61	5.00 ug/kg		30	35 - 120	30	35 - 120	30
Acenaphthene	1.49	5.00 ug/kg		30	39 - 120	30	39 - 120	30
Dibenzofuran	1.41	5.00 ug/kg		30	38 - 120	30	38 - 120	30
2,3,5-Trimethylnaphthalene	0.419	5.00 ug/kg		30		30		30
Fluorene	1.47	5.00 ug/kg		30	41 - 120	30	41 - 120	30
Dibenzothiophene	0.425	5.00 ug/kg		30		30		30
Phenanthrene	1.58	5.00 ug/kg		30	46 - 120	30	46 - 120	30
Anthracene	1.78	5.00 ug/kg		30	36 - 120	30	36 - 120	30
Carbazole	0.189	5.00 ug/kg		30	30 - 160	30	30 - 160	30
1-Methylphenanthrene	0.700	5.00 ug/kg		30	30 - 160	30	30 - 160	30
Fluoranthene	1.87	5.00 ug/kg		30	46 - 120	30	46 - 120	30
Pyrene	2.26	5.00 ug/kg		30	49 - 120	30	49 - 120	30
Benzo(a)anthracene	2.22	5.00 ug/kg		30	42 - 120	30	42 - 120	30
Chrysene	1.92	5.00 ug/kg		30	48 - 120	30	48 - 120	30
Benzo(b)fluoranthene	2.11	5.00 ug/kg		30	35 - 127	30	35 - 127	30
Benzo(k)fluoranthene	2.28	5.00 ug/kg		30	37 - 129	30	37 - 129	30
Benzo(j)fluoranthene	1.75	5.00 ug/kg		30	40 - 120	30	40 - 120	30
Benzo(e)pyrene	0.647	5.00 ug/kg		30	30 - 160	30	30 - 160	30
Benzo(a)pyrene	2.38	5.00 ug/kg		30	36 - 120	30	36 - 120	30
Perylene	3.56	5.00 ug/kg		30	44 - 120	30	44 - 120	30
Indeno(1,2,3-cd)pyrene	3.01	5.00 ug/kg		30	40 - 120	30	40 - 120	30
Dibenzo(a,h)anthracene	2.56	5.00 ug/kg		30	38 - 120	30	38 - 120	30
Benzo(g,h,i)perylene	2.79	5.00 ug/kg		30	38 - 120	30	38 - 120	30
surr: 2-Methylnaphthalene-d10			32 - 120					
surr: Dibenzo[a,h]anthracene-d14			21 - 133					
surr: Fluoranthene-d10			36 - 134					
Naphthalene-d8								
Acenaphthene-d10								
Phenanthrene-d10								
Chrysene-d12								
Perylene-d12								

Analytical Method Information

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Met 6010C in Solid (EPA 6010C)								
Preservation: Cool <6°C								
Container: Glass WM, Clear, 4 oz		**Amount Required:** 100 g				**Hold Time:** 180 days		
Aluminum	0.757	5.00 mg/kg		20	75 - 125	20	80 - 120	20
Antimony	0.628	5.00 mg/kg		20	75 - 125	20	80 - 120	20
Arsenic	0.333	5.00 mg/kg		20	75 - 125	20	80 - 120	20
Barium	0.133	0.300 mg/kg		20	75 - 125	20	80 - 120	20
Beryllium	0.0160	0.100 mg/kg		20	75 - 125	20	80 - 120	20
Boron	0.739	2.00 mg/kg		20	75 - 125	20	80 - 120	20
Cadmium	0.0180	0.200 mg/kg		20	75 - 125	20	80 - 120	20
Calcium	1.13	5.00 mg/kg		20	75 - 125	20	80 - 120	20
Chromium	0.124	0.500 mg/kg		20	75 - 125	20	80 - 120	20
Cobalt	0.0270	0.300 mg/kg		20	75 - 125	20	80 - 120	20
Copper	0.0920	0.200 mg/kg		20	75 - 125	20	80 - 120	20
Iron	0.750	5.00 mg/kg		20	75 - 125	20	80 - 120	20
Lead	0.155	2.00 mg/kg		20	75 - 125	20	80 - 120	20
Magnesium	0.961	5.00 mg/kg		20	75 - 125	20	80 - 120	20
Manganese	0.0280	0.100 mg/kg		20	75 - 125	20	80 - 120	20
Molybdenum	0.0790	0.500 mg/kg		20	75 - 125	20	80 - 120	20
Nickel	0.386	1.00 mg/kg		20	75 - 125	20	80 - 120	20
Potassium	6.57	50.0 mg/kg		20	75 - 125	20	80 - 120	20
Selenium	0.499	5.00 mg/kg		20	75 - 125	20	80 - 120	20
Silver	0.0430	0.300 mg/kg		20	75 - 125	20	80 - 120	20
Sodium	1.14	50.0 mg/kg		20	75 - 125	20	80 - 120	20
Sodium-I	114	5000 mg/kg		20	75 - 125	20	80 - 120	20
Strontium	0.00900	0.100 mg/kg		20	75 - 125	20	80 - 120	20
Thallium	0.310	5.00 mg/kg		20	75 - 125	20	80 - 120	20
Tin	0.141	1.00 mg/kg		20	75 - 125	20	80 - 120	20
Titanium	0.211	0.500 mg/kg		20	75 - 125	20	80 - 120	20
Vanadium	0.0270	0.300 mg/kg		20	75 - 125	20	80 - 120	20
Zinc	0.145	1.00 mg/kg		20	75 - 125	20	80 - 120	20

Volatile Analysis
Report and Summary QC Forms

ARI Job ID: ZP06, ZP11

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-11-9.5-10**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZP06A
LIMS ID: 14-27337
Matrix: Soil
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZP06-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Instrument/Analyst: NT5/PAB
Date Analyzed: 12/23/14 16:48

Sample Amount: 5.10 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 22.6%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	290	980	5,200
108-88-3	Toluene	150	980	1,600
100-41-4	Ethylbenzene	200	980	1,300
179601-23-1	m,p-Xylene	380	980	1,900
95-47-6	o-Xylene	220	980	500 J

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	85.4%
d8-Toluene	92.0%
Bromofluorobenzene	96.0%
d4-1,2-Dichlorobenzene	99.7%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-11-18.0-18.5**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZP06B
LIMS ID: 14-27338
Matrix: Soil
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZP06-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Instrument/Analyst: NT5/PAB
Date Analyzed: 12/23/14 17:13

Sample Amount: 3.99 g-dry-wt
Purge Volume: 5.0 mL
Moisture: 26.7%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	**Benzene**	**0.37**	**1.3**	**1.8**
108-88-3	Toluene	0.19	1.3	< 1.3 U
100-41-4	Ethylbenzene	0.25	1.3	< 1.3 U
179601-23-1	m,p-Xylene	0.49	1.3	< 1.3 U
95-47-6	o-Xylene	0.28	1.3	< 1.3 U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	91.6%
d8-Toluene	100%
Bromofluorobenzene	97.1%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: TRIP BLANK SAMPLE**
Page 1 of 1

Lab Sample ID: ZP06C
LIMS ID: 14-27339
Matrix: Water
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZP06-Geoengineers
Project: Gas Works Park-Play Area Investigat 0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Instrument/Analyst: NT5/PAB
Date Analyzed: 12/23/14 09:47

Sample Amount: 5.00 mL
Purge Volume: 5.0 mL

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	0.25	1.0	< 1.0 U
108-88-3	Toluene	0.18	1.0	< 1.0 U
100-41-4	Ethylbenzene	0.18	1.0	< 1.0 U
179601-23-1	m,p-Xylene	0.36	2.0	< 2.0 U
95-47-6	o-Xylene	0.22	1.0	< 1.0 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	87.8%
d8-Toluene	103%
Bromofluorobenzene	98.0%
d4-1,2-Dichlorobenzene	98.5%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: ZP06-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520

ARI ID	Client ID	Level	DCE	TOL	BFB	DCB	TOT OUT
MB-122314A	Method Blank	Med	88.8%	100%	97.0%	98.9%	0
LCS-122314A	Lab Control	Med	92.4%	101%	98.2%	98.3%	0
LCSD-122314A	Lab Control Dup	Med	87.2%	102%	99.0%	98.5%	0
ZP06A	PAI-11-9.5-10	Med	85.4%	92.0%	96.0%	99.7%	0
MB-122314A	Method Blank	Low	88.8%	100%	97.0%	98.9%	0
LCS-122314A	Lab Control	Low	92.4%	101%	98.2%	98.3%	0
LCSD-122314A	Lab Control Dup	Low	87.2%	102%	99.0%	98.5%	0
ZP06B	PAI-11-18.0-18.5	Low	91.6%	100%	97.1%	101%	0

	LCS/MB LIMITS		QC LIMITS	
SW8260C	Low	Med	Low	Med
(DCE) = d4-1,2-Dichloroethane	80-149	80-124	80-149	80-124
(TOL) = d8-Toluene	77-120	80-120	77-120	80-120
(BFB) = Bromofluorobenzene	80-120	80-120	80-120	80-120
(DCB) = d4-1,2-Dichlorobenzene	80-120	80-120	80-120	80-120

Log Number Range: 14-27337 to 14-27338

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZP06-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
ZP06C	TRIP BLANK	5	87.8%	103%	98.0%	98.5%	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	80-149	80-125
(TOL) = d8-Toluene	77-120	80-120
(BFB) = Bromofluorobenzene	80-120	80-120
(DCB) = d4-1,2-Dichlorobenzene	80-120	80-120

Prep Method: SW5030B
Log Number Range: 14-27339 to 14-27339

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-4-16.0-16.5**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZP11C
LIMS ID: 14-27363
Matrix: Soil
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZP11-Geoengineers
Project: Gas Works Park-Play Area Invsetigat
0186-846-01 Task 1520
Date Sampled: 12/10/14
Date Received: 12/11/14

Instrument/Analyst: NT5/PAB
Date Analyzed: 12/23/14 17:37

Sample Amount: 9.04 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 12.2%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	**Benzene**	160	550	16,000
108-88-3	**Toluene**	84	550	18,000
100-41-4	**Ethylbenzene**	110	550	2,000
179601-23-1	**m,p-Xylene**	220	550	7,800
95-47-6	**o-Xylene**	120	550	2,900

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	89.2%
d8-Toluene	104%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	99.7%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-3-13.0-13.5**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZP11D
LIMS ID: 14-27364
Matrix: Soil
Data Release Authorized: MW
Reported: 12/29/14

QC Report No: ZP11-Geoengineers
Project: Gas Works Park-Play Area Invsetigat
0186-846-01 Task 1520
Date Sampled: 12/10/14
Date Received: 12/11/14

Instrument/Analyst: NT5/PAB
Date Analyzed: 12/23/14 18:02

Sample Amount: 3.19 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 39.4%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	460	1600	15,000
108-88-3	Toluene	240	1600	51,000
100-41-4	Ethylbenzene	320	1600	36,000
179601-23-1	m,p-Xylene	610	1600	30,000
95-47-6	o-Xylene	350	1600	8,000

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	94.1%
d8-Toluene	104%
Bromofluorobenzene	98.4%
d4-1,2-Dichlorobenzene	99.1%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-3-33.5-34.0**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZP11G
LIMS ID: 14-27367
Matrix: Soil
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZP11-Geoengineers
Project: Gas Works Park-Play Area Invsetigat
0186-846-01 Task 1520
Date Sampled: 12/10/14
Date Received: 12/11/14

Instrument/Analyst: NT5/PAB
Date Analyzed: 12/23/14 15:09

Sample Amount: 92.4 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 13.5%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	16	54	2,500
108-88-3	Toluene	8.2	54	190
100-41-4	Ethylbenzene	11	54	940
179601-23-1	m,p-Xylene	21	54	610
95-47-6	o-Xylene	12	54	350

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	90.0%
d8-Toluene	102%
Bromofluorobenzene	98.7%
d4-1,2-Dichlorobenzene	101%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-8-14.5-15.0**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZP11I
LIMS ID: 14-27369
Matrix: Soil
Data Release Authorized: MW
Reported: 12/29/14

QC Report No: ZP11-Geoengineers
Project: Gas Works Park-Play Area Invsetigat
0186-846-01 Task 1520
Date Sampled: 12/10/14
Date Received: 12/11/14

Instrument/Analyst: NT5/PAB
Date Analyzed: 12/23/14 14:44

Sample Amount: 105 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 7.5%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	**Benzene**	14	48	730
108-88-3	**Toluene**	7.2	48	450
100-41-4	**Ethylbenzene**	9.6	48	200
179601-23-1	**m,p-Xylene**	19	48	250
95-47-6	**o-Xylene**	11	48	120

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	84.3%
d8-Toluene	103%
Bromofluorobenzene	97.8%
d4-1,2-Dichlorobenzene	100%

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: TRIP BLANK**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZP11K
LIMS ID: 14-27371
Matrix: Water
Data Release Authorized: MW
Reported: 12/29/14

QC Report No: ZP11-Geoengineers
Project: Gas Works Park-Play Area Invsetigat
0186-846-01 Task 1520
Date Sampled: 12/10/14
Date Received: 12/11/14

Instrument/Analyst: NT5/PAB
Date Analyzed: 12/23/14 10:12

Sample Amount: 5.00 mL
Purge Volume: 5.0 mL

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	0.25	1.0	< 1.0 U
108-88-3	Toluene	0.18	1.0	< 1.0 U
100-41-4	Ethylbenzene	0.18	1.0	< 1.0 U
179601-23-1	m,p-Xylene	0.36	2.0	< 2.0 U
95-47-6	o-Xylene	0.22	1.0	< 1.0 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	89.1%
d8-Toluene	102%
Bromofluorobenzene	99.0%
d4-1,2-Dichlorobenzene	99.3%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: ZP11-Geoengineers
Project: Gas Works Park-Play Area Invsetigat
0186-846-01 Task 1520

ARI ID	Client ID	Level	DCE	TOL	BFB	DCB	TOT OUT
MB-122314A	Method Blank	Med	88.8%	100%	97.0%	98.9%	0
LCS-122314A	Lab Control	Med	92.4%	101%	98.2%	98.3%	0
LCSD-122314A	Lab Control Dup	Med	87.2%	102%	99.0%	98.5%	0
ZP11C	PAI-4-16.0-16.5	Med	89.2%	104%	100%	99.7%	0
ZP11D	PAI-3-13.0-13.5	Med	94.1%	104%	98.4%	99.1%	0
ZP11G	PAI-3-33.5-34.0	Med	90.0%	102%	98.7%	101%	0
ZP11I	PAI-8-14.5-15.0	Med	84.3%	103%	97.8%	100%	0

	LCS/MB LIMITS		QC LIMITS	
SW8260C	Low	Med	Low	Med
(DCE) = d4-1,2-Dichloroethane	80-149	80-124	80-149	80-124
(TOL) = d8-Toluene	77-120	80-120	77-120	80-120
(BFB) = Bromofluorobenzene	80-120	80-120	80-120	80-120
(DCB) = d4-1,2-Dichlorobenzene	80-120	80-120	80-120	80-120

Log Number Range: 14-27363 to 14-27369

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZP11-Geoengineers
Project: Gas Works Park-Play Area Invsetigat
0186-846-01 Task 1520

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
ZP11K	TRIP BLANK	5	89.1%	102%	99.0%	99.3%	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	80-149	80-125
(TOL) = d8-Toluene	77-120	80-120
(BFB) = Bromofluorobenzene	80-120	80-120
(DCB) = d4-1,2-Dichlorobenzene	80-120	80-120

Prep Method: SW5030B
Log Number Range: 14-27371 to 14-27371

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-122314A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-122314A
LIMS ID: 14-27337
Matrix: Soil
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZP06-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT5/PAB
LCSD: NT5/PAB
Date Analyzed LCS: 12/23/14 08:33
LCSD: 12/23/14 08:58

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt
Purge Volume LCS: 5.0 mL
LCSD: 5.0 mL
Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	2350	2500	94.0%	2520	2500	101%	7.0%
Toluene	2750	2500	110%	2760	2500	110%	0.4%
Ethylbenzene	2650	2500	106%	2680	2500	107%	1.1%
m,p-Xylene	5320	5000	106%	5340	5000	107%	0.4%
o-Xylene	2650	2500	106%	2630	2500	105%	0.8%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	92.4%	87.2%
d8-Toluene	101%	102%
Bromofluorobenzene	98.2%	99.0%
d4-1,2-Dichlorobenzene	98.3%	98.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-122314A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-122314A
LIMS ID: 14-27338
Matrix: Soil
Data Release Authorized: MW
Reported: 12/29/14

QC Report No: ZP06-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT5/PAB
LCSD: NT5/PAB
Date Analyzed LCS: 12/23/14 08:33
LCSD: 12/23/14 08:58

Sample Amount LCS: 5.00 g-dry-wt
LCSD: 5.00 g-dry-wt
Purge Volume LCS: 5.0 mL
LCSD: 5.0 mL
Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	46.9	50.0	93.8%	50.3	50.0	101%	7.0%
Toluene	55.1	50.0	110%	55.2	50.0	110%	0.2%
Ethylbenzene	53.0	50.0	106%	53.6	50.0	107%	1.1%
m,p-Xylene	106	100	106%	107	100	107%	0.9%
o-Xylene	53.0	50.0	106%	52.7	50.0	105%	0.6%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	92.4%	87.2%
d8-Toluene	101%	102%
Bromofluorobenzene	98.2%	99.0%
d4-1,2-Dichlorobenzene	98.3%	98.5%

4A
VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB1223

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: ZP16

Project: GAS WORKS PARK

Lab File ID: MB1223

Lab Sample ID: MB1223

Date Analyzed: 12/23/14

Time Analyzed: 0922

Instrument ID: NT5

Heated Purge: (Y/N) Y

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1223	LCS1223	LCS1223	0833
02	LCS1223	LCS1223	LCS1223A	0858
03	TRIP BLANK	ZP06C	ZP06C	0947
04	TRIP BLANK	ZP11K	ZP11K	1012
05	TRIP BLANKS	ZP16M	ZP16M	1037
06	PAI-9-12.5-1	ZP16A	ZP16A	1330
07	PAI-10-9.5-1	ZP16C	ZP16C	1419
08	PAI-8-14.5-1	ZP11I	ZP11I2	1444
09	PAI-3-33.5-3	ZP11G	ZP11G2	1509
10	PAI-9-12.5-1	ZP16B	ZP16B2	1534
11	PAI-10-19.5-	ZP16D	ZP16D	1558
12	PAI-10-24.5-	ZP16E	ZP16E	1623
13	PAI-11-9.5-1	ZP06A	ZP06A	1648
14	PAI-11-18.0-	ZP06B	ZP06B	1713
15	PAI-4-16.0-1	ZP11C	ZP11C	1737
16	PAI-3-13.0-1	ZP11D	ZP11D	1802
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-122314A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-122314A
LIMS ID: 14-27337
Matrix: Soil
Data Release Authorized: MW
Reported: 12/29/14

QC Report No: ZP06-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT5/PAB
Date Analyzed: 12/23/14 09:22

Sample Amount: 100 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: NA

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	15	50	< 50 U
108-88-3	Toluene	7.6	50	< 50 U
100-41-4	Ethylbenzene	10	50	< 50 U
179601-23-1	m,p-Xylene	20	50	< 50 U
95-47-6	o-Xylene	11	50	< 50 U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	88.8%
d8-Toluene	100%
Bromofluorobenzene	97.0%
d4-1,2-Dichlorobenzene	98.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-122314A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-122314A
LIMS ID: 14-27338
Matrix: Soil
Data Release Authorized: MW
Reported: 12/29/14

QC Report No: ZP06-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT5/PAB
Date Analyzed: 12/23/14 09:22

Sample Amount: 5.00 g-dry-wt
Purge Volume: 5.0 mL
Moisture: NA

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	0.30	1.0	< 1.0 U
108-88-3	Toluene	0.15	1.0	< 1.0 U
100-41-4	Ethylbenzene	0.20	1.0	< 1.0 U
179601-23-1	m,p-Xylene	0.39	1.0	< 1.0 U
95-47-6	o-Xylene	0.22	1.0	< 1.0 U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	88.8%
d8-Toluene	100%
Bromofluorobenzene	97.0%
d4-1,2-Dichlorobenzene	98.9%

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: GEOENGINEERS

Lab Code: ARI Case No.: GAS WORKS PARK SDG No.: ZP16

Lab File ID: BFB1120X BFB Injection Date: 11/20/14

Instrument ID: NT5 BFB Injection Time: 1217

GC Column: RTXVMS ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	18.5
75	30.0 - 60.0% of mass 95	46.4
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.1
173	Less than 2.0% of mass 174	0.1 (0.2)1
174	50.0 - 100.0% of mass 95	77.3
175	5.0 - 9.0% of mass 174	5.9 (7.6)1
176	95.0 - 101.0% of mass 174	76.1 (98.5)1
177	5.0 - 9.0% of mass 176	5.2 (6.8)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	1	SCL0002-CAL1	0011120	11/20/14	1321
02	2	SCL0002-CAL2	0021120	11/20/14	1346
03	5	SCL0002-CAL3	0051120	11/20/14	1410
04	10	SCL0002-CAL4	0101120	11/20/14	1435
05	50	SCL0002-CAL5	0501120	11/20/14	1500
06	100	SCL0002-CAL6	1001120	11/20/14	1525
07	150	SCL0002-CAL7	1501120	11/20/14	1550
08	200	SCL0002-CAL8	2001120	11/20/14	1614
09	ICV1120	SCL0002-SCV1	ICV1120	11/20/14	1639
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: GEOENGINEERS

Lab Code: ARI Case No.: GAS WORKS PARK SDG No.: ZP16

Lab File ID: BFB1223 BFB Injection Date: 12/23/14

Instrument ID: NT5 BFB Injection Time: 0734

GC Column: RTXVMS ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	18.4
75	30.0 - 60.0% of mass 95	48.8
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.4
173	Less than 2.0% of mass 174	0.9 (1.1)1
174	50.0 - 100.0% of mass 95	80.1
175	5.0 - 9.0% of mass 174	5.9 (7.3)1
176	95.0 - 101.0% of mass 174	77.2 (96.3)1
177	5.0 - 9.0% of mass 176	5.4 (6.9)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	CC1223	CC1223	CC1223	12/23/14	0808
02	LCS1223	LCS1223	LCS1223	12/23/14	0833
03	LCS1223	LCS1223	LCS1223A	12/23/14	0858
04	MB1223	MB1223	MB1223	12/23/14	0922
05	TRIP BLANK	ZP06C	ZP06C	12/23/14	0947
06	TRIP BLANK	ZP11K	ZP11K	12/23/14	1012
07	TRIP BLANKS	ZP16M	ZP16M	12/23/14	1037
08	PAI-9-12.5-13.0	ZP16A	ZP16A	12/23/14	1330
09	PAI-10-9.5-10.0	ZP16C	ZP16C	12/23/14	1419
10	PAI-8-14.5-15.0	ZP11I	ZP11I2	12/23/14	1444
11	PAI-3-33.5-34.0	ZP11G	ZP11G2	12/23/14	1509
12	PAI-9-12.5-13-DU	ZP16B	ZP16B2	12/23/14	1534
13	PAI-10-19.5-20.0	ZP16D	ZP16D	12/23/14	1558
14	PAI-10-24.5-25.0	ZP16E	ZP16E	12/23/14	1623
15	PAI-11-9.5-10	ZP06A	ZP06A	12/23/14	1648
16	PAI-11-18.0-18.5	ZP06B	ZP06B	12/23/14	1713
17	PAI-4-16.0-16.5	ZP11C	ZP11C	12/23/14	1737
18	PAI-3-13.0-13.5	ZP11D	ZP11D	12/23/14	1802
19					
20					
21					
22					

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

LAB FILE ID: RF1: 0011120 RF2: 0021120 RF5: 0051120
RF10: 0101120 RF50: 0501120

COMPOUND	RF1	RF2	RF5	RF10	RF50
Chloromethane	0.949	1.008	0.921	1.124	1.051
Vinyl Chloride	0.867	0.917	0.810	1.046	1.016
Bromomethane	0.494	0.469	0.373	0.467	0.349
Chloroethane	0.578	0.777	0.578	0.685	0.600
Trichlorofluoromethane	1.172	1.211	1.065	1.204	1.146
Acrolein	0.135	0.143	0.127	0.148	0.142
112Trichloro122Trifluoroetha	0.684	0.665	0.612	0.675	0.605
Acetone	0.269	0.238	0.176	0.199	0.180
1,1-Dichloroethene	0.651	0.636	0.590	0.682	0.601
Bromoethane	0.491	0.452	0.394	0.505	0.406
Iodomethane	0.165	0.143	0.148	0.267	0.384
Methylene Chloride		0.954	0.756	0.805	0.712
Acrylonitrile	0.255	0.288	0.282	0.305	0.302
Carbon Disulfide	2.309	2.143	1.980	2.280	1.989
Trans-1,2-Dichloroethene	0.747	0.804	0.745	0.804	0.778
Vinyl Acetate	0.363	0.366	0.366	0.362	0.364
1,1-Dichloroethane	1.416	1.460	1.412	1.505	1.466
2-Butanone	0.076	0.075	0.081	0.088	0.082
2,2-Dichloropropane	1.057	1.097	1.090	1.162	1.135
Cis-1,2-Dichloroethene	0.797	0.805	0.814	0.830	0.803
Chloroform	1.279	1.258	1.206	1.284	1.231
Bromochloromethane	0.319	0.372	0.366	0.356	0.350
1,1,1-Trichloroethane	1.148	1.152	1.134	1.201	1.162
1,1-Dichloropropene	0.419	0.427	0.429	0.433	0.415
Carbon Tetrachloride	0.392	0.401	0.378	0.407	0.394
1,2-Dichloroethane	0.339	0.393	0.377	0.392	0.364
Benzene	1.171	1.263	1.207	1.275	1.157
Trichloroethene	0.307	0.314	0.306	0.330	0.298
1,2-Dichloropropane	0.350	0.309	0.329	0.334	0.318
Bromodichloromethane	0.362	0.382	0.375	0.391	0.371
Dibromomethane	0.151	0.158	0.163	0.163	0.156
2-Chloroethyl Vinyl Ether	0.163	0.184	0.189	0.184	0.186
4-Methyl-2-Pentanone	0.110	0.140	0.130	0.139	0.142
Cis 1,3-dichloropropene	0.435	0.481	0.455	0.478	0.490
Toluene	0.795	0.958	0.793	0.811	0.897
Trans 1,3-Dichloropropene	0.382	0.385	0.388	0.417	0.440
2-Hexanone	0.180	0.187	0.193	0.208	0.201

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

LAB FILE ID: RF1: 0011120 RF2: 0021120 RF5: 0051120
RF10: 0101120 RF50: 0501120

COMPOUND	RF1	RF2	RF5	RF10	RF50
1,1,2-Trichloroethane	0.210	0.271	0.240	0.279	0.269
1,3-Dichloropropane	0.373	0.391	0.369	0.425	0.397
Tetrachloroethene	0.315	0.301	0.267	0.308	0.283
Chlorodibromomethane	0.205	0.234	0.219	0.253	0.245
1,2-Dibromoethane	0.216	0.253	0.246	0.258	0.254
Chlorobenzene	0.774	0.815	0.818	0.844	0.790
Ethyl Benzene	1.466	1.465	1.389	1.522	1.396
1,1,1,2-Tetrachloroethane	0.246	0.260	0.253	0.265	0.261
m,p-xylene	0.598	0.584	0.559	0.591	0.553
o-Xylene	0.566	0.540	0.534	0.552	0.532
Styrene	0.881	0.841	0.851	0.915	0.859
Bromoform	0.267	0.263	0.248	0.272	0.280
1,1,2,2-Tetrachloroethane	0.466	0.534	0.519	0.534	0.526
1,2,3-Trichloropropane	0.164	0.176	0.173	0.190	0.170
Trans-1,4-Dichloro 2-Butene	0.133	0.142	0.128	0.150	0.152
N-Propyl Benzene	3.163	3.265	3.103	3.166	2.974
Bromobenzene	0.592	0.621	0.599	0.608	0.576
Isopropyl Benzene	2.783	2.756	2.710	2.785	2.659
2-Chloro Toluene	1.916	1.893	1.744	1.842	1.746
4-Chloro Toluene	1.932	1.999	1.885	1.885	1.832
T-Butyl Benzene	2.049	2.022	1.994	2.055	1.930
1,3,5-Trimethyl Benzene	2.325	2.267	2.224	2.315	2.195
1,2,4-Trimethylbenzene	2.245	2.277	2.261	2.292	2.179
S-Butyl Benzene	3.059	3.086	2.987	3.069	2.905
4-Isopropyl Toluene	2.404	2.503	2.435	2.480	2.384
1,3-Dichlorobenzene	1.229	1.250	1.188	1.197	1.138
1,4-Dichlorobenzene	1.372	1.342	1.237	1.214	1.158
N-Butyl Benzene	2.406	2.262	2.301	2.316	2.177
1,2-Dichlorobenzene	1.254	1.162	1.117	1.140	1.076
1,2-Dibromo 3-Chloropropane	0.086	0.075	0.086	0.090	0.096
1,2,4-Trichlorobenzene	0.958	0.809	0.751	0.760	0.718
Hexachloro 1,3-Butadiene	0.413	0.414	0.387	0.408	0.376
Naphthalene	2.262	1.943	1.927	1.946	1.839
1,2,3-Trichlorobenzene	0.793	0.726	0.716	0.701	0.667
Dichlorodifluoromethane	0.557	0.510	0.610	0.833	0.781
Methyl tert butyl ether	1.960	1.988	2.006	2.102	2.122

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

LAB FILE ID: RF1: 0011120 RF2: 0021120 RF5: 0051120
RF10: 0101120 RF50: 0501120

COMPOUND	RF1	RF2	RF5	RF10	RF50
d4-1,2-Dichloroethane	0.726	0.738	0.728	0.735	0.750
d8-Toluene	1.240	1.408	1.252	1.247	1.338
4-Bromofluorobenzene	0.529	0.508	0.498	0.510	0.514
d4-1,2-Dichlorobenzene	0.954	0.952	0.940	0.933	0.951
Dibromofluoromethane	0.687	0.658	0.677	0.682	0.701

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

LAB FILE ID: RF100: 1001120 RF150: 1501120 RF200: 2001120

COMPOUND	RF100	RF150	RF200
Chloromethane	1.043	1.006	1.011
Vinyl Chloride	0.975	0.965	0.940
Bromomethane	0.307	0.306	0.298
Chloroethane	0.571	0.556	0.538
Trichlorofluoromethane	1.067	1.034	0.976
Acrolein	0.118	0.112	0.103
112Trichloro122Trifluoroetha	0.593	0.610	0.564
Acetone	0.146		
1,1-Dichloroethene	0.592	0.597	0.550
Bromoethane	0.366	0.361	0.336
Iodomethane	0.415	0.433	0.395
Methylene Chloride	0.552		
Acrylonitrile	0.303	0.282	0.278
Carbon Disulfide	1.956	2.007	1.852
Trans-1,2-Dichloroethene	0.723	0.567	0.539
Vinyl Acetate	0.379	0.365	0.360
1,1-Dichloroethane	1.469	1.419	1.405
2-Butanone	0.085	0.076	0.075
2,2-Dichloropropane	1.130	1.086	1.076
Cis-1,2-Dichloroethene	0.807	0.776	0.784
Chloroform	1.248	1.203	1.192
Bromochloromethane	0.356	0.334	0.334
1,1,1-Trichloroethane	1.188	1.138	1.123
1,1-Dichloropropene	0.429	0.406	0.433
Carbon Tetrachloride	0.398	0.381	0.398
1,2-Dichloroethane	0.377	0.354	0.372
Benzene	1.208	1.146	1.212
Trichloroethene	0.301	0.293	0.299
1,2-Dichloropropane	0.327	0.314	0.325
Bromodichloromethane	0.379	0.366	0.372
Dibromomethane	0.159	0.149	0.154
2-Chloroethyl Vinyl Ether	0.199	0.209	0.197
4-Methyl-2-Pentanone	0.133	0.137	0.140
Cis 1,3-dichloropropene	0.489	0.513	0.475
Toluene	0.817	0.868	0.839
Trans 1,3-Dichloropropene	0.429	0.449	0.456
2-Hexanone	0.213	0.206	0.209

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

LAB FILE ID: RF100: 1001120 RF150: 1501120 RF200: 2001120

COMPOUND	RF100	RF150	RF200
1,1,2-Trichloroethane	0.244	0.262	0.264
1,3-Dichloropropane	0.382	0.405	0.412
Tetrachloroethene	0.262	0.289	0.295
Chlorodibromomethane	0.244	0.256	0.262
1,2-Dibromoethane	0.238	0.255	0.261
Chlorobenzene	0.809	0.774	0.793
Ethyl Benzene	1.405	1.339	1.332
1,1,1,2-Tetrachloroethane	0.271	0.267	0.270
m,p-xylene	0.550	0.529	0.524
o-Xylene	0.546	0.530	0.537
Styrene	0.893	0.848	0.868
Bromoform	0.294	0.294	0.296
1,1,2,2-Tetrachloroethane	0.556	0.542	0.558
1,2,3-Trichloropropane	0.176	0.173	0.175
Trans-1,4-Dichloro 2-Butene	0.159	0.160	0.163
N-Propyl Benzene	2.939	2.795	2.767
Bromobenzene	0.589	0.579	0.595
Isopropyl Benzene	2.623	2.549	2.519
2-Chloro Toluene	1.758	1.727	1.735
4-Chloro Toluene	1.822	1.789	1.796
T-Butyl Benzene	1.940	1.870	1.882
1,3,5-Trimethyl Benzene	2.192	2.115	2.119
1,2,4-Trimethylbenzene	2.177	2.092	2.082
S-Butyl Benzene	2.859	2.737	2.696
4-Isopropyl Toluene	2.364	2.273	2.251
1,3-Dichlorobenzene	1.152	1.129	1.149
1,4-Dichlorobenzene	1.157	1.137	1.154
N-Butyl Benzene	2.168	2.086	2.064
1,2-Dichlorobenzene	1.086	1.067	1.095
1,2-Dibromo 3-Chloropropane	0.103	0.102	0.102
1,2,4-Trichlorobenzene	0.741	0.740	0.750
Hexachloro 1,3-Butadiene	0.384	0.384	0.392
Naphthalene	1.956	1.887	1.889
1,2,3-Trichlorobenzene	0.695	0.691	0.707
Dichlorodifluoromethane	0.760	0.743	0.719
Methyl tert butyl ether	2.137	1.776	1.540

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

LAB FILE ID: RF100: 1001120 RF150: 1501120 RF200: 2001120

COMPOUND	RF100	RF150	RF200
d4-1,2-Dichloroethane	0.746	0.711	0.700
d8-Toluene	1.248	1.311	1.195
4-Bromofluorobenzene	0.515	0.516	0.518
d4-1,2-Dichlorobenzene	0.944	0.946	0.937
Dibromofluoromethane	0.713	0.691	0.686

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
Chloromethane	AVRG	1.014	6.2
Vinyl Chloride	AVRG	0.942	8.2
Bromomethane	LINR		0.9975
Chloroethane	AVRG	0.610	13.2
Trichlorofluoromethane	AVRG	1.109	7.8
Acrolein	AVRG	0.128	12.6
112Trichloro122Trifluoroetha	AVRG	0.626	6.9
Acetone	2ORDR		0.9994
1,1-Dichloroethene	AVRG	0.612	6.8
Bromoethane	AVRG	0.414	15.1
Iodomethane	LINR		0.9962
Methylene Chloride	AVRG	0.756	19.3
Acrylonitrile	AVRG	0.287	5.8
Carbon Disulfide	AVRG	2.064	7.9
Trans-1,2-Dichloroethene	AVRG	0.714	14.5
Vinyl Acetate	AVRG	0.366	1.6
1,1-Dichloroethane	AVRG	1.444	2.5
2-Butanone	AVRG	0.080	6.4
2,2-Dichloropropane	AVRG	1.104	3.2
Cis-1,2-Dichloroethene	AVRG	0.802	2.1
Chloroform	AVRG	1.238	2.9
Bromochloromethane	AVRG	0.348	5.2
1,1,1-Trichloroethane	AVRG	1.156	2.3
1,1-Dichloropropene	AVRG	0.424	2.3
Carbon Tetrachloride	AVRG	0.394	2.5
1,2-Dichloroethane	AVRG	0.371	5.0
Benzene	AVRG	1.205	3.9
Trichloroethene	AVRG	0.306	3.8
1,2-Dichloropropane	AVRG	0.326	3.9
Bromodichloromethane	AVRG	0.375	2.4
Dibromomethane	AVRG	0.157	3.3
2-Chloroethyl Vinyl Ether	AVRG	0.189	7.2
4-Methyl-2-Pentanone	AVRG	0.134	7.8
Cis 1,3-dichloropropene	AVRG	0.477	4.9
Toluene	AVRG	0.847	6.8
Trans 1,3-Dichloropropene	AVRG	0.418	7.1
2-Hexanone	AVRG	0.200	5.8

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
1,1,2-Trichloroethane	AVRG	0.255	8.8
1,3-Dichloropropane	AVRG	0.394	4.9
Tetrachloroethene	AVRG	0.290	6.5
Chlorodibromomethane	AVRG	0.240	8.1
1,2-Dibromoethane	AVRG	0.248	5.8
Chlorobenzene	AVRG	0.802	3.0
Ethyl Benzene	AVRG	1.414	4.6
1,1,1,2-Tetrachloroethane	AVRG	0.262	3.4
m,p-xylene	AVRG	0.561	4.9
o-Xylene	AVRG	0.542	2.2
Styrene	AVRG	0.869	2.9
Bromoform	AVRG	0.277	6.2
1,1,2,2-Tetrachloroethane	AVRG	0.529	5.4
1,2,3-Trichloropropane	AVRG	0.175	4.2
Trans-1,4-Dichloro 2-Butene	AVRG	0.148	8.6
N-Propyl Benzene	AVRG	3.022	6.0
Bromobenzene	AVRG	0.595	2.5
Isopropyl Benzene	AVRG	2.673	3.9
2-Chloro Toluene	AVRG	1.795	4.3
4-Chloro Toluene	AVRG	1.868	3.9
T-Butyl Benzene	AVRG	1.968	3.7
1,3,5-Trimethyl Benzene	AVRG	2.219	3.6
1,2,4-Trimethylbenzene	AVRG	2.201	3.7
S-Butyl Benzene	AVRG	2.925	5.2
4-Isopropyl Toluene	AVRG	2.387	3.8
1,3-Dichlorobenzene	AVRG	1.179	3.8
1,4-Dichlorobenzene	AVRG	1.221	7.4
N-Butyl Benzene	AVRG	2.223	5.3
1,2-Dichlorobenzene	AVRG	1.125	5.5
1,2-Dibromo 3-Chloropropane	AVRG	0.092	10.9
1,2,4-Trichlorobenzene	AVRG	0.778	9.9
Hexachloro 1,3-Butadiene	AVRG	0.395	3.7
Naphthalene	AVRG	1.956	6.6
1,2,3-Trichlorobenzene	AVRG	0.712	5.2
Dichlorodifluoromethane	AVRG	0.689	16.8
Methyl tert butyl ether	AVRG	1.954	10.4

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
d4-1,2-Dichloroethane	AVRG	0.729	2.3
d8-Toluene	AVRG	1.280	5.3
4-Bromofluorobenzene	AVRG	0.513	1.8
d4-1,2-Dichlorobenzene	AVRG	0.945	0.8
Dibromofluoromethane	AVRG	0.687	2.4

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Cont. Calib. Date: 12/23/14

Init. Calib. Date: 11/20/14 Cont. Calib. Time: 0808

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
Chloromethane	1.014	0.8198	0.100	AVRG	-19.2	
Vinyl Chloride	0.942	0.8135	0.010	AVRG	-13.6	
Bromomethane	50.000	48.670	0.010	LINR	-2.7	
Chloroethane	0.610	0.4933	0.010	AVRG	-19.1	
Trichlorofluoromethane	1.109	1.1184	0.010	AVRG	0.8	
Acrolein	0.128	0.0955	0.010	AVRG	-25.4	<-
112Trichloro122Trifluoroetha	0.626	0.6351	0.010	AVRG	1.4	
Acetone	250.00	190.39	0.010	2ORDR	-23.8	<-
1,1-Dichloroethene	0.612	0.5884	0.010	AVRG	-3.8	
Bromoethane	0.414	0.4290	0.010	AVRG	3.6	
Iodomethane	50.000	43.092	0.010	LINR	-13.8	
Methylene Chloride	0.756	0.6326	0.010	AVRG	-16.3	
Acrylonitrile	0.287	0.2199	0.010	AVRG	-23.4	<-
Carbon Disulfide	2.064	1.9259	0.010	AVRG	-6.7	
Trans-1,2-Dichloroethene	0.713	0.7065	0.010	AVRG	-0.9	
Vinyl Acetate	0.366	0.2661	0.010	AVRG	-27.3	<-
1,1-Dichloroethane	1.444	1.2901	0.100	AVRG	-10.6	
2-Butanone	0.080	0.0610	0.010	AVRG	-23.8	<-
2,2-Dichloropropane	1.104	1.1292	0.010	AVRG	2.3	
Cis-1,2-Dichloroethene	0.802	0.6979	0.010	AVRG	-13.0	
Chloroform	1.238	1.1524	0.010	AVRG	-6.9	
Bromochloromethane	0.348	0.3239	0.010	AVRG	-6.9	
1,1,1-Trichloroethane	1.156	1.1789	0.010	AVRG	2.0	
1,1-Dichloropropene	0.424	0.4721	0.010	AVRG	11.3	
Carbon Tetrachloride	0.394	0.4920	0.010	AVRG	24.9	<-
1,2-Dichloroethane	0.371	0.4074	0.010	AVRG	9.8	
Benzene	1.205	1.2299	0.010	AVRG	2.1	
Trichloroethene	0.306	0.3283	0.010	AVRG	7.3	
1,2-Dichloropropane	0.326	0.3548	0.010	AVRG	8.8	
Bromodichloromethane	0.375	0.4313	0.010	AVRG	15.0	
Dibromomethane	0.157	0.1710	0.010	AVRG	8.9	
2-Chloroethyl Vinyl Ether	0.189	0.1422	0.010	AVRG	-24.8	<-
4-Methyl-2-Pentanone	0.134	0.1305	0.010	AVRG	-2.6	
Cis 1,3-dichloropropene	0.477	0.5429	0.010	AVRG	13.8	
Toluene	0.847	0.9617	0.010	AVRG	13.5	
Trans 1,3-Dichloropropene	0.418	0.4779	0.010	AVRG	14.3	
2-Hexanone	0.200	0.1858	0.010	AVRG	-7.1	

<- Exceeds QC limit of 20% D
* RF less than minimum RF

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Cont. Calib. Date: 12/23/14

Init. Calib. Date: 11/20/14 Cont. Calib. Time: 0808

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
1,1,2-Trichloroethane	0.255	0.2726	0.010	AVRG	6.9	
1,3-Dichloropropane	0.394	0.4146	0.010	AVRG	5.2	
Tetrachloroethene	0.290	0.3392	0.010	AVRG	17.0	
Chlorodibromomethane	0.240	0.2824	0.010	AVRG	17.7	
1,2-Dibromoethane	0.248	0.2778	0.010	AVRG	12.0	
Chlorobenzene	0.802	0.8815	0.300	AVRG	9.9	
Ethyl Benzene	1.414	1.5497	0.010	AVRG	9.6	
1,1,1,2-Tetrachloroethane	0.262	0.3102	0.010	AVRG	18.4	
m,p-xylene	0.561	0.6139	0.010	AVRG	9.4	
o-Xylene	0.542	0.5846	0.010	AVRG	7.8	
Styrene	0.870	0.9495	0.010	AVRG	9.1	
Bromoform	0.277	0.3256	0.100	AVRG	17.5	
1,1,2,2-Tetrachloroethane	0.529	0.5378	0.300	AVRG	1.7	
1,2,3-Trichloropropane	0.175	0.1798	0.010	AVRG	2.7	
Trans-1,4-Dichloro 2-Butene	0.148	0.1533	0.010	AVRG	3.6	
N-Propyl Benzene	3.022	3.3167	0.010	AVRG	9.8	
Bromobenzene	0.595	0.6342	0.010	AVRG	6.6	
Isopropyl Benzene	2.673	2.9451	0.010	AVRG	10.2	
2-Chloro Toluene	1.795	1.9268	0.010	AVRG	7.3	
4-Chloro Toluene	1.868	2.0250	0.010	AVRG	8.4	
T-Butyl Benzene	1.968	2.2004	0.010	AVRG	11.8	
1,3,5-Trimethyl Benzene	2.219	2.4695	0.010	AVRG	11.3	
1,2,4-Trimethylbenzene	2.201	2.4286	0.010	AVRG	10.3	
S-Butyl Benzene	2.925	3.2719	0.010	AVRG	11.8	
4-Isopropyl Toluene	2.387	2.7241	0.010	AVRG	14.1	
1,3-Dichlorobenzene	1.179	1.2958	0.010	AVRG	9.9	
1,4-Dichlorobenzene	1.221	1.2971	0.010	AVRG	6.2	
N-Butyl Benzene	2.222	2.4600	0.010	AVRG	10.7	
1,2-Dichlorobenzene	1.125	1.1830	0.010	AVRG	5.2	
1,2-Dibromo 3-Chloropropane	0.092	0.1005	0.010	AVRG	9.2	
1,2,4-Trichlorobenzene	0.778	0.8375	0.010	AVRG	7.6	
Hexachloro 1,3-Butadiene	0.395	0.4488	0.010	AVRG	13.6	
Naphthalene	1.956	1.9484	0.010	AVRG	-0.4	
1,2,3-Trichlorobenzene	0.712	0.7410	0.010	AVRG	4.1	
Dichlorodifluoromethane	0.689	0.5282	0.010	AVRG	-23.3	<-
Methyl tert butyl ether	1.954	1.8572	0.010	AVRG	-5.0	

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII VOA

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Instrument ID: NT5 Cont. Calib. Date: 12/23/14

Init. Calib. Date: 11/20/14 Cont. Calib. Time: 0808

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
d4-1,2-Dichloroethane	0.729	0.6205	0.010	AVRG	-14.9
d8-Toluene	1.280	1.3328	0.010	AVRG	4.1
4-Bromofluorobenzene	0.514	0.5092	0.010	AVRG	-0.9
d4-1,2-Dichlorobenzene	0.945	0.9322	0.010	AVRG	-1.4
Dibromofluoromethane	0.687	0.5819	0.010	AVRG	-15.3

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII VOA

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZP16 Project: GAS WORKS PARK

Ical Midpoint ID: 0101120 Ical Date: 11/20/14

Instrument ID: NT5 Project Run Date: 11/20/14

		IS1(PFB) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CLB) AREA #	RT #
	ICAL MIDPT	278101	5.12	699590	5.56	830842	8.00
	UPPER LIMIT	556202	5.62	1399180	6.06	1661684	8.50
	LOWER LIMIT	139050	4.62	349795	5.06	415421	7.50
	Sample ID						
01	ICV1120	274481	5.11	695211	5.55	823689	8.00
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.