ZUS revisions 12-10-14

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
Client Company: [illegible]	Phone: 206 [illegible]
Client Contact: [illegible]	
Client Project Name: [illegible] Investigation	
Client Project #: [illegible] TASK 1520	Samplers: [illegible]

Page: [illegible]		of: [illegible]	
Date: 12/8/14		Ice Present?	
No. of Coolers:		Cooler Temps:	

Sample ID	Date	Time	Matrix	No Containers	Hold	Arsenic EPA 200.8	PAHs by EPA 8270 SIM (low level)	BTEX by EPA 8260 (low level)					Notes Comments
[illegible]			W	1	[illegible]			O					XRF gun >100 ppm

The column group "Hold" through the four unlabelled columns is headed "Analysis Requested".

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [illegible]	(Signature) [illegible]	(Signature)	(Signature)
	Printed Name: [illegible]	Printed Name: [illegible]	Printed Name:	Printed Name:
	Company: [illegible]	Company: ARI	Company:	Company:
	Date & Time: [illegible]	Date & Time: 12/8/14 1500	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 [illegible]

[illegible] discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate [illegible]

ZOU11 : 000007

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: GeoEngineers Project Name: Gas Works Part-Play Area

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

Assigned ARI Job No: 7041 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) 12.7

Time: 1420

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90837952

Cooler Accepted by: RH (AV) Date: 12/9/14 Time: 1340

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	12/5/14	

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

Samples Logged by: AV Date: 12/11/14 Time: 1210

***** 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: API-1-29.0-29.5 Vials (~~soil~~ all) have blank labels, sample determined by process of elimination

By: AV Date: 12/11/14

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)

Analytical Resources, Incorporated
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Cooler Temperature Compliance Form

Cooler#: 1 Temperature(°C): 12.7

Sample ID	Bottle Count	Bottle Type
Samples received above 6°C.		

Cooler#: _____ Temperature(°C): _____

Sample ID	Bottle Count	Bottle Type

Cooler#: _____ Temperature(°C): _____

Sample ID	Bottle Count	Bottle Type

Cooler#: _____ Temperature(°C): _____

Sample ID	Bottle Count	Bottle Type

Completed by: AV Date: 12/11/14 Time: 1210

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 1 of 2	
ARI Client Company: GeoEngineers	Phone: 206-239-3231	Date: 12/9/14	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		

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Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: HOLD								Notes/Comments
PAI-6-5.5-6.0	12/9	0910	Soil	6	X								
PAI-6-9.0-9.5	12/9	0905	Soil	6	X								
PAI-7-5.5-6.0	12/9	1000	Soil	6	X								
PAI-7-8.0-8.5	12/9	1010	Soil	6	X								
PAI-7-15.0-15.5	12/9	1100	Soil	6	X								
PAI-7-18.5-19.0	12/9	1110	Soil	6	X								
PAI-7-10.0-10.5	12/9	1040	Soil	6	X								
PAI-7-22.5-23.0	12/9	1145	Soil	6	X								
PAI-2-4.5-5.0	12/9	1300	Soil	6 4	X								
PAI-2-12.5-13.0	12/9	1400	Soil	4	X								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Claudia DeLaVia	Printed Name:	Printed Name:	Printed Name
	Company: GeoEngineers	Company: ARI	Company:	Company
	Date & Time: 12/10/14 1315	Date & Time: 12-10-14 13:15	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 Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 2 of 2	
ARI Client Company: GeoEngineers	Phone: 206-239-3231	Date: 12/9/14	Ice Present?
Client Contact: Zanna Satterwhite		No. of Coolers:	Cooler Temps:
Client Project Name: Gas Works Park			
Client Project #: 0186-846-01	Samplers: Robert Miyahira + Claudia DeLa Via		

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Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: HOLD								Notes/Comments
PAI-2-18.0-18.5	12/9	1440	Soil	4	X								
PAI-2-18.0-18.5-DUP	12/9	1440	Soil	4	X								
PAI-2-19.5-20.0	12/9	1450	Soil	4	X								
PAI-2-24.0-24.5	12/9	1510	Soil	4	X								
PAI-2-28.0-28.5	12/9	1540	Soil	5	X								
TRIP BLANK			Water	1	X								

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by: (Signature)
	Printed Name: Claudia DeLa Via	Printed Name:	Printed Name:	Printed Name:
	Company: GeoEngineers	Company: ARI	Company	Company
	Date & Time 12/10/14 1315	Date & Time: 12/10/14 1315	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.

ZAS revision 12-10-14

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 7698	Turn-around Requested: standard	Page: 1 of 2	
ARI Client Company: Geo Engineers	Phone: 206-239-3231	Date: 12/9/14	ice Present?
Client Contact: Zanna Sutterwhite		No. of Coolers:	Cooler Temps:
Client Project Name: Bas Works Park – Play Area Investigation			
Client Project #: 0186-846-01 Task 02	Samplers: Robert Miyahira + Claudia DeLuca		

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Analysis Requested

Sample ID	Date	Time	Matrix	No. Containers	HOLD	Arsenic EPA 200.8	Lead EPA 200.8	Mercury EPA 7471B						
PAI-6-5.5-6.0	12/9	0910	Soil	6	X									
PAI-6-9.0-9.5	12/9	0905	Soil	6	X	X	X	X						
PAI-7-5.5-6.0	12/9	1000	Soil	6	X	X								
PAI-7-8.0-8.5	12/9	1010	Soil	6	X									
PAI-7-15.0-15.5	12/9	1110	Soil	6	X									
PAI-7-18.5-19.0	12/9	1120	Soil	6	X									
PAI-7-10.0-10.5	12/9	1030	Soil	6	X	X	X	X						
PAI-7-22.5-23.0	12/9	1145	Soil	6	X	X	X	X						
PAI-2-4.5-5.0	12/9	1300	Soil	6	X									
PAI-2-12.5-13.0	12/9	1400	Soil	6	X		X	X						

Comments/Special Instructions

2014-00913

ZAS revisions - 12-10-14

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 2 of 2	
ARI Client Company: GeoEngineers	Phone: 206-239-3231	Date: 12/9/14	Ice Present?
Client Contact: Zanna Sutterwhite		No of Coolers:	Cooler Temps:
Client Project Name: Gas Works Park			
Client Project #: 21186-846-01 Task 1520	Samplers: Robert Miyahira + Claudia DeLaVia		

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Sample ID	Date	Time	Matrix	No Containers	Analysis Requested: HOLD	Arsenic EPA 200.8	Partial Leach EPA 8270 SIM Cleanup	BTEX by EPA 8260C Cleanup					Notes/Comments
PAI-2-18.0-18.5	12/9	1440	Soil	4	X	O							
PAI-2-18.0-18.5-MD	12/9	1440	Soil	4	X	O							X
PAI-2-19.5-20.0	12/9	1450	Soil	4	X								
PAI-2-24.0-24.5	12/9	1510	Soil	4	X								
PAI-2-28.0-28.5	12/9	1540	Soil	5	X	O							
TRIP BLANK			Water	1	X			O					

Comments/Special Instructions

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: GeoEngineer | Project Name: Gas Works Park

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

Assigned ARI Job No: ZO4E | 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: 1410

If cooler temperature is out of compliance fill out form 00070F | Temp Gun ID#: 90277952

Cooler Accepted by: _____ Date 12/10/14 Time: 1315

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	12/5/14	

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

Samples Logged by: AV Date: 12/12/14 Time: 1040

***** 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 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)

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: ZO41, ZO68

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Client: GeoEngineers, Inc.
Project: Gas Works Park-Play Area Investigation, 0186-846-01 Task 1520
ARI Job Nos.: ZO41 & ZO68

Sample Receipt

Ten soil samples and a trip blank were received on December 9, 2014. Select samples were archived upon receipt. The cooler temperature measured by IR thermometer following ARI SOP was 12.7°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

Fifteen soils and a trip blank were received on December 10, 2014. Select samples were archived upon receipt. 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 of d4-1,2-Dichloroethane were outside the control limits high for samples **PAI-6-9.0-9.5** and **PAI-7-10.0-10.5**. All other surrogate percent recoveries were within control limits. No corrective action was taken.

The surrogate percent recovery of d4-1,2-Dichloroethane was outside the control limit for the trip blank associated with ARI job ZO68. All other surrogate percent recoveries were within control limits. No corrective action was taken.

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 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.

Naphthalene was present in **MB-122114** 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 and LCSD percent recoveries were within control limits.

All matrix spike and matrix spike duplicate percent recoveries were outside control limits for sample **PAI-7-10.0-10.5** due to matrix effects. 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 limit. The LCS percent recovery was within 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: ZO41
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-1-13.8-14.3	ZO41A	14-26952	Soil	12/08/14 10:45	12/09/14 13:40
2.	PAI-1-14.5-15.0	ZO41B	14-26953	Soil	12/08/14 11:05	12/09/14 13:40
3.	PAI-1-24.0-24.5	ZO41C	14-26954	Soil	12/08/14 12:10	12/09/14 13:40
4.	PAI-5-8.0-8.5	ZO41D	14-26955	Soil	12/08/14 14:30	12/09/14 13:40
5.	TRIP BLANK	ZO41E	14-26956	Water	12/08/14	12/09/14 13:40
6.	PAI-1-4.5-5.0	ZO41F	14-26957	Soil	12/08/14 10:25	12/09/14 13:40
7.	PAI-1-16.5-17.0	ZO41G	14-26958	Soil	12/08/14 11:35	12/09/14 13:40
8.	PAI-1-29.0-29.5	ZO41H	14-26959	Soil	12/08/14 12:30	12/09/14 13:40
9.	PAI-5-6.0-6.5	ZO41I	14-26960	Soil	12/08/14 14:22	12/09/14 13:40
10.	PAI-5-14.5-15.0	ZO41J	14-26961	Soil	12/08/14 15:00	12/09/14 13:40
11.	PAI-5-13.5-14.0	ZO41K	14-26962	Soil	12/08/14 14:55	12/09/14 13:40

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ZO68
Client: Geoengineers
Project Event: 0186-846-01 Task 1570
Project Name: Gas Works Park-Play Area Investigat

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	PAI-6-9.0-9.5	ZO68A	14-27148	Soil	12/09/14 09:05	12/10/14 13:15
2.	PAI-7-5.5-6.0	ZO68B	14-27149	Soil	12/09/14 10:00	12/10/14 13:15
3.	PAI-7-10.0-10.5	ZO68C	14-27150	Soil	12/09/14 10:40	12/10/14 13:15
4.	PAI-7-22.5-23.0	ZO68D	14-27151	Soil	12/09/14 11:45	12/10/14 13:15
5.	PAI-2-12.5-13.0	ZO68E	14-27152	Soil	12/09/14 14:00	12/10/14 13:15
6.	PAI-2-18.0-18.5	ZO68F	14-27153	Soil	12/09/14 14:40	12/10/14 13:15
7.	PAI-2-18.0-18.5-DUP	ZO68G	14-27154	Soil	12/09/14 14:40	12/10/14 13:15
8.	PAI-2-28.0-28.5	ZO68H	14-27155	Soil	12/09/14 15:40	12/10/14 13:15
9.	TRIP BLANK	ZO68I	14-27156	Water	12/09/14	12/10/14 13:15
10.	PAI-6-5.5-6.0	ZO68J	14-27157	Soil	12/09/14 09:10	12/10/14 13:15
11.	PAI-7-8.0-8.5	ZO68K	14-27158	Soil	12/09/14 10:10	12/10/14 13:15
12.	PAI-7-15.0-15.5	ZO68L	14-27159	Soil	12/09/14 11:00	12/10/14 13:15
13.	PAI-7-18.5-19.0	ZO68M	14-27160	Soil	12/09/14 11:10	12/10/14 13:15
14.	PAI-2-4.5-5.0	ZO68N	14-27161	Soil	12/09/14 13:00	12/10/14 13:15
15.	PAI-2-19.5-20.0	ZO68O	14-27162	Soil	12/09/14 14:50	12/10/14 13:15
16.	PAI-2-24.0-24.5	ZO68P	14-27163	Soil	12/09/14 15:10	12/10/14 13:15

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-1	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: ZO41, ZO68

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-1-14.5-15.0**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZO41B
LIMS ID: 14-26953
Matrix: Soil
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/08/14
Date Received: 12/09/14

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/15/14 17:27

Sample Amount: 3.74 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 33.1%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	**Benzene**	400	1300	20,000
108-88-3	**Toluene**	200	1300	29,000
100-41-4	**Ethylbenzene**	270	1300	7,600
179601-23-1	**m,p-Xylene**	520	1300	24,000
95-47-6	**o-Xylene**	300	1300	12,000

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	116%
d8-Toluene	107%
Bromofluorobenzene	98.5%

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 SAMPLE**
Page 1 of 1

Lab Sample ID: ZO41E
LIMS ID: 14-26956
Matrix: Water
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat 0186-846-01 Task 1520
Date Sampled: 12/08/14
Date Received: 12/09/14

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/15/14 18:01

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	123%
d8-Toluene	110%
Bromofluorobenzene	98.0%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: ZO41-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-121514A	Method Blank	Med	117%	105%	96.7%	NA	0
LCS-121514A	Lab Control	Med	111%	100%	98.0%	NA	0
LCSD-121514A	Lab Control Dup	Med	115%	104%	98.6%	NA	0
ZO41B	PAI-1-14.5-15.0	Med	116%	107%	98.5%	NA	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: 14-26953 to 14-26953

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
ZO41E	TRIP BLANK	5	123%	110%	98.0%	NA	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: 14-26956 to 14-26956

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-6-9.0-9.5**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZO68A
LIMS ID: 14-27148
Matrix: Soil
Data Release Authorized:
Reported: 12/30/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Instrument/Analyst: NT5/SDRD
Date Analyzed: 12/15/14 18:51

Sample Amount: 82.8 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 15.0%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	18	60	2,200
108-88-3	Toluene	9.1	60	6,100
100-41-4	Ethylbenzene	12	60	580
179601-23-1	m,p-Xylene	24	60	4,900
95-47-6	o-Xylene	14	60	1,900

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	127%
d8-Toluene	111%
Bromofluorobenzene	104%
d4-1,2-Dichlorobenzene	106%

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-7-10.0-10.5**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZO68C
LIMS ID: 14-27150
Matrix: Soil
Data Release Authorized:
Reported: 12/30/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Instrument/Analyst: NT5/SDRD
Date Analyzed: 12/15/14 19:15

Sample Amount: 104 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 13.7%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	**Benzene**	**14**	**48**	**170**
108-88-3	**Toluene**	**7.3**	**48**	**120**
100-41-4	Ethylbenzene	9.7	48	< 48 U
179601-23-1	**m,p-Xylene**	**19**	**48**	**56**
95-47-6	o-Xylene	11	48	< 48 U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	125%
d8-Toluene	112%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	105%

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-7-22.5-23.0**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZO68D
LIMS ID: 14-27151
Matrix: Soil
Data Release Authorized:
Reported: 12/30/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Instrument/Analyst: NT5/SDRD
Date Analyzed: 12/15/14 19:40

Sample Amount: 1.80 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 12.4%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	820	2800	110,000
108-88-3	Toluene	420	2800	180,000
100-41-4	Ethylbenzene	560	2800	310,000
179601-23-1	m,p-Xylene	1100	2800	280,000
95-47-6	o-Xylene	620	2800	140,000

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	122%
d8-Toluene	107%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	105%

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-2-12.5-13.0**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZO68E
LIMS ID: 14-27152
Matrix: Soil
Data Release Authorized:
Reported: 12/30/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Instrument/Analyst: NT5/SDRD
Date Analyzed: 12/15/14 20:05

Sample Amount: 30.2 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 48.5%

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	49	170	28,000
108-88-3	Toluene	25	170	1,600
100-41-4	Ethylbenzene	33	170	3,700
179601-23-1	m,p-Xylene	65	170	2,500
95-47-6	o-Xylene	37	170	490

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	120%
d8-Toluene	111%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	105%

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 SAMPLE**
Page 1 of 1

Lab Sample ID: ZO68I
LIMS ID: 14-27156
Matrix: Water
Data Release Authorized:
Reported: 12/30/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat 0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Instrument/Analyst: NT5/SDRD
Date Analyzed: 12/15/14 18:26

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	125%
d8-Toluene	111%
Bromofluorobenzene	97.5%
d4-1,2-Dichlorobenzene	105%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570

ARI ID	Client ID	Level	DCE	TOL	BFB	DCB	TOT OUT
MB-121514A	Method Blank	Med	117%	105%	96.7%	104%	0
LCS-121514A	Lab Control	Med	111%	100%	98.0%	102%	0
LCSD-121514A	Lab Control Dup	Med	115%	104%	98.6%	101%	0
ZO68A	PAI-6-9.0-9.5	Med	127%*	111%	104%	106%	1
ZO68C	PAI-7-10.0-10.5	Med	125%*	112%	101%	105%	1
ZO68D	PAI-7-22.5-23.0	Med	122%	107%	102%	105%	0
ZO68E	PAI-2-12.5-13.0	Med	120%	111%	101%	105%	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: 14-27148 to 14-27152

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: Z068-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
Z068I	TRIP BLANK	5	125%*	111%	97.5%	105%	1

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: 14-27156 to 14-27156

Z041: 39 BC 1/14/15

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-121514A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-121514A
LIMS ID: 14-26953
Matrix: Soil
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT5/PKC
LCSD: NT5/PKC
Date Analyzed LCS: 12/15/14 13:29
LCSD: 12/15/14 13:54

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	2330	2500	93.2%	2170	2500	86.8%	7.1%
Toluene	2280	2500	91.2%	2370	2500	94.8%	3.9%
Ethylbenzene	2340	2500	93.6%	2270	2500	90.8%	3.0%
m,p-Xylene	4690	5000	93.8%	4490	5000	89.8%	4.4%
o-Xylene	2270	2500	90.8%	2170	2500	86.8%	4.5%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	111%	115%
d8-Toluene	100%	104%
Bromofluorobenzene	98.0%	98.6%

4A
VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB1215

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: ZO41

Project: GAS WORKS PARK

Lab File ID: MB1215

Lab Sample ID: MB1215

Date Analyzed: 12/15/14

Time Analyzed: 1419

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	LCS1215	LCS1215	LCS1215	1329
02	LCS1215	LCS1215	LCS1215A	1354
03	PAI-1-14.5-1	ZO41B	ZO41B0	1727
04	TRIP BLANK	ZO41E	ZO41E	1801
05				
06				
07				
08				
09				
10				
11				
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COMMENTS:

4A
VOLATILE METHOD BLANK SUMMARY

BLANK NO.

MB1215

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: ZO68

Project: GAS WORKS PARK

Lab File ID: MB1215

Lab Sample ID: MB1215

Date Analyzed: 12/15/14

Time Analyzed: 1419

GC Column: RTXVMS ID: 0.18 (mm)

Heated Purge: (Y/N) Y

Instrument ID: NT5

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

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1215	LCS1215	LCS1215	1329
02	LCS1215	LCS1215	LCS1215A	1354
03	TRIP BLANK	ZO68I	ZO68I	1826
04	PAI-6-9.0-9.	ZO68A	ZO68A	1851
05	PAI-7-10.0-1	ZO68C	ZO68C	1915
06	PAI-7-22.5-2	ZO68D	ZO68D	1940
07	PAI-2-12.5-1	ZO68E	ZO68E	2005
08				
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ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-121514A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-121514A
LIMS ID: 14-26953
Matrix: Soil
Data Release Authorized:
Reported: 12/29/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/15/14 14:19

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	117%
d8-Toluene	105%
Bromofluorobenzene	96.7%

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.: ZO41

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
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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.: ZO41

Lab File ID: BFB1215A BFB Injection Date: 12/15/14

Instrument ID: NT5 BFB Injection Time: 1143

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	18.0
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	6.9
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	80.9
175	5.0 - 9.0% of mass 174	6.3 (7.8)1
176	95.0 - 101.0% of mass 174	78.5 (96.9)1
177	5.0 - 9.0% of mass 176	5.8 (7.4)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	50	CC1215	CC1215	12/15/14	1251
02	LCS1215	LCS1215	LCS1215	12/15/14	1329
03	LCS1215	LCS1215	LCS1215A	12/15/14	1354
04	MB1215	MB1215	MB1215	12/15/14	1419
05	PAI-1-14.5-15.0	ZO41B	ZO41B0	12/15/14	1727
06	TRIP BLANK	ZO41E	ZO41E	12/15/14	1801
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5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

Instrument ID: NT5 Project: GAS WORKS PARK

BFB Injection Date: 12/15/14 BFB Injection Time: 1143

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	18.0
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	6.9
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	80.9
175	5.0 - 9.0% of mass 174	6.3 (7.8)1
176	95.0 - 101.0% of mass 174	78.5 (96.9)1
177	5.0 - 9.0% of mass 176	5.8 (7.4)2

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

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	50	CC1215	CC1215	12/15/14	1251
02	LCS1215	LCS1215	LCS1215	12/15/14	1329
03	LCS1215	LCS1215	LCS1215A	12/15/14	1354
04	MB1215	MB1215	MB1215	12/15/14	1419
05	TRIP BLANK	ZO68I	ZO68I	12/15/14	1826
06	PAI-6-9.0-9.5	ZO68A	ZO68A	12/15/14	1851
07	PAI-7-10.0-10.5	ZO68C	ZO68C	12/15/14	1915
08	PAI-7-22.5-23.0	ZO68D	ZO68D	12/15/14	1940
09	PAI-2-12.5-13.0	ZO68E	ZO68E	12/15/14	2005
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FORM V VOA

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO41 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: ZO41 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: ZO41 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: ZO41 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: ZO41 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: ZO41 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: ZO41 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: ZO41 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: ZO41 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)

6A

VOLATILE 8270-D INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO68 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

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

LAB FILE ID: RRF1 =0011120 RRF2 =0021120 RRF5 =0051120
RRF10 =0101120 RRF50 =0501120 RRF100=1001120
RRF150=1501120 RRF200=2001120

COMPOUND	RRF 1	RRF 2	RRF 5	RRF 10	RRF 50	RRF 100	RRF 150	RRF 200	RRF 150	R 2
Benzene	1.171	1.263	1.207	1.275	1.157	1.208	1.146	1.212		
Toluene	0.795	0.958	0.793	0.811	0.897	0.817	0.868	0.839		
Ethyl Benzene	1.466	1.465	1.389	1.522	1.396	1.405	1.339	1.332		
m,p-xylene	0.598	0.584	0.559	0.591	0.553	0.550	0.529	0.524		
o-Xylene	0.566	0.540	0.534	0.552	0.532	0.546	0.530	0.537		
d4-1,2-Dichloroethane	0.726	0.738	0.728	0.735	0.750	0.746	0.711	0.700		
d8-Toluene	1.240	1.408	1.252	1.247	1.338	1.248	1.311	1.195		
4-Bromofluorobenzene	0.529	0.508	0.498	0.510	0.514	0.515	0.516	0.518		
Dibromofluoromethane	0.687	0.658	0.677	0.682	0.701	0.713	0.691	0.686		

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

FORM VI VOA

6A

VOLATILE 8270-D INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO68 Project: GAS WORKS PARK

Instrument ID: NT5 Calibration Date: 11/20/14

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

LAB FILE ID: RRF1 =0011120 RRF2 =0021120 RRF5 =0051120
RRF10 =0101120 RRF50 =0501120 RRF100=1001120
RRF150=1501120 RRF200=2001120

COMPOUND	RRF 1	RRF 2	RRF 5	RRF 10	RRF 50	RRF 100	RRF 150	RRF 200	RRF 150	R 2
Benzene	1.171	1.263	1.207	1.275	1.157	1.208	1.146	1.212		
Toluene	0.795	0.958	0.793	0.811	0.897	0.817	0.868	0.839		
Ethyl Benzene	1.466	1.465	1.389	1.522	1.396	1.405	1.339	1.332		
m,p-xylene	0.598	0.584	0.559	0.591	0.553	0.550	0.529	0.524		
o-Xylene	0.566	0.540	0.534	0.552	0.532	0.546	0.530	0.537		
d4-1,2-Dichloroethane	0.726	0.738	0.728	0.735	0.750	0.746	0.711	0.700		
d8-Toluene	1.240	1.408	1.252	1.247	1.338	1.248	1.311	1.195		
4-Bromofluorobenzene	0.529	0.508	0.498	0.510	0.514	0.515	0.516	0.518		
Dibromofluoromethane	0.687	0.658	0.677	0.682	0.701	0.713	0.691	0.686		

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

FORM VI VOA

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO41 Project: GAS WORKS PARK

Instrument ID: NT5 Cont. Calib. Date: 12/15/14

Init. Calib. Date: 11/20/14 Cont. Calib. Time: 1251

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
Chloromethane	1.014	0.8258	0.100	AVRG	-18.6	
Vinyl Chloride	0.942	0.9072	0.010	AVRG	-3.7	
Bromomethane	50.000	26.514	0.010	LINR	-47.0	<-
Chloroethane	0.610	0.5850	0.010	AVRG	-4.1	
Trichlorofluoromethane	1.109	1.2061	0.010	AVRG	8.8	
Acrolein	0.128	0.1213	0.010	AVRG	-5.2	
112Trichloro122Trifluoroetha	0.626	0.7858	0.010	AVRG	25.5	<-
Acetone	250.00	172.07	0.010	2ORDR	-31.2	<-
1,1-Dichloroethene	0.612	0.7246	0.010	AVRG	18.4	
Bromoethane	0.414	0.4955	0.010	AVRG	19.7	
Iodomethane	50.000	35.647	0.010	LINR	-28.7	<-
Methylene Chloride	0.756	0.6767	0.010	AVRG	-10.5	
Acrylonitrile	0.287	0.3133	0.010	AVRG	9.2	
Carbon Disulfide	2.064	2.6172	0.010	AVRG	26.8	<-
Trans-1,2-Dichloroethene	0.713	0.7703	0.010	AVRG	8.0	
Vinyl Acetate	0.366	0.3673	0.010	AVRG	0.4	
1,1-Dichloroethane	1.444	1.5090	0.100	AVRG	4.5	
2-Butanone	0.080	0.0884	0.010	AVRG	10.5	
2,2-Dichloropropane	1.104	1.2730	0.010	AVRG	15.3	
Cis-1,2-Dichloroethene	0.802	0.8269	0.010	AVRG	3.1	
Chloroform	1.238	1.2987	0.010	AVRG	4.9	
Bromochloromethane	0.348	0.3627	0.010	AVRG	4.2	
1,1,1-Trichloroethane	1.156	1.3154	0.010	AVRG	13.8	
1,1-Dichloropropene	0.424	0.4100	0.010	AVRG	-3.3	
Carbon Tetrachloride	0.394	0.4121	0.010	AVRG	4.6	
1,2-Dichloroethane	0.371	0.3367	0.010	AVRG	-9.2	
Benzene	1.205	1.0820	0.010	AVRG	-10.2	
Trichloroethene	0.306	0.2813	0.010	AVRG	-8.1	
1,2-Dichloropropane	0.326	0.2828	0.010	AVRG	-13.2	
Bromodichloromethane	0.375	0.3390	0.010	AVRG	-9.6	
Dibromomethane	0.157	0.1368	0.010	AVRG	-12.9	
2-Chloroethyl Vinyl Ether	0.189	0.1322	0.010	AVRG	-30.0	<-
4-Methyl-2-Pentanone	0.134	0.1270	0.010	AVRG	-5.2	
Cis 1,3-dichloropropene	0.477	0.4183	0.010	AVRG	-12.3	
Toluene	0.847	0.7647	0.010	AVRG	-9.7	
Trans 1,3-Dichloropropene	0.418	0.3903	0.010	AVRG	-6.6	
2-Hexanone	0.200	0.1821	0.010	AVRG	-9.0	

<- 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: ZO41 Project: GAS WORKS PARK

Instrument ID: NT5 Cont. Calib. Date: 12/15/14

Init. Calib. Date: 11/20/14 Cont. Calib. Time: 1251

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
1,1,2-Trichloroethane	0.255	0.2275	0.010	AVRG	-10.8	
1,3-Dichloropropane	0.394	0.3398	0.010	AVRG	-13.8	
Tetrachloroethene	0.290	0.2781	0.010	AVRG	-4.1	
Chlorodibromomethane	0.240	0.2224	0.010	AVRG	-7.3	
1,2-Dibromoethane	0.248	0.2315	0.010	AVRG	-6.6	
Chlorobenzene	0.802	0.7217	0.300	AVRG	-10.0	
Ethyl Benzene	1.414	1.2954	0.010	AVRG	-8.4	
1,1,1,2-Tetrachloroethane	0.262	0.2435	0.010	AVRG	-7.1	
m,p-xylene	0.561	0.5102	0.010	AVRG	-9.0	
o-Xylene	0.542	0.4783	0.010	AVRG	-11.8	
Styrene	0.870	0.7689	0.010	AVRG	-11.6	
Bromoform	0.277	0.2609	0.100	AVRG	-5.8	
1,1,2,2-Tetrachloroethane	0.529	0.4757	0.300	AVRG	-10.1	
1,2,3-Trichloropropane	0.175	0.1587	0.010	AVRG	-9.3	
Trans-1,4-Dichloro 2-Butene	0.148	0.1395	0.010	AVRG	-5.7	
N-Propyl Benzene	3.022	2.8337	0.010	AVRG	-6.2	
Bromobenzene	0.595	0.5210	0.010	AVRG	-12.4	
Isopropyl Benzene	2.673	2.5039	0.010	AVRG	-6.3	
2-Chloro Toluene	1.795	1.6232	0.010	AVRG	-9.6	
4-Chloro Toluene	1.868	1.7254	0.010	AVRG	-7.6	
T-Butyl Benzene	1.968	1.8533	0.010	AVRG	-5.8	
1,3,5-Trimethyl Benzene	2.219	2.0647	0.010	AVRG	-7.0	
1,2,4-Trimethylbenzene	2.201	2.0360	0.010	AVRG	-7.5	
S-Butyl Benzene	2.925	2.7640	0.010	AVRG	-5.5	
4-Isopropyl Toluene	2.387	2.2766	0.010	AVRG	-4.6	
1,3-Dichlorobenzene	1.179	1.0864	0.010	AVRG	-7.8	
1,4-Dichlorobenzene	1.221	1.0798	0.010	AVRG	-11.6	
N-Butyl Benzene	2.222	2.1254	0.010	AVRG	-4.3	
1,2-Dichlorobenzene	1.125	0.9834	0.010	AVRG	-12.6	
1,2-Dibromo 3-Chloropropane	0.092	0.0926	0.010	AVRG	0.6	
1,2,4-Trichlorobenzene	0.778	0.6668	0.010	AVRG	-14.3	
Hexachloro 1,3-Butadiene	0.395	0.3746	0.010	AVRG	-5.2	
Naphthalene	1.956	1.6865	0.010	AVRG	-13.8	
1,2,3-Trichlorobenzene	0.712	0.5973	0.010	AVRG	-16.1	
Dichlorodifluoromethane	0.689	0.4910	0.010	AVRG	-28.7	<-
Methyl tert butyl ether	1.954	2.0117	0.010	AVRG	3.0	

<- 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: ZO41 Project: GAS WORKS PARK

Instrument ID: NT5 Cont. Calib. Date: 12/15/14

Init. Calib. Date: 11/20/14 Cont. Calib. Time: 1251

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
d4-1,2-Dichloroethane	0.729	0.8245	0.010	AVRG	13.1	
d8-Toluene	1.280	1.2520	0.010	AVRG	-2.2	
4-Bromofluorobenzene	0.514	0.4900	0.010	AVRG	-4.7	
d4-1,2-Dichlorobenzene	0.945	0.9699	0.010	AVRG	2.6	
Dibromofluoromethane	0.687	0.8942	0.010	AVRG	30.2	<-

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

FORM VII VOA

7A

VOLATILE 8270-D CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO68 Project: GAS WORKS PARK

Instrument ID: NT5 Cont. Calib. Date: 12/15/14

Init. Calib. Date: 11/20/14 Cont. Calib. Time: 1251

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
Benzene	1.205	1.082	0.010	AVRG	-10.2	
Toluene	0.847	0.765	0.010	AVRG	-9.7	
Ethyl Benzene	1.414	1.295	0.010	AVRG	-8.4	
m,p-xylene	0.561	0.510	0.010	AVRG	-9.1	
o-Xylene	0.542	0.478	0.010	AVRG	-11.8	
d4-1,2-Dichloroethane	0.729	0.824	0.010	AVRG	13.0	
d8-Toluene	1.280	1.252	0.010	AVRG	-2.2	
4-Bromofluorobenzene	0.514	0.490	0.010	AVRG	-4.7	
Dibromofluoromethane	0.687	0.894	0.010	AVRG	30.1	<-

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

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC | Client: GEOENGINEERS

ARI Job No: ZO41 | 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													
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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: ZO41 | Project: GAS WORKS PARK

Ical Midpoint ID: 0101120 | Ical Date: 11/20/14

Instrument ID: NT5 | Project Run Date: 11/20/14

		IS4(DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	450241	10.09				
	UPPER LIMIT	900482	10.59				
	LOWER LIMIT	225120	9.59				
	Sample ID						
01	ICV1120	439864	10.10				
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: ZO41 | Project: GAS WORKS PARK

Ical Midpoint ID: 0101120 | Ical Date: 11/20/14

Instrument ID: NT5 | Project Run Date: 12/15/14

		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	LCS1215	263073	5.11	736552	5.55	895884	8.00
02	LCS1215	262120	5.11	765826	5.55	918243	8.00
03	MB1215	255808	5.11	754895	5.55	936905	8.00
04	PAI-1-14.5-1	269650	5.11	799616	5.55	977210	8.00
05	TRIP BLANK	269236	5.11	808812	5.55	1021699	8.00
06							
07							
08							
09							
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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: ZO41 | Project: GAS WORKS PARK

Ical Midpoint ID: 0101120 | Ical Date: 11/20/14

Instrument ID: NT5 | Project Run Date: 12/15/14

		IS4 (DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	450241	10.09				
	UPPER LIMIT	900482	10.59				
	LOWER LIMIT	225120	9.59				
	Sample ID						
01	LCS1215	482342	10.10				
02	LCS1215	495764	10.10				
03	MB1215	493109	10.10				
04	PAI-1-14.5-1	510773	10.10				
05	TRIP BLANK	531825	10.10				
06							
07							
08							
09							
10							
11							
12							
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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: ZO68 Project: GAS WORKS PARK

Ical Midpoint ID: 0501120 Ical Date: 11/20/14

Instrument ID: NT5 Cont. Cal Date: 12/15/14

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

		IS1 AREA #	RT #	IS2(DFB) AREA #	RT #	IS3 AREA #	RT #
	ICAL MIDPT	269017	5.12	691370	5.56	832963	8.01
	UPPER LIMIT	538034		1382740		1665926	
	LOWER LIMIT	134508		345685		416482	
	CCAL	272452	5.11	786499	5.55	966130	8.00
	UPPER LIMIT		5.61		6.05		8.50
	LOWER LIMIT		4.61		5.05		7.50
01	LCS1215	263073	5.11	736552	5.55	895884	8.00
02	LCS1215	262120	5.11	765826	5.55	918243	8.00
03	MB1215	255808	5.11	754895	5.55	936905	8.00
04	TRIP BLANK	274753	5.12	840694	5.56	1073072	8.01
05	PAI-6-9.0-9.	266881	5.11	808060	5.55	1034518	8.01
06	PAI-7-10.0-1	280546	5.11	839701	5.55	1101205	8.01
07	PAI-7-22.5-2	277761	5.12	856440	5.56	1054935	8.01
08	PAI-2-12.5-1	289799	5.11	840016	5.55	1085698	8.01
09							
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22							
23							
24							
25							

IS1 = Pentafluorobenzene
IS2 = 1,4-Difluorobenzene
IS3 = 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 Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

FORM VIII VOA

8A

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO68 Project: GAS WORKS PARK

Ical Midpoint ID: 0501120 Ical Date: 11/20/14

Instrument ID: NT5 Cont. Cal Date: 12/15/14

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

		IS4 AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	442342	10.10				
	UPPER LIMIT	884684					
	LOWER LIMIT	221171					
	CCAL	504764	10.09				
	UPPER LIMIT		10.59				
	LOWER LIMIT		9.59				
01	LCS1215	482342	10.10				
02	LCS1215	495764	10.10				
03	MB1215	493109	10.10				
04	TRIP BLANK	567065	10.10				
05	PAI-6-9.0-9.	547600	10.10				
06	PAI-7-10.0-1	599306	10.10				
07	PAI-7-22.5-2	572098	10.10				
08	PAI-2-12.5-1	586416	10.10				
09							
10							
11							
12							
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14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

IS4 = 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 Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

FORM VIII VOA

SIM PAH Analysis
Report and Summary QC Forms

ARI Job ID: ZO41, ZO68

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: PAI-1-14.5-15.0
SAMPLE

Lab Sample ID: ZO41B
LIMS ID: 14-26953
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/08/14
Date Received: 12/09/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 16:51
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 0.67 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 50.0
Percent Moisture: 33.1 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**1700**	**3,700**	**430,000 EB**
208-96-8	**Acenaphthylene**	**1200**	**3,700**	**14,000**
83-32-9	**Acenaphthene**	**1100**	**3,700**	**5,600**
86-73-7	**Fluorene**	**1100**	**3,700**	**17,000**
85-01-8	**Phenanthrene**	**1200**	**3,700**	**80,000**
120-12-7	**Anthracene**	**1300**	**3,700**	**19,000**
206-44-0	**Fluoranthene**	**1400**	**3,700**	**58,000**
129-00-0	**Pyrene**	**1700**	**3,700**	**66,000**
56-55-3	**Benzo(a)anthracene**	**1700**	**3,700**	**19,000**
218-01-9	**Chrysene**	**1400**	**3,700**	**22,000**
205-99-2	**Benzo(b)fluoranthene**	**1600**	**3,700**	**13,000**
207-08-9	**Benzo(k)fluoranthene**	**1700**	**3,700**	**6,100**
50-32-8	**Benzo(a)pyrene**	**1800**	**3,700**	**18,000**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**2200**	**3,700**	**9,900**
53-70-3	Dibenz(a,h)anthracene	1900	3,700	< 3,700 U
191-24-2	**Benzo(g,h,i)perylene**	**2100**	**3,700**	**13,000**
TOTBFA	**Total Benzofluoranthenes**	**1700**	**3,700**	**26,000**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

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

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: PAI-1-14.5-15.0
DILUTION

Lab Sample ID: ZO41B
LIMS ID: 14-26953
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/08/14
Date Received: 12/09/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 18:58
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 0.67 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 100
Percent Moisture: 33.1 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	Naphthalene	3400	7,500	460,000 B
208-96-8	Acenaphthylene	2400	7,500	16,000
83-32-9	Acenaphthene	2200	7,500	7,100 J
86-73-7	Fluorene	2200	7,500	17,000
85-01-8	Phenanthrene	2400	7,500	85,000
120-12-7	Anthracene	2700	7,500	21,000
206-44-0	Fluoranthene	2800	7,500	62,000
129-00-0	Pyrene	3400	7,500	69,000
56-55-3	Benzo(a)anthracene	3300	7,500	19,000
218-01-9	Chrysene	2900	7,500	23,000
205-99-2	Benzo(b)fluoranthene	3100	7,500	13,000
207-08-9	Benzo(k)fluoranthene	3400	7,500	7,000 J
50-32-8	Benzo(a)pyrene	3600	7,500	20,000
193-39-5	Indeno(1,2,3-cd)pyrene	4500	7,500	11,000
53-70-3	Dibenz(a,h)anthracene	3800	7,500	< 7,500 U
191-24-2	Benzo(g,h,i)perylene	4200	7,500	14,000
TOTBFA	Total Benzofluoranthenes	3400	7,500	28,000

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

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

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520

Client ID	FLN	MNP	DBA	TOT OUT
MB-122114	73.7%	49.0%	84.7%	0
LCS-122114	65.0%	48.3%	77.3%	0
LCSD-122114	64.0%	47.0%	75.3%	0
PAI-1-14.5-15.0	D D	D D	D D	0
PAI-1-14.5-15.0 DL	D D	D D	D D	0

	LCS/MB LIMITS	QC LIMITS
(FLN) = d10-Fluoranthene	(36-134)	(36-134)
(MNP) = d10-2-Methylnaphthalene	(32-120)	(32-120)
(DBA) = d14-Dibenzo(a,h)anthracene	(21-133)	(21-133)

Prep Method: SW3546
Log Number Range: 14-26953 to 14-26953

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: PAI-6-9.0-9.5
SAMPLE

Lab Sample ID: ZO68A
LIMS ID: 14-27148
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 03:13
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 2.70 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 3.00
Percent Moisture: 10.8 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	Naphthalene	25	56	35,000 ESB
208-96-8	Acenaphthylene	18	56	5,700 E
83-32-9	Acenaphthene	17	56	1,400
86-73-7	Fluorene	16	56	5,200
85-01-8	Phenanthrene	18	56	16,000 ES
120-12-7	Anthracene	20	56	5,600 E
206-44-0	Fluoranthene	21	56	12,000 ES
129-00-0	Pyrene	25	56	13,000 ES
56-55-3	Benzo(a)anthracene	25	56	5,300
218-01-9	Chrysene	21	56	6,300 E
205-99-2	Benzo(b)fluoranthene	23	56	4,200
207-08-9	Benzo(k)fluoranthene	25	56	2,200
50-32-8	Benzo(a)pyrene	26	56	6,700 E
193-39-5	Indeno(1,2,3-cd)pyrene	33	56	4,400
53-70-3	Dibenz(a,h)anthracene	28	56	930
191-24-2	Benzo(g,h,i)perylene	31	56	6,100 E
TOTBFA	Total Benzofluoranthenes	25	56	8,600

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	68.0%
d10-2-Methylnaphthalene	51.0%
d14-Dibenzo(a,h)anthracen	78.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: PAI-6-9.0-9.5
DILUTION

Lab Sample ID: ZO68A
LIMS ID: 14-27148
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 17:17
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 2.70 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 60.0
Percent Moisture: 10.8 %

CAS Number	Analyte	DL	LOQ	Result	
91-20-3	**Naphthalene**	500	1,100	79,000	B
208-96-8	**Acenaphthylene**	360	1,100	4,700	
83-32-9	**Acenaphthene**	330	1,100	1,100	J
86-73-7	**Fluorene**	330	1,100	4,500	
85-01-8	**Phenanthrene**	350	1,100	24,000	
120-12-7	**Anthracene**	400	1,100	4,900	
206-44-0	**Fluoranthene**	420	1,100	15,000	
129-00-0	**Pyrene**	500	1,100	18,000	
56-55-3	**Benzo(a)anthracene**	490	1,100	4,700	
218-01-9	**Chrysene**	430	1,100	5,300	
205-99-2	**Benzo(b)fluoranthene**	470	1,100	3,500	
207-08-9	**Benzo(k)fluoranthene**	510	1,100	1,800	
50-32-8	**Benzo(a)pyrene**	530	1,100	5,400	
193-39-5	**Indeno(1,2,3-cd)pyrene**	670	1,100	3,000	
53-70-3	Dibenz(a,h)anthracene	570	1,100	< 1,100	U
191-24-2	**Benzo(g,h,i)perylene**	620	1,100	4,600	
TOTBFA	**Total Benzofluoranthenes**	510	1,100	7,000	

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

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

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: PAI-7-10.0-10.5
SAMPLE

Lab Sample ID: ZO68C
LIMS ID: 14-27150
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 03:39
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 10.6 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 3.00
Percent Moisture: 11.9 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	Naphthalene	6.4	14	5,400 ESB
208-96-8	Acenaphthylene	4.6	14	3,100 ES
83-32-9	Acenaphthene	4.2	14	670
86-73-7	Fluorene	4.2	14	1,600 E
85-01-8	Phenanthrene	4.5	14	5,000 ES
120-12-7	Anthracene	5.0	14	2,200 E
206-44-0	Fluoranthene	5.3	14	5,800 ES
129-00-0	Pyrene	6.4	14	6,400 ES
56-55-3	Benzo(a)anthracene	6.3	14	3,400 ES
218-01-9	Chrysene	5.4	14	4,400 ES
205-99-2	Benzo(b)fluoranthene	6.0	14	4,300 ES
207-08-9	Benzo(k)fluoranthene	6.5	14	2,100 E
50-32-8	Benzo(a)pyrene	6.7	14	5,600 ES
193-39-5	Indeno(1,2,3-cd)pyrene	8.5	14	5,100 ES
53-70-3	Dibenz(a,h)anthracene	7.2	14	920
191-24-2	Benzo(g,h,i)perylene	7.9	14	7,000 ES
TOTBFA	Total Benzofluoranthenes	6.5	14	8,800 ES

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	68.0%
d10-2-Methylnaphthalene	58.0%
d14-Dibenzo(a,h)anthracen	59.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: PAI-7-10.0-10.5
DILUTION

Lab Sample ID: ZO68C
LIMS ID: 14-27150
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 17:42
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 10.6 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 30.0
Percent Moisture: 11.9 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	Naphthalene	64	140	7,400 B
208-96-8	Acenaphthylene	46	140	4,200
83-32-9	Acenaphthene	42	140	360
86-73-7	Fluorene	42	140	1,700
85-01-8	Phenanthrene	45	140	11,000
120-12-7	Anthracene	50	140	3,100
206-44-0	Fluoranthene	53	140	13,000
129-00-0	Pyrene	64	140	15,000 E
56-55-3	Benzo(a)anthracene	63	140	4,600
218-01-9	Chrysene	54	140	6,000
205-99-2	Benzo(b)fluoranthene	60	140	5,200
207-08-9	Benzo(k)fluoranthene	65	140	2,500
50-32-8	Benzo(a)pyrene	67	140	7,600
193-39-5	Indeno(1,2,3-cd)pyrene	85	140	5,400
53-70-3	Dibenz(a,h)anthracene	72	140	820
191-24-2	Benzo(g,h,i)perylene	79	140	7,700
TOTBFA	Total Benzofluoranthenes	65	140	10,000

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

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

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
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Sample ID: PAI-7-10.0-10.5
DILUTION2

Lab Sample ID: ZO68C
LIMS ID: 14-27150
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 19:23
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 10.6 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 60.0
Percent Moisture: 11.9 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	Naphthalene	130	280	7,200 B
208-96-8	Acenaphthylene	91	280	4,200
83-32-9	Acenaphthene	84	280	320
86-73-7	Fluorene	83	280	1,700
85-01-8	Phenanthrene	89	280	12,000
120-12-7	Anthracene	100	280	3,000
206-44-0	Fluoranthene	110	280	13,000
129-00-0	Pyrene	130	280	16,000
56-55-3	Benzo(a)anthracene	130	280	4,500
218-01-9	Chrysene	110	280	5,700
205-99-2	Benzo(b)fluoranthene	120	280	5,200
207-08-9	Benzo(k)fluoranthene	130	280	2,500
50-32-8	Benzo(a)pyrene	130	280	7,600
193-39-5	Indeno(1,2,3-cd)pyrene	170	280	5,300
53-70-3	Dibenz(a,h)anthracene	140	280	800
191-24-2	Benzo(g,h,i)perylene	160	280	7,600
TOTBFA	Total Benzofluoranthenes	130	280	10,000

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

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

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
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Sample ID: PAI-7-22.5-23.0
SAMPLE

Lab Sample ID: ZO68D
LIMS ID: 14-27151
Matrix: Soil
Data Release Authorized: MW
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 04:55
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 2.72 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 3.00
Percent Moisture: 9.6 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	Naphthalene	25	55	59,000 ESB
208-96-8	Acenaphthylene	18	55	16,000 ES
83-32-9	Acenaphthene	16	55	14,000 ES
86-73-7	Fluorene	16	55	21,000 ES
85-01-8	Phenanthrene	17	55	31,000 ES
120-12-7	Anthracene	20	55	12,000 ES
206-44-0	Fluoranthene	21	55	14,000 ES
129-00-0	Pyrene	25	55	19,000 ES
56-55-3	Benzo(a)anthracene	24	55	11,000 ES
218-01-9	Chrysene	21	55	12,000 ES
205-99-2	Benzo(b)fluoranthene	23	55	4,000
207-08-9	Benzo(k)fluoranthene	25	55	2,700
50-32-8	Benzo(a)pyrene	26	55	8,800 ES
193-39-5	Indeno(1,2,3-cd)pyrene	33	55	3,100
53-70-3	Dibenz(a,h)anthracene	28	55	1,300
191-24-2	Benzo(g,h,i)perylene	31	55	3,400
TOTBFA	Total Benzofluoranthenes	25	55	10,000

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	66.0%
d10-2-Methylnaphthalene	61.0%
d14-Dibenzo(a,h)anthracen	67.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
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Sample ID: PAI-7-22.5-23.0
DILUTION

Lab Sample ID: ZO68D
LIMS ID: 14-27151
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 18:07
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 2.72 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 300
Percent Moisture: 9.6 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**2500**	**5,500**	**390,000 B**
208-96-8	**Acenaphthylene**	**1800**	**5,500**	**45,000**
83-32-9	**Acenaphthene**	**1600**	**5,500**	**28,000**
86-73-7	**Fluorene**	**1600**	**5,500**	**55,000**
85-01-8	**Phenanthrene**	**1700**	**5,500**	**120,000**
120-12-7	**Anthracene**	**2000**	**5,500**	**28,000**
206-44-0	**Fluoranthene**	**2100**	**5,500**	**28,000**
129-00-0	**Pyrene**	**2500**	**5,500**	**43,000**
56-55-3	**Benzo(a)anthracene**	**2400**	**5,500**	**14,000**
218-01-9	**Chrysene**	**2100**	**5,500**	**14,000**
205-99-2	**Benzo(b)fluoranthene**	**2300**	**5,500**	**4,900 J**
207-08-9	**Benzo(k)fluoranthene**	**2500**	**5,500**	**3,000 J**
50-32-8	**Benzo(a)pyrene**	**2600**	**5,500**	**11,000**
193-39-5	Indeno(1,2,3-cd)pyrene	3300	5,500	< 5,500 U
53-70-3	Dibenz(a,h)anthracene	2800	5,500	< 5,500 U
191-24-2	**Benzo(g,h,i)perylene**	**3100**	**5,500**	**3,900 J**
TOTBFA	**Total Benzofluoranthenes**	**2500**	**5,500**	**11,000**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

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

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
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Sample ID: PAI-2-12.5-13.0
SAMPLE

Lab Sample ID: ZO68E
LIMS ID: 14-27152
Matrix: Soil
Data Release Authorized: MW
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 18:32
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 10.3 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 100
Percent Moisture: 48.5 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**220**	**480**	**80,000 EB**
208-96-8	**Acenaphthylene**	**160**	**480**	**530**
83-32-9	**Acenaphthene**	**140**	**480**	**3,200**
86-73-7	**Fluorene**	**140**	**480**	**1,800**
85-01-8	**Phenanthrene**	**150**	**480**	**3,800**
120-12-7	**Anthracene**	**170**	**480**	**770**
206-44-0	**Fluoranthene**	**180**	**480**	**1,500**
129-00-0	**Pyrene**	**220**	**480**	**1,600 J**
56-55-3	**Benzo(a)anthracene**	**210**	**480**	**310 J**
218-01-9	**Chrysene**	**190**	**480**	**340 J**
205-99-2	Benzo(b)fluoranthene	200	480	< 480 U
207-08-9	Benzo(k)fluoranthene	220	480	< 480 U
50-32-8	Benzo(a)pyrene	230	480	< 480 U
193-39-5	Indeno(1,2,3-cd)pyrene	290	480	< 480 U
53-70-3	Dibenz(a,h)anthracene	250	480	< 480 U
191-24-2	Benzo(g,h,i)perylene	270	480	< 480 U
TOTBFA	Total Benzofluoranthenes	220	480	< 480 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

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

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
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Sample ID: PAI-2-12.5-13.0
DILUTION

Lab Sample ID: ZO68E
LIMS ID: 14-27152
Matrix: Soil
Data Release Authorized: MW
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 19:48
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 10.3 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 300
Percent Moisture: 48.5 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**660**	**1,400**	**85,000 B**
208-96-8	Acenaphthylene	470	1,400	< 1,400 U
83-32-9	**Acenaphthene**	**430**	**1,400**	**3,200**
86-73-7	**Fluorene**	**430**	**1,400**	**1,800**
85-01-8	**Phenanthrene**	**460**	**1,400**	**3,700**
120-12-7	**Anthracene**	**520**	**1,400**	**830 J**
206-44-0	**Fluoranthene**	**540**	**1,400**	**1,600**
129-00-0	**Pyrene**	**660**	**1,400**	**1,500**
56-55-3	Benzo(a)anthracene	640	1,400	< 1,400 U
218-01-9	Chrysene	560	1,400	< 1,400 U
205-99-2	Benzo(b)fluoranthene	610	1,400	< 1,400 U
207-08-9	Benzo(k)fluoranthene	660	1,400	< 1,400 U
50-32-8	Benzo(a)pyrene	690	1,400	< 1,400 U
193-39-5	Indeno(1,2,3-cd)pyrene	870	1,400	< 1,400 U
53-70-3	Dibenz(a,h)anthracene	740	1,400	< 1,400 U
191-24-2	Benzo(g,h,i)perylene	810	1,400	< 1,400 U
TOTBFA	Total Benzofluoranthenes	660	1,400	< 1,400 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

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

FORM I

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570

Client ID	FLN	MNP	DBA	TOT OUT
PAI-6-9.0-9.5	68.0%	51.0%	78.0%	0
PAI-6-9.0-9.5 DL	D D	D D	D D	0
MB-122114	73.7%	49.0%	84.7%	0
LCS-122114	65.0%	48.3%	77.3%	0
LCSD-122114	64.0%	47.0%	75.3%	0
PAI-7-10.0-10.5	68.0%	58.0%	59.0%	0
PAI-7-10.0-10.5 DL	D D	D D	D D	0
PAI-7-10.0-10.5 DL2	D D	D D	D D	0
PAI-7-10.0-10.5 MS	72.0%	51.0%	66.0%	0
PAI-7-10.0-10.5 MSD	68.0%	51.0%	61.0%	0
PAI-7-22.5-23.0	66.0%	61.0%	67.0%	0
PAI-7-22.5-23.0 DL	D D	D D	D D	0
PAI-2-12.5-13.0	D D	D D	D D	0
PAI-2-12.5-13.0 DL	D D	D D	D D	0

	LCS/MB LIMITS	QC LIMITS
(FLN) = d10-Fluoranthene	(36-134)	(36-134)
(MNP) = d10-2-Methylnaphthalene	(32-120)	(32-120)
(DBA) = d14-Dibenzo(a,h)anthracene	(21-133)	(21-133)

Prep Method: SW3546
Log Number Range: 14-27148 to 14-27152

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
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Sample ID: PAI-7-10.0-10.5
MATRIX SPIKE

Lab Sample ID: ZO68C
LIMS ID: 14-27150
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
Event: 0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted MS/MSD: 12/21/14

Sample Amount MS: 10.58 g-dry-wt
MSD: 10.61 g-dry-wt

Date Analyzed MS: 01/14/15 04:04
MSD: 01/14/15 04:30

Final Extract Volume MS: 0.50 mL
MSD: 0.50 mL

Instrument/Analyst MS: NT8/JZ
MSD: NT8/JZ

Dilution Factor MS: 3.00
MSD: 3.00

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Naphthalene	5400 ESB	3900 ESB	142	NA	4690 ESB	141	NA	18.4%
Acenaphthylene	3100 ES	2930 ES	142	NA	2790 E	141	NA	4.9%
Acenaphthene	670	484	142	NA	497	141	NA	2.7%
Fluorene	1600 E	1510 E	142	NA	1500 E	141	NA	0.7%
Phenanthrene	5000 ES	4850 ES	142	NA	5200 ES	141	NA	7.0%
Anthracene	2200 E	2140 E	142	NA	2270 E	141	NA	5.9%
Fluoranthene	5800 ES	5580 ES	142	NA	5940 ES	141	NA	6.2%
Pyrene	6400 ES	6190 ES	142	NA	6300 ES	141	NA	1.8%
Benzo(a)anthracene	3400 ES	3260 ES	142	NA	3280 ES	141	NA	0.6%
Chrysene	4400 ES	4260 ES	142	NA	4310 ES	141	NA	1.2%
Benzo(b)fluoranthene	4300 ES	3990 ES	142	NA	4050 ES	141	NA	1.5%
Benzo(k)fluoranthene	2100 E	1920 E	142	NA	2050 E	141	NA	6.5%
Benzo(a)pyrene	5600 ES	5150 ES	142	NA	5300 ES	141	NA	2.9%
Indeno(1,2,3-cd)pyrene	5100 ES	4570 ES	142	NA	4720 ES	141	NA	3.2%
Dibenz(a,h)anthracene	920	836	142	NA	878	141	NA	4.9%
Benzo(g,h,i)perylene	7000 ES	6440 ES	142	NA	6540 ES	141	NA	1.5%
Total Benzofluoranthenes	8800 ES	8030 ES	425	NA	8300 ES	424	NA	3.3%

Reported in µg/kg (ppb)

NA-No recovery due to high concentration (> 4X) of analyte in original sample, calculated negative recovery, or undetected spike.
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
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Sample ID: PAI-7-10.0-10.5
MATRIX SPIKE

Lab Sample ID: ZO68C
LIMS ID: 14-27150
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 04:04
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 10.6 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 3.00
Percent Moisture: 11.9 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	Naphthalene	6.4	14	---
208-96-8	Acenaphthylene	4.6	14	---
83-32-9	Acenaphthene	4.2	14	---
86-73-7	Fluorene	4.2	14	---
85-01-8	Phenanthrene	4.5	14	---
120-12-7	Anthracene	5.0	14	---
206-44-0	Fluoranthene	5.3	14	---
129-00-0	Pyrene	6.4	14	---
56-55-3	Benzo(a)anthracene	6.3	14	---
218-01-9	Chrysene	5.4	14	---
205-99-2	Benzo(b)fluoranthene	6.0	14	---
207-08-9	Benzo(k)fluoranthene	6.5	14	---
50-32-8	Benzo(a)pyrene	6.7	14	---
193-39-5	Indeno(1,2,3-cd)pyrene	8.5	14	---
53-70-3	Dibenz(a,h)anthracene	7.3	14	---
191-24-2	Benzo(g,h,i)perylene	7.9	14	---
TOTBFA	Total Benzofluoranthenes	6.5	14	---

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	72.0%
d10-2-Methylnaphthalene	51.0%
d14-Dibenzo(a,h)anthracen	66.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
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Sample ID: PAI-7-10.0-10.5
MATRIX SPIKE DUP

Lab Sample ID: ZO68C
LIMS ID: 14-27150
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 04:30
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 10.6 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 3.00
Percent Moisture: 11.9 %

CAS Number	Analyte	DL	LOQ	Result
91-20-3	Naphthalene	6.4	14	---
208-96-8	Acenaphthylene	4.6	14	---
83-32-9	Acenaphthene	4.2	14	---
86-73-7	Fluorene	4.2	14	---
85-01-8	Phenanthrene	4.5	14	---
120-12-7	Anthracene	5.0	14	---
206-44-0	Fluoranthene	5.3	14	---
129-00-0	Pyrene	6.4	14	---
56-55-3	Benzo(a)anthracene	6.3	14	---
218-01-9	Chrysene	5.4	14	---
205-99-2	Benzo(b)fluoranthene	6.0	14	---
207-08-9	Benzo(k)fluoranthene	6.4	14	---
50-32-8	Benzo(a)pyrene	6.7	14	---
193-39-5	Indeno(1,2,3-cd)pyrene	8.5	14	---
53-70-3	Dibenz(a,h)anthracene	7.2	14	---
191-24-2	Benzo(g,h,i)perylene	7.9	14	---
TOTBFA	Total Benzofluoranthenes	6.4	14	---

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	68.0%
d10-2-Methylnaphthalene	51.0%
d14-Dibenzo(a,h)anthracen	61.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
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Sample ID: LCS-122114
LAB CONTROL SAMPLE

Lab Sample ID: LCS-122114
LIMS ID: 14-27150
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
Event: 0186-846-01 Task 1570
Date Sampled: NA
Date Received: NA

Date Extracted: 12/21/14

Date Analyzed LCS: 01/14/15 01:57
LCSD: 01/14/15 02:23
Instrument/Analyst LCS: NT8/JZ
LCSD: NT8/JZ

Sample Amount LCS: 10.00 g-dry-wt
LCSD: 10.00 g-dry-wt
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	68.7 B	150	45.8%	68.0 B	150	45.3%	1.0%
Acenaphthylene	72.6	150	48.4%	72.8	150	48.5%	0.3%
Acenaphthene	68.2	150	45.5%	68.2	150	45.5%	0.0%
Fluorene	76.5	150	51.0%	80.1	150	53.4%	4.6%
Phenanthrene	88.6	150	59.1%	90.8	150	60.5%	2.5%
Anthracene	80.6	150	53.7%	86.2	150	57.5%	6.7%
Fluoranthene	96.2	150	64.1%	101	150	67.3%	4.9%
Pyrene	96.5	150	64.3%	100	150	66.7%	3.6%
Benzo(a)anthracene	96.2	150	64.1%	97.8	150	65.2%	1.6%
Chrysene	94.8	150	63.2%	97.9	150	65.3%	3.2%
Benzo(b)fluoranthene	104	150	69.3%	105	150	70.0%	1.0%
Benzo(k)fluoranthene	96.0	150	64.0%	99.3	150	66.2%	3.4%
Benzo(a)pyrene	90.8	150	60.5%	91.5	150	61.0%	0.8%
Indeno(1,2,3-cd)pyrene	105	150	70.0%	103	150	68.7%	1.9%
Dibenz(a,h)anthracene	107	150	71.3%	106	150	70.7%	0.9%
Benzo(g,h,i)perylene	106	150	70.7%	106	150	70.7%	0.0%
Total Benzofluoranthenes	276	450	61.3%	282	450	62.7%	2.2%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

SIM Semivolatile Surrogate Recovery

	LCS	LCSD
d10-Fluoranthene	65.0%	64.0%
d10-2-Methylnaphthalene	48.3%	47.0%
d14-Dibenzo(a,h)anthracene	77.3%	75.3%

4B

SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

ZO68MBS1

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: ZO68

Project: GAS WORKS PARK-PLAY

Lab File ID: 01141515

Date Extracted: 12/21/14

Instrument ID: NT8

Date Analyzed: 01/14/15

Matrix: SOLID

Time Analyzed: 1626

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

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	ZO41LCSS1	ZO41LCSS1	01131536	01/14/15
02	ZO41LCSDS1	ZO41LCSDS1	01131537	01/14/15
03	PAI-6-9.0-9.5	ZO68A	01131539	01/14/15
04	PAI-7-10.0-10.5	ZO68C	01131540	01/14/15
05	PAI-7-10.0-10.5	ZO68CMS	01131541	01/14/15
06	PAI-7-10.0-10.5	ZO68CMSD	01131542	01/14/15
07	PAI-7-22.5-23.0	ZO68D	01131543	01/14/15
08	PAI-6-9.0-9.5	ZO68A	01141517	01/14/15
09	PAI-7-10.0-10.5	ZO68C	01141518	01/14/15
10	PAI-7-22.5-23.0	ZO68D	01141519	01/14/15
11	PAI-2-12.5-13.0	ZO68E	01141520	01/14/15
12	PAI-7-10.0-10.5	ZO68C	01141522	01/14/15
13	PAI-2-12.5-13.0	ZO68E	01141523	01/14/15
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FORM IV SV

4B

SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

ZO41MBS1

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: ZO41

Project: GAS WORKS PARK-PLAY

Lab File ID: 01141515

Date Extracted: 12/21/14

Instrument ID: NT8

Date Analyzed: 01/14/15

Matrix: SOLID

Time Analyzed: 1626

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

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	ZO41LCSS1	ZO41LCSS1	01131536	01/14/15
02	ZO41LCSDS1	ZO41LCSDS1	01131537	01/14/15
03	PAI-1-14.5-15.0	ZO41B	01141516	01/14/15
04	PAI-1-14.5-15.0	ZO41B	01141521	01/14/15
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FORM IV SV

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-122114
METHOD BLANK

Lab Sample ID: MB-122114
LIMS ID: 14-27150
Matrix: Soil
Data Release Authorized:
Reported: 01/15/15

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: NA
Date Received: NA

Date Extracted: 12/21/14
Date Analyzed: 01/14/15 16:26
Instrument/Analyst: NT8/JZ
GPC Cleanup: No

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	DL	LOQ	Result
91-20-3	**Naphthalene**	**2.3**	**5.0**	**3.2 J**
208-96-8	Acenaphthylene	1.6	5.0	< 5.0 U
83-32-9	Acenaphthene	1.5	5.0	< 5.0 U
86-73-7	Fluorene	1.5	5.0	< 5.0 U
85-01-8	Phenanthrene	1.6	5.0	< 5.0 U
120-12-7	Anthracene	1.8	5.0	< 5.0 U
206-44-0	Fluoranthene	1.9	5.0	< 5.0 U
129-00-0	Pyrene	2.3	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	2.2	5.0	< 5.0 U
218-01-9	Chrysene	1.9	5.0	< 5.0 U
205-99-2	Benzo(b)fluoranthene	2.1	5.0	< 5.0 U
207-08-9	Benzo(k)fluoranthene	2.3	5.0	< 5.0 U
50-32-8	Benzo(a)pyrene	2.4	5.0	< 5.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	3.0	5.0	< 5.0 U
53-70-3	Dibenz(a,h)anthracene	2.6	5.0	< 5.0 U
191-24-2	Benzo(g,h,i)perylene	2.8	5.0	< 5.0 U
TOTBFA	Total Benzofluoranthenes	2.3	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	73.7%
d10-2-Methylnaphthalene	49.0%
d14-Dibenzo(a,h)anthracen	84.7%

FORM I

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

Instrument ID: NT8 Project: GAS WORKS PARK-PLAY AREA

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
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5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

Instrument ID: NT8 Project: GAS WORKS PARK-PLAY AREA

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	ZO41LCSS1	ZO41LCSS1	01131536	01/14/15	0157
03	ZO41LCSDS1	ZO41LCSDS1	01131537	01/14/15	0223
04	PAI-6-9.0-9.5	ZO68A	01131539	01/14/15	0313
05	PAI-7-10.0-10.5	ZO68C	01131540	01/14/15	0339
06	PAI-7-10.0-10.5	ZO68CMS	01131541	01/14/15	0404
07	PAI-7-10.0-10.5	ZO68CMSD	01131542	01/14/15	0430
08	PAI-7-22.5-23.0	ZO68D	01131543	01/14/15	0455
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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 AREA

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	ZO41LCSS1	ZO41LCSS1	01131536	01/14/15	0157
03	ZO41LCSDS1	ZO41LCSDS1	01131537	01/14/15	0223
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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 AREA

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	ZO41MBS1	ZO41MBS1	01141515	01/14/15	1626
03	PAI-6-9.0-9.5	ZO68A	01141517	01/14/15	1717
04	PAI-7-10.0-10.5	ZO68C	01141518	01/14/15	1742
05	PAI-7-22.5-23.0	ZO68D	01141519	01/14/15	1807
06	PAI-2-12.5-13.0	ZO68E	01141520	01/14/15	1832
07	PAI-7-10.0-10.5	ZO68C	01141522	01/14/15	1923
08	PAI-2-12.5-13.0	ZO68E	01141523	01/14/15	1948
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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 AREA

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	ZO41MBS1	ZO41MBS1	01141515	01/14/15	1626
03	PAI-1-14.5-15.0	ZO41B	01141516	01/14/15	1651
04	PAI-1-14.5-15.0	ZO41B	01141521	01/14/15	1858
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FORM V SV

6B

SEMIVOLATILE 8270-D INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO68 Project: GAS WORKS PARK-PLAY AREA

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: ZO68 Project: GAS WORKS PARK-PLAY AREA

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: ZO68 Project: GAS WORKS PARK-PLAY AREA

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

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC | Client: GEOENGINEERS

ARI Job No: ZO68 | Project: GAS WORKS PARK-PLAY AREA

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	ZO41LCSS1	433241	4.60	293235	6.86	497893	8.87
02	ZO41LCSDS1	431144	4.60	285153	6.86	493840	8.87
03	PAI-6-9.0-9.	512059	4.61	305992	6.87	538605	8.88
04	PAI-7-10.0-1	418460	4.61	318383	6.87	535655	8.89
05	PAI-7-10.0-1	466019	4.61	321315	6.87	542107	8.89
06	PAI-7-10.0-1	468661	4.61	344756	6.87	551240	8.89
07	PAI-7-22.5-2	554153	4.64	408425	6.87	574550	8.89
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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: ZO68 | Project: GAS WORKS PARK-PLAY AREA

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	ZO41LCSS1	540000	13.54	545045	17.30		
02	ZO41LCSDS1	538531	13.53	542354	17.30		
03	PAI-6-9.0-9.	645543	13.56	701062	17.33		
04	PAI-7-10.0-1	609848	13.57	646286	17.34		
05	PAI-7-10.0-1	630425	13.57	672031	17.34		
06	PAI-7-10.0-1	661077	13.57	691732	17.35		
07	PAI-7-22.5-2	606764	13.56	673342	17.33		
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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: ZO68 | Project: GAS WORKS PARK-PLAY AREA

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	ZO41MBS1	395297	4.59	265032	6.85	469329	8.85
02	PAI-6-9.0-9.	392017	4.59	268341	6.85	472405	8.85
03	PAI-7-10.0-1	376527	4.59	254557	6.85	452085	8.85
04	PAI-7-22.5-2	387780	4.59	261728	6.85	460519	8.85
05	PAI-2-12.5-1	387123	4.59	256108	6.85	452194	8.85
06	PAI-7-10.0-1	368175	4.59	254892	6.85	434230	8.86
07	PAI-2-12.5-1	376686	4.59	252021	6.85	440566	8.85
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IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

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* 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: ZO68 Project: GAS WORKS PARK-PLAY AREA

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	ZO41MBS1	520759	13.51	436027	17.27		
02	PAI-6-9.0-9.	527767	13.51	487930	17.27		
03	PAI-7-10.0-1	514983	13.51	492384	17.27		
04	PAI-7-22.5-2	511238	13.51	479374	17.26		
05	PAI-2-12.5-1	503222	13.51	477116	17.27		
06	PAI-7-10.0-1	496074	13.51	464698	17.27		
07	PAI-2-12.5-1	502300	13.51	466315	17.27		
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* 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: ZO41 Project: GAS WORKS PARK-PLAY AREA

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	ZO41LCSS1	433241	4.60	293235	6.86	497893	8.87
02	ZO41LCSDS1	431144	4.60	285153	6.86	493840	8.87
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FORM VIII SV-1

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO41 Project: GAS WORKS PARK-PLAY AREA

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	ZO41LCSS1	540000	13.54	545045	17.30		
02	ZO41LCSDS1	538531	13.53	542354	17.30		
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FORM VIII SV-2

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO41 Project: GAS WORKS PARK-PLAY AREA

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	ZO41MBS1	395297	4.59	265032	6.85	469329	8.85
02	PAI-1-14.5-1	378977	4.59	264386	6.85	455262	8.86
03	PAI-1-14.5-1	366026	4.59	244374	6.85	431215	8.86
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FORM VIII SV-1

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO41 Project: GAS WORKS PARK-PLAY AREA

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	ZO41MBS1	520759	13.51	436027	17.27		
02	PAI-1-14.5-1	505777	13.51	493532	17.27		
03	PAI-1-14.5-1	486185	13.51	457886	17.27		
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* Values outside of QC limits.

FORM VIII SV-2

Metals Analysis
Report and Summary QC Forms

ARI Job ID: ZO41, ZO68

Cover Page

INORGANIC ANALYSIS DATA PACKAGE

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO41

CLIENT ID	ARI ID	ARI LIMS ID	REPREP
PAI-1-13.8-14.3	ZO41A	14-26952	
PAI-1-13.8-14.3D	ZO41ADUP	14-26952	
PAI-1-13.8-14.3S	ZO41ASPK	14-26952	
PAI-1-24.0-24.5	ZO41C	14-26954	
PAI-5-8.0-8.5	ZO41D	14-26955	
PAI-5-13.5-14.0	ZO41K	14-26962	
PBS	ZO41MB1	14-26962	
LCSS	ZO41MB1SPK	14-26962	
PAI-6-9.0-9.5	ZO68A	14-27148	
PAI-7-5.5-6.0	ZO68B	14-27149	
PAI-7-10.0-10.5	ZO68C	14-27150	
PAI-7-22.5-23.0	ZO68D	14-27151	
PAI-2-18.0-18.5	ZO68F	14-27153	
PAI-2-18.0-18.5-DU	ZO68G	14-27154	
PAI-2-28.0-28.5	ZO68H	14-27155	

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: 12/19/14 Title: Inorganics Director

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PAI-1-13.8-14.3
SAMPLE

Lab Sample ID: ZO41A
LIMS ID: 14-26952
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/08/14
Date Received: 12/09/14

Percent Total Solids: 65.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	3.4	40	**3,880**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS

Sample ID: PAI-1-24.0-24.5
SAMPLE

Lab Sample ID: ZO41C
LIMS ID: 14-26954
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/08/14
Date Received: 12/09/14

Percent Total Solids: 89.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	0.49	5	**33**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS

Sample ID: PAI-5-8.0-8.5
SAMPLE

Lab Sample ID: ZO41D
LIMS ID: 14-26955
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/08/14
Date Received: 12/09/14

Percent Total Solids: 77.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	0.56	6	**290**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS

Sample ID: PAI-5-13.5-14.0
SAMPLE

Lab Sample ID: ZO41K
LIMS ID: 14-26962
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/08/14
Date Received: 12/09/14

Percent Total Solids: 74.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	0.58	6	**531**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS
Page 1 of 1

Sample ID: PAI-6-9.0-9.5
SAMPLE

Lab Sample ID: ZO68A
LIMS ID: 14-27148
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Percent Total Solids: 85.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	2.5	30	**2,990**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS

Sample ID: PAI-7-5.5-6.0
SAMPLE

Lab Sample ID: ZO68B
LIMS ID: 14-27149
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Percent Total Solids: 83.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	0.52	6	**704**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS
Page 1 of 1

Sample ID: PAI-7-10.0-10.5
SAMPLE

Lab Sample ID: ZO68C
LIMS ID: 14-27150
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Percent Total Solids: 86.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	0.52	6	**354**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS

Sample ID: PAI-7-22.5-23.0
SAMPLE

Lab Sample ID: ZO68D
LIMS ID: 14-27151
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Percent Total Solids: 87.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	0.50	5	**8**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS

Sample ID: PAI-2-18.0-18.5
SAMPLE

Lab Sample ID: ZO68F
LIMS ID: 14-27153
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Percent Total Solids: 58.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	3.7	40	**4,140**

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS

Sample ID: PAI-2-18.0-18.5-DUP
SAMPLE

Lab Sample ID: ZO68G
LIMS ID: 14-27154
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Percent Total Solids: 67.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	3.2	30	**6,000**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS

Sample ID: PAI-2-28.0-28.5
SAMPLE

Lab Sample ID: ZO68H
LIMS ID: 14-27155
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO68-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1570
Date Sampled: 12/09/14
Date Received: 12/10/14

Percent Total Solids: 91.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	**7440-38-2**	**Arsenic**	0.48	5	**22**	

U-Analyte undetected at given DL
J-Analyte detected between DL and LOQ
DL-Method 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
TOTAL METALS

Sample ID: PAI-1-13.8-14.3
MATRIX SPIKE

Lab Sample ID: ZO41A
LIMS ID: 14-26952
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/08/14
Date Received: 12/09/14

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010C	3,880	4,720	292	288%	H

Reported in mg/kg-dry

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
TOTAL METALS

Sample ID: PAI-1-13.8-14.3
DUPLICATE

Lab Sample ID: ZO41A
LIMS ID: 14-26952
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: 12/08/14
Date Received: 12/09/14

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010C	3,880	3,570	8.3%	+/- 20%	

Reported in mg/kg-dry

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

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: ZO41LCS
LIMS ID: 14-26962
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO41-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	215	200	108%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: ZO41MB
LIMS ID: 14-26962
Matrix: Soil
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO41-Geoengineers
Project: Gas Works Park-Play Area Investigat
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	mg/kg	Q
3050B	12/16/14	6010C	12/18/14	7440-38-2	Arsenic	0.46	5	5	U

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

UNITS: ug/L

SDG: ZO41

ANALYTE	EL	M	RUN	ICVTV	ICV	%R	CCVTV	CCV1	%R	CCV2	%R	CCV3	%R	CCV4	%R	CCV5	%R
Arsenic	AS	ICP	IP121871	2000.0	2021.81	**101.1**	2000.0	2044.93	**102.2**	2051.90	**102.6**	1992.74	**99.6**	2042.50	**102.1**	2032.90	**101.6**

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

FORM II (1)

Calibration Verification

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO41

UNITS: ug/L

ANALYTE	EL	M	RUN	CCVTV	CCV6	%R	CCV7	%R	CCV8	%R	CCV9	%R	CCV10	%R	CCV11	%R
Arsenic	AS	ICP	IP121871	2000.0	2009.72	**100.5**	2044.63	**102.2**								

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: ZO41

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	IP121871		50.0	49.50	**99.0**	49.83	**99.7**								

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

SDG: ZO41

UNITS: ug/L

ANALYTE	EL	METH	RUN	CRDL	IDL	ICB	C	CCB1	C	CCB2	C	CCB3	C	CCB4	C	CCB5	C
Arsenic	AS	ICP	IP121871	10.0	50.0	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U

Calibration Blanks

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

UNITS: ug/L

SDG: ZO41

ANALYTE	EL	METH	RUN	CRDL	IDL	CCB6	C	CCB7	C	CCB8	C	CCB9	C	CCB10	C	CCB11	C
Arsenic	AS	ICP	IP121871	10.0	50.0	50.0	U	50.0	U								

ZOU41 : 050425

ICP Interference Check Sample

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

ICS SOURCE: I.V.

PROJECT: Gas Works Park-Play

RUNID: IP121871

SDG: ZO41

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	201756.4	208448.6	**104.2**	197804.1	196876.5	**98.4**			
Antimony		1000	13.1	1062.7	**106.3**	10.7	1028.9	**102.9**			
Arsenic		1000	15.5	1065.0	**106.5**	14.3	1033.9	**103.4**			
Barium		1000	2.4	1041.0	**104.1**	2.5	1017.5	**101.8**			
Beryllium		1000	0.1	1035.0	**103.5**	0.0	1004.8	**100.5**			
Boron			-1.3	0.1		-0.6	-1.1				
Cadmium		1000	0.5	1045.6	**104.6**	0.5	1012.0	**101.2**			
Calcium	100000	100000	102665.2	103545.0	**103.5**	101743.3	100378.3	**100.4**			
Chromium		1000	-1.0	1045.5	**104.6**	-0.5	1015.1	**101.5**			
Cobalt		1000	2.5	984.9	**98.5**	2.4	956.9	**95.7**			
Copper		1000	-0.2	1064.1	**106.4**	-0.1	1035.1	**103.5**			
Iron	200000	200000	200488.6	207776.5	**103.9**	197334.3	195848.8	**97.9**			
Lead		1000	-4.1	1002.4	**100.2**	-4.4	971.7	**97.2**			
Magnesium	100000	100000	104682.7	104224.5	**104.2**	102630.0	97892.6	**97.9**			
Manganese		1000	0.2	989.3	**98.9**	0.0	938.8	**93.9**			
Molybdenum			0.5	0.9		0.4	0.5				
Nickel		1000	-0.2	1015.9	**101.6**	1.4	987.6	**98.8**			
Potassium			-17.3	-25.2		-9.6	-14.2				
Selenium		1000	31.4	1080.9	**108.1**	30.3	1045.1	**104.5**			
Silicon			5.7	1.8		30.4	2.0				
Silver		1000	-1.1	1115.6	**111.6**	-0.9	1089.8	**109.0**			
Sodium			1.8	-1.6		7.4	5.8				
Strontium			2.9	2.9		2.8	2.8				
Thallium		1000	-4.6	966.9	**96.7**	-5.0	940.7	**94.1**			
Tin			-8.1	-8.7		-7.8	-7.9				
Titanium			1.8	1.8		1.9	0.9				
Vanadium		1000	2.4	1014.0	**101.4**	1.9	984.9	**98.5**			
Zinc		1000	3.0	1015.5	**101.6**	2.2	980.9	**98.1**			

IDLs and ICP Linear Ranges

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO41 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

ICP Interelement Correction Factors

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

IEC DATE: 10/27/2014

SDG: ZO41

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

ZO41 : 95128

FORM XI

ICP Interelement Correction Factors

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

IEC DATE: 10/27/2014

SDG: ZO41

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

ZO41 :: 99129

Preparation Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO41

ANALYSIS METHOD: ICP

ARI PREP CODE: SWC

PREPDATE: 12/16/2014

CLIENT ID	ARI ID	MASS (g)	INITIAL VOLUME (mL)	FINAL VOLUME (mL)
PAI-1-13.8-14.3	ZO41A	1.044	0.0	50.0
PAI-1-13.8-14.3D	ZO41ADUP	1.044	0.0	50.0
PAI-1-13.8-14.3S	ZO41ASPK	1.044	0.0	50.0
PAI-1-24.0-24.5	ZO41C	1.044	0.0	50.0
PAI-5-8.0-8.5	ZO41D	1.056	0.0	50.0
PAI-5-13.5-14.0	ZO41K	1.061	0.0	50.0
PBS	ZO41MB1	1.000	0.0	50.0
LCSS	ZO41MB1SPK	1.000	0.0	50.0
PAI-6-9.0-9.5	ZO68A	1.082	0.0	50.0
PAI-7-5.5-6.0	ZO68B	1.060	0.0	50.0
PAI-7-10.0-10.5	ZO68C	1.027	0.0	50.0
PAI-7-22.5-23.0	ZO68D	1.045	0.0	50.0
PAI-2-18.0-18.5	ZO68F	1.048	0.0	50.0
PAI-2-18.0-18.5-DU	ZO68G	1.081	0.0	50.0
PAI-2-28.0-28.5	ZO68H	1.051	0.0	50.0

Analysis Run Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play | INSTRUMENT ID: OPTIMA ICP 2 | START DATE: 12/18/2014

SDG: ZO41 | RUNID: IP121871 | METHOD: ICP | END DATE: 12/18/2014

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	08534				X																										
S2	S2	1.00	08580																														
S3	S3	1.00	09000				X																										
S4	S4	1.00	09021																														
S5	S5	1.00	09043																														
ICV	ICV	1.00	09065				X																										
ICB	ICB	1.00	09110				X																										
CRI	CRII	1.00	09150				X																										
ICSA	ICSAI	1.00	09191				X																										
ICSAB	ICSABI	1.00	09233				X																										
CCV	CCV1	1.00	09283				X																										
CCB	CCB1	1.00	09323				X																										
ZZZZZZ	C4564	10.00	09365																														
ZZZZZZ	ZO56MB1	1.00	09405																														
ZZZZZZ	ZO56A-L	5.00	09450																														
ZZZZZZ	ZO56A	1.00	09492																														
ZZZZZZ	ZO56ADUP	1.00	09534																														
ZZZZZZ	ZO56ASPK	1.00	09581																														
ZZZZZZ	ZZZZZZ	1.00	10023																														
ZZZZZZ	ZO56B	1.00	10064																														
ZZZZZZ	ZO56C	1.00	10110																														
ZZZZZZ	ZO56MB1SPK	1.00	10151																														
CCV	CCV2	1.00	10191				X																										
CCB	CCB2	1.00	10232				X																										
CRI	CRIF	1.00	10273				X																										
ICSA	ICSAF	1.00	10315				X																										
ICSAB	ICSABF	1.00	10361				X																										
CCV	CCV3	1.00	10413				X																										
CCB	CCB3	1.00	10453				X																										
ZZZZZZ	ZP33MB1	2.00	10495																														
ZZZZZZ	ZP33ADUP	2.00	10540																														
ZZZZZZ	ZP33A	10.00	11081																														
ZZZZZZ	ZP33ADUP	10.00	11121																														
ZZZZZZ	ZP33ASPK	10.00	11161																														
ZZZZZZ	ZP33C	10.00	11201																														

FORM XIV

ZO41-090131

Analysis Run Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play | INSTRUMENT ID: OPTIMA ICP 2 | START DATE: 12/18/2014

SDG: ZO41 | RUNID: IP121871 | METHOD: ICP | END DATE: 12/18/2014

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
ZZZZZZ	ZP33D	10.00	11241																														
ZZZZZZ	ZP33E	10.00	11281																														
ZZZZZZ	ZP33F	10.00	11321																														
ZZZZZZ	ZP33MB1SPK	2.00	11361																														
CCV	CCV4	1.00	11401				X																										
CCB	CCB4	1.00	11441				X																										
ZZZZZZ	ZP33B	10.00	11483																														
ZZZZZZ	ZP33G	10.00	11523																														
ZZZZZZ	ZP33H	10.00	11563																														
ZZZZZZ	ZP33I	10.00	12003																														
ZZZZZZ	ZP33J	10.00	12043																														
PAI-1-13.8-14.3D	ZO41ADUP	100.00	12083																														
PAI-6-9.0-9.5	ZO68A	100.00	12135																														
PAI-2-18.0-18.5	ZO68F	100.00	12194																														
PAI-1-24.0-24.5	ZO41C	2.00	12240				X																										
ZZZZZZ	ZP33MB1SPD	2.00	12280																														
CCV	CCV5	1.00	12320				X																										
CCB	CCB5	1.00	12360				X																										
PBS	ZO41MB1	2.00	12400				X																										
PAI-5-8.0-8.5	ZO41D	2.00	12442				X																										
PAI-5-13.5-14.0	ZO41K	2.00	12483				X																										
PAI-6-9.0-9.5	ZO68A	10.00	12523				X																										
PAI-7-5.5-6.0	ZO68B	2.00	12564				X																										
PAI-7-10.0-10.5	ZO68C	2.00	13004				X																										
PAI-7-22.5-23.0	ZO68D	2.00	13044				X																										
PAI-2-18.0-18.5	ZO68F	10.00	13084				X																										
PAI-2-18.0-18.5-DU	ZO68G	10.00	13125				X																										
LCSS	ZO41MB1SPK	2.00	13165				X																										
CCV	CCV6	1.00	13205				X																										
CCB	CCB6	1.00	13250				X																										
ZZZZZZ	ZO53MB1	1.00	13291																														
ZZZZZZ	ZO53ADUP	1.00	13333																														
ZZZZZZ	ZO53A	1.00	13375																														
ZZZZZZ	ZO53ASPK	1.00	13420																														
PAI-1-13.8-14.3D	ZO41ADUP	10.00	13460				X																										

FORM XIV

ZO41-090232

Analysis Run Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play | INSTRUMENT ID: OPTIMA ICP 2 | START DATE: 12/18/2014

SDG: ZO41 | RUNID: IP121871 | METHOD: ICP | END DATE: 12/18/2014

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
PAI-1-13.8-14.3	ZO41A	10.00	13500				X																									
PAI-1-13.8-14.3S	ZO41ASPK	10.00	13540				X																									
PAI-2-28.0-28.5	ZO68H	2.00	13580				X																									
ZZZZZZ	ZO53MB1SPK	1.00	14020																													
CCV	CCV7	1.00	14060				X																									
CCB	CCB7	1.00	14101				X																									

ZOU41 : 901433

Total Solids

ARI Job ID: ZO41, ZO68

Volatiles Total Solids-voats
Data By: Paul K. Campbell
Created: 12/29/14

Worklist: 6315
Analyst: PKC
Comments:

Oven ID:_____

Balance ID:_____

Samples In: Date:_____ Time:_____ Temp:_____ Analyst:_____

Samples Out: Date:_____ Time:_____ Temp:_____ Analyst:_____

	ARI ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)		% Solids
1.	Z041B 14-26953	_____	_____		$	66.90

Worklist ID: 6315 Page: 1
* - VOA TS Copied From BETX TS
% - VOA TS Copied From Metals TS
$ - VOA TS Copied From Extraction TS
$D - VOA TS Copied From Extraction TS/Decanted

Volatiles Total Solids-voats
Data By: Susan D. Dunnihoo
Created: 12/30/14

Worklist: 6711
Analyst: SDRD
Comments:

Oven ID:_____

Balance ID:_____

Samples In: Date:_____ Time:_____ Temp:_____ Analyst:_____

Samples Out: Date:_____ Time:_____ Temp:_____ Analyst:_____

ARI ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)		% Solids
1. Z068A 14-27148				%	85.05
2. Z068C 14-27150				%	86.27
3. Z068D 14-27151				%	87.63
4. Z068E 14-27152				$	51.50

Worklist ID: 6711 Page: 1
* - VOA TS Copied From BETX TS
% - VOA TS Copied From Metals TS
$ - VOA TS Copied From Extraction TS
$D - VOA TS Copied From Extraction TS/Decanted

Extractions Total Solids-extts
Data By: Susan D. Dunnihoo
Created: 12/18/14

Worklist: 2603
Analyst: SDRD
Comments:

Oven ID:_____

Balance ID:_____

Samples In: Date:_____ Time:_____ Temp:_____ Analyst:_____

Samples Out: Date:_____ Time:_____ Temp:_____ Analyst:_____

	ARI ID CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% TS	Dcnt	5g	10g	12.5g
1.	ZO41B 14-26953 PAI-1-14.5-15.0	1.19	10.12	7.16	66.9	No	7.47	14.95	18.68

Extractions Total Solids-extts
Data By: Susan D. Dunnihoo
Created: 12/18/14

Worklist: 2603
Analyst: SDRD
Comments:

Oven ID: Ø15

Balance ID: B334705934

Samples In: Date: 12/18/14 Time: 14:50 Temp: 105 Analyst: TH

Samples Out: Date: 12/19/14 Time: 0844 Temp: 103 Analyst: SP

	ARI ID / CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% TS	Dcnt	5g	10g	12.5g
1.	Z041B 14-26953 PAI-1-14.5-15.0	1.19	10.12	7.16		No			

Extractions Total Solids-extts
Data By: Susan D. Dunnihoo
Created: 12/18/14

Worklist: 2602
Analyst: SDRD
Comments:

Oven ID:_____

Balance ID:_____

Samples In: Date:_____ Time:_____ Temp:_____ Analyst:_____

Samples Out: Date:_____ Time:_____ Temp:_____ Analyst:_____

	ARI ID CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% TS	Dcnt	5g	10g	12.5g
1.	ZO68A 14-27148 PAI-6-9.0-9.5	1.20	11.40	10.30	89.2	No	5.61	11.21	14.01
2.	ZO68C 14-27150 PAI-7-10.0-10.5	1.17	12.98	11.58	88.1	No	5.68	11.35	14.19
3.	ZO68D 14-27151 PAI-7-22.5-23.0	1.20	12.96	11.83	90.4	No	5.53	11.06	13.83
4.	ZO68E 14-27152 PAI-2-12.5-13.0	1.20	10.67	6.08	51.5	No	9.71	19.42	24.27

Extractions Total Solids-extts
Data By: Susan D. Dunnihoo
Created: 12/18/14

Worklist: 2602
Analyst: SDRD
Comments:

Oven ID: 015

Balance ID: B334705934

Samples In: Date: 12/18/14 Time: 14:50 Temp: 105 Analyst: TH

Samples Out: Date: 12/19/14 Time: 0800 Temp: 103 Analyst: SC

	ARI ID / CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% TS	Dcnt	5g	10g	12.5g
1.	Z068A 14-27148 PAI-6-9.0-9.5	1.20	11.40	10.36		No			
2.	Z068C 14-27150 PAI-7-10.0-10.5	1.17	R.98	11.58		No			
3.	Z068D 14-27151 PAI-7-22.5-23.0	1.20	12.96	11.83		No			
4.	Z068E 14-27152 PAI-2-12.5-13.0	1.20	10.67	6.08		No			

Solids Data Entry Report Checked by: CM Date: 12/17/14
Date: 12/17/14 Data Analyst: CB

Solids Determination performed on 12/16/14 by CB

JOB	SAMPLE	CLIENTID	TAREWEIGHT	SAMPDISH	DRYWEIGHT	SOLIDS
ZO41	A	PAI-1-13.8-14.3	1.000	10.295	7.104	65.67
ZO41	C	PAI-1-24.0-24.5	1.012	10.784	9.725	89.16
ZO41	D	PAI-5-8.0-8.5	1.020	10.591	8.472	77.86
ZO41	K	PAI-5-13.5-14.0	1.028	10.437	8.034	74.46

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Total Solids Bench Sheet

Laboratory Section metals

Oven Identification: 07 **Balance ID:** 0108735

Samples in Oven: Date: 12-11-14 Time: 1040 Temp: 103°C Analyst: CB

Removed from Oven: Date: 12-12-14 Time: 0705 Temp: 105°C Analyst: CB

ARI Sample ID		Tare Weight (g)	Tare + Sample Wet (g)	Tare + Sample Dry (g)	Date & Time Last Weight	Final Weighting >12 hrs[1]
2041	A	1.000	10.295	7.104	—	√
"	C	1.012	10.784	9.725	—	√
"	D	1.020	10.391	8.472	—	√
"	K	1.028	10.437	8.034	—	√
2068	A	0.980	10.262	8.874	—	√
2068	B	1.004	10.254	8.700	—	√
"	C	1.007	10.914	9.554	—	√
"	D	1.035	10.236	9.098	—	√
"	F	1.053	10.923	8.855	—	√
"	G	1.033	10.357	7.319	—	√
"	H	1.006	10.411	9.636	—	√
2B07	A	1.038	10.293	9.984	—	√
"	B	1.015	10.522	9.874	—	√
"	C	0.972	10.213	9.886	—	√
			12-16-14			

1) Place a check mark in this column if samples have dried > 12 but < 24 hours. When samples have been at 104°C < 12 hours, constant weight must be verified as described in SOP 10023S. Use a 2nd bench sheet for additional weightings.

Solids Data Entry Report Checked by: DM Date: 12/17/14
Date: 12/17/14 Data Analyst: CB

Solids Determination performed on 12/16/14 by CB

JOB	SAMPLE	CLIENTID	TAREWEIGHT	SAMPDISH	DRYWEIGHT	SOLIDS
ZO68	A	PAI-6-9.0-9.5	0.980	10.262	8.874	85.05
ZO68	B	PAI-7-5.5-6.0	1.004	10.254	8.700	83.20
ZO68	C	PAI-7-10.0-10.5	1.007	10.914	9.554	86.27
ZO68	D	PAI-7-22.5-23.0	1.035	10.236	9.098	87.63
ZO68	F	PAI-2-18.0-18.5	1.053	10.923	6.855	58.78
ZO68	G	PAI-2-18.0-18.5-DUP	1.033	10.357	7.319	67.42
ZO68	H	PAI-2-28.0-28.5	1.006	10.411	9.636	91.76

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Total Solids Bench Sheet

Laboratory Section metals

Oven Identification: 07 **Balance ID:** 206225

Samples in Oven: Date: 12-16-14 Time: 1040 Temp: 103°C Analyst: CB

Removed from Oven: Date: 12-17-14 Time: 0705 Temp: 105°C Analyst: CB

ARI Sample ID		Tare Weight (g)	Tare + Sample Wet (g)	Tare + Sample Dry (g)	Date & Time Last Weight	Final Weighting >12 hrs[1]
ZQ41	A	1.000	10.295	9.104	—	√
"	C	1.012	10.284	9.725	—	√
"	D	1.020	10.391	8.472	—	√
"	K	1.028	10.437	8.034	—	√
2068	A	0.980	10.262	8.874	—	√
2068	B	1.004	10.254	8.700	—	√
"	C	1.007	10.414	9.554	—	√
"	D	1.035	10.236	9.098	—	√
"	F	1.053	10.523	8.855	—	√
"	G	1.033	10.357	9.319	—	√
"	H	1.006	10.411	9.636	—	√
ZP07	A	1.038	10.293	9.984	—	√
"	B	1.015	10.522	9.874	—	√
"	C	0.972	10.213	9.886	—	√
			12-16-14			

1) Place a check mark in this column if samples have dried > 12 but < 24 hours. When samples have been at 104°C < 12 hours, constant weight must be verified as described in SOP 10023S. Use a 2nd bench sheet for additional weightings.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

January 16, 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.: ZO53

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: ZO53

Enclosures

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

Chain of Custody Documentation

ARI Job ID: ZO53

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 2053	Turn-around Requested:	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	Cooler Temps: 4.0
Client Project Name: Gas Works Park-Play Area Investigation			
Client Project #: 0186-846-01	Samplers: Robert Miyahira + Claudia De La Via		

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
PA1-10GW	12/11/14	1500	GW	15	X	
PA1-11-9.5-10	"	1540	Soil	5	"	
PA1-11-18.5-19	"	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

2053 : 00003

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.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client. GeoEngineers — Project Name GasWorks Park

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

Assigned ARI Job No. 2053 — 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	12/1/14	

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

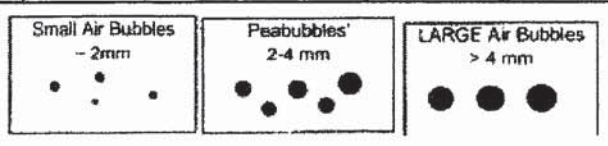
Samples Logged by: AV Date: 12/12/14 Time: 1235

***** 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

JTS 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: ~~2053~~ 2054	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 Mijahirat 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 (after glass filtering)	PAHs by EPA 8270SIM (no filtering)	BTEX EPA 8260 low level	Arsenic EPA 200.8	Sulfide, Sulfid, Chloride, Alkalinity, TDS, Nitrate, ferrous iron, Ions (Ca, Mg, K, Na), Total Iron	Hold	Notes/Comments
PA1-10GW *	12/11/14	1500	GW	15	X	X	X	X	X	X	~~X~~	XRF >1000 ppm As
PA1-11-9.5-10		1540	Soil	5							X	
PA1-11-~~18.5-19~~ 18.0-18.8		1545	Soil	5							X	

JTS 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, last 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.

2053 : 00000

PRESERVATION VERIFICATION 12/12/14
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **Z053**

PC: Cheronne
VTSR: 12/11/14

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

Project #: 0186-846-01 Task 1520
Project:
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
14-27173 **Z053A**	PAI-10GW						DIS DISS						** Fail		*	Y		S⁻	7.2		2ml NaOH 6N	12-12-14 14:10 W

* lab to determine ferrous iron preservation

** Sulfide preserved w/ ZnOAC, lab to adjust pH

Checked By AV Date 12/12/14

Z053 : 00007

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: ZO53

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Client: GeoEngineers, Inc.
Project: Gas Works Park-Play Area Investigation, 0186-846-01 Task 1520
ARI Job No.: ZO53

Sample Receipt

One water sample was received on December 11, 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 sample **PAI-10GW**. One bottle was filtered prior to extraction using a 0.7 micron borosilicate glass, binder free filter. The filtered sample was reported under ARI ID ZO53B.

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 and EPA 200.8

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

The method blanks were 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 sample and associated laboratory QC were digested and analyzed within recommended holding times.

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 recoveries and 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	**ARI Job No.:** ZO53
Client Project No.: 0186-846-01 Task 1520	

Case Narrative

1. One sample was submitted for filtering on December 12, 2014.
2. The sample was 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

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ZO53
Client: Geoengineers
Project Event: 0186-846-01 Task 1520
Project Name: Gas Works Park-Play Area

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	PAI-10GW	ZO53A	14-27173	Water	12/11/14 15:00	12/11/14 17:15
2.	PAI-10GW	ZO53B	14-27174	Water	12/11/14 15:00	12/11/14 17:15
3.	TRIP BLANK	ZO53C	14-27175	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 Resources, Inc.

1/16/2015

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
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 Resources, Inc.

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 Resources, Inc.

Analytical Method Information

Met Diss 200.8 in Water (EPA 200.8)

Preservation: pH<2; HNO3, Cool <6°C
Container: HDPE NM, 500 mL, 1:1 HNO3 (FF)
Amount Required: 500 mL
Hold Time: 180 days

Analyte	MDL	Reporting Limit	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Aluminum-27	0.00160	0.0200 mg/L		20	75 - 125	20	80 - 120	20
Antimony-121	0.0000100	.000200 mg/L		20	75 - 125	20	80 - 120	20
Antimony-123	0.0000110	.000200 mg/L		20	75 - 125	20	80 - 120	20
Arsenic-75a	0.0000480	.000200 mg/L		20	75 - 125	20	80 - 120	20
Arsenic-75b	0.0000480	.000200 mg/L		20	75 - 125	20	80 - 120	20
Barium-135	0.0000200	.000500 mg/L		20	75 - 125	20	80 - 120	20
Barium-137	0.0000190	.000500 mg/L		20	75 - 125	20	80 - 120	20
Beryllium-9	0.0000210	.000200 mg/L		20	75 - 125	20	80 - 120	20
Cadmium-111	0.000100	.000100 mg/L		20	75 - 125	20	80 - 120	20
Cadmium-114	0.00000500	.000100 mg/L		20	75 - 125	20	80 - 120	20
Calcium-43	0.00398	0.0500 mg/L		20	75 - 125	20	80 - 120	20
Chromium-52	0.0000450	.000500 mg/L		20	75 - 125	20	80 - 120	20
Chromium-53	0.000118	.000500 mg/L		20	75 - 125	20	80 - 120	20
Cobalt-59	0.0000110	.000200 mg/L		20	75 - 125	20	80 - 120	20
Copper-63	0.000158	.000500 mg/L		20	75 - 125	20	80 - 120	20
Copper-65	0.000236	.000500 mg/L		20	75 - 125	20	80 - 120	20
Iron-54	0.00575	0.0200 mg/L		20	75 - 125	20	80 - 120	20
Iron-57	0.00388	0.0200 mg/L		20	75 - 125	20	80 - 120	20
Lead-208	0.0000460	.000100 mg/L		20	75 - 125	20	80 - 120	20
Magnesium-24	0.000297	0.0200 mg/L		20	75 - 125	20	80 - 120	20
Manganese-55	0.0000220	.000500 mg/L		20	75 - 125	20	80 - 120	20
Molybdenum-98	0.0000130	.000200 mg/L		20	75 - 125	20	80 - 120	20
Nickel-60	0.0000790	.000500 mg/L		20	75 - 125	20	80 - 120	20
Nickel-62	0.0000890	.000500 mg/L		20	75 - 125	20	80 - 120	20
Potassium-39	0.00294	0.0200 mg/L		20	75 - 125	20	80 - 120	20
Selenium-82	0.000127	.000500 mg/L		20	75 - 125	20	80 - 120	20
Selenium-78	0.000324	0.00200 mg/L		20	75 - 125	20	80 - 120	20
Silver-107	0.00000800	.000200 mg/L		20	75 - 125	20	80 - 120	20
Sodium-23	0.00283	0.100 mg/L		20	75 - 125	20	80 - 120	20
Thallium-205	0.00000400	.000200 mg/L		20	75 - 125	20	80 - 120	20
Vanadium-51a	0.0000430	.000200 mg/L		20	75 - 125	20	80 - 120	20
Vanadium-51b	0.0000430	.000200 mg/L		20	75 - 125	20	80 - 120	20
Zinc-66	0.000497	0.00400 mg/L		20	75 - 125	20	80 - 120	20
Zinc-67	0.000531	0.00400 mg/L		20	75 - 125	20	80 - 120	20
Zinc-68	0.000524	0.00400 mg/L		20	75 - 125	20	80 - 120	20
Lithium								
Scandium								
Germanium								
Indium								
Terbium								

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 Resources, Inc.

1/16/2015

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, 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 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
Solids, Total Dissolved SM 2540 C-97 in Water (SM 2540 C-97)								
Preservation: Cool <6°C								
Container: HDPE NM, 1000 mL		**Amount Required:** 1000 mL				**Hold Time:** 7 days		
Dissolved Solids		5.00 mg/L		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: ZO53

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: PAI-10GW**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZO53A
LIMS ID: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Instrument/Analyst: NT3/LH
Date Analyzed: 12/23/14 12:00

Sample Amount: 0.50 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	0.53	4.0	250
108-88-3	Toluene	0.80	4.0	15
100-41-4	Ethylbenzene	0.74	4.0	150
179601-23-1	m,p-Xylene	1.0	8.0	91
95-47-6	o-Xylene	0.70	4.0	46

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	95.4%
d8-Toluene	100%
Bromofluorobenzene	96.2%
d4-1,2-Dichlorobenzene	97.5%

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: ZO53C
LIMS ID: 14-27175
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area 0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Instrument/Analyst: NT3/LH
Date Analyzed: 12/22/14 18:17

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
71-43-2	Benzene	0.03	0.54	< 0.54 Y
108-88-3	Toluene	0.04	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.33	< 0.33 Y
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	101%
d8-Toluene	101%
Bromofluorobenzene	99.6%
d4-1,2-Dichlorobenzene	98.0%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-122314A	Method Blank	10	105%	100%	98.3%	99.4%	0
LCS-122314A	Lab Control	10	104%	102%	100%	102%	0
LCSD-122314A	Lab Control Dup	10	99.8%	102%	101%	98.4%	0
ZO53A	PAI-10GW	10	95.4%	100%	96.2%	97.5%	0
MB-122214A	Method Blank	10	102%	101%	98.1%	99.3%	0
LCS-122214A	Lab Control	10	102%	101%	101%	99.5%	0
LCSD-122214A	Lab Control Dup	10	99.0%	102%	99.3%	100%	0
ZO53C	TRIP BLANK	10	101%	101%	99.6%	98.0%	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: 14-27173 to 14-27175

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-122214A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-122214A
LIMS ID: 14-27175
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/LH
LCSD: NT3/LH
Date Analyzed LCS: 12/22/14 10:52
LCSD: 12/22/14 11:20

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	10.1	10.0	101%	10.1	10.0	101%	0.0%
Toluene	10.0	10.0	100%	10.1	10.0	101%	1.0%
Ethylbenzene	10.3	10.0	103%	10.4	10.0	104%	1.0%
m,p-Xylene	20.3	20.0	102%	20.5	20.0	102%	1.0%
o-Xylene	9.92	10.0	99.2%	10.0	10.0	100%	0.8%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	102%	99.0%
d8-Toluene	101%	102%
Bromofluorobenzene	101%	99.3%
d4-1,2-Dichlorobenzene	99.5%	100%

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: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/LH
LCSD: NT3/LH
Date Analyzed LCS: 12/23/14 10:08
LCSD: 12/23/14 10:35

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	10.3	10.0	103%	10.1	10.0	101%	2.0%
Toluene	10.1	10.0	101%	10.1	10.0	101%	0.0%
Ethylbenzene	10.4	10.0	104%	10.3	10.0	103%	1.0%
m,p-Xylene	20.8	20.0	104%	20.5	20.0	102%	1.5%
o-Xylene	9.99	10.0	99.9%	9.94	10.0	99.4%	0.5%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	104%	99.8%
d8-Toluene	102%	102%
Bromofluorobenzene	100%	101%
d4-1,2-Dichlorobenzene	102%	98.4%

4A
VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB1222

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: ZO53

Project: 0186-846-01 TASK 1520

Lab File ID: MB1222

Lab Sample ID: MB1222

Date Analyzed: 12/22/14

Time Analyzed: 1147

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	LCS1222	LCS1222	LCS1222	1052
02	LCS1222	LCS1222	LCS1222A	1120
03	TRIP BLANK	ZO53C	ZO53C	1817
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
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26				
27				
28				
29				
30				

COMMENTS:

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-122214A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-122214A
LIMS ID: 14-27175
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/LH
Date Analyzed: 12/22/14 11:47

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	102%
d8-Toluene	101%
Bromofluorobenzene	98.1%
d4-1,2-Dichlorobenzene	99.3%

4A
VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB1223

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: ZO53

Project: 0186-846-01 TASK 1520

Lab File ID: MB1223

Lab Sample ID: MB1223

Date Analyzed: 12/23/14

Time Analyzed: 1102

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	LCS1223	LCS1223	LCS1223	1008
02	LCS1223	LCS1223	LCS1223A	1035
03	PAI-10GW	ZO53A	ZO53A2	1200
04				
05				
06				
07				
08				
09				
10				
11				
12				
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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: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 12/31/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/LH
Date Analyzed: 12/23/14 11:02

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	105%
d8-Toluene	100%
Bromofluorobenzene	98.3%
d4-1,2-Dichlorobenzene	99.4%

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: GEOENGINEERS

Lab Code: ARI Case No.: 0186-846-01 TASK 1520 SDG No.: ZO53

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					
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17					
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19					
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21					
22					

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: GEOENGINEERS

Lab Code: ARI Case No.: 0186-846-01 TASK 1520 SDG No.: ZO53

Lab File ID: BFB1222 BFB Injection Date: 12/22/14

Instrument ID: NT3 BFB Injection Time: 0944

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	15.7
75	30.0 - 60.0% of mass 95	46.2
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.3
173	Less than 2.0% of mass 174	0.6 (0.9)1
174	50.0 - 100.0% of mass 95	71.0
175	5.0 - 9.0% of mass 174	4.9 (6.9)1
176	95.0 - 101.0% of mass 174	69.6 (98.1)1
177	5.0 - 9.0% of mass 176	4.6 (6.6)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	CC1222	CC1222	CC1222	12/22/14	1025
02	LCS1222	LCS1222	LCS1222	12/22/14	1052
03	LCS1222	LCS1222	LCS1222A	12/22/14	1120
04	MB1222	MB1222	MB1222	12/22/14	1147
05	TRIP BLANK	ZO53C	ZO53C	12/22/14	1817
06					
07					
08					
09					
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22					

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES INC Contract: GEOENGINEERS

Lab Code: ARI Case No.: 0186-846-01 TASK 1520 SDG No.: ZO53

Lab File ID: BFB1223C BFB Injection Date: 12/23/14

Instrument ID: NT3 BFB Injection Time: 0905

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	15.9
75	30.0 - 60.0% of mass 95	46.5
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.8
173	Less than 2.0% of mass 174	0.6 (0.9)1
174	50.0 - 100.0% of mass 95	69.6
175	5.0 - 9.0% of mass 174	5.4 (7.8)1
176	95.0 - 101.0% of mass 174	67.1 (96.5)1
177	5.0 - 9.0% of mass 176	3.9 (5.8)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	CC1223	CC1223	CC1223	12/23/14	0941
02	LCS1223	LCS1223	LCS1223	12/23/14	1008
03	LCS1223	LCS1223	LCS1223A	12/23/14	1035
04	MB1223	MB1223	MB1223	12/23/14	1102
05	PAI-10GW	ZO53A	ZO53A2	12/23/14	1200
06					
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FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO53 Project: 0186-846-01 TASK 1520

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: ZO53 Project: 0186-846-01 TASK 1520

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: ZO53 Project: 0186-846-01 TASK 1520

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: ZO53 Project: 0186-846-01 TASK 1520

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: ZO53 Project: 0186-846-01 TASK 1520

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: ZO53 Project: 0186-846-01 TASK 1520

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: ZO53 Project: 0186-846-01 TASK 1520

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: ZO53 Project: 0186-846-01 TASK 1520

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: ZO53 Project: 0186-846-01 TASK 1520

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: ZO53 Project: 0186-846-01 TASK 1520

Instrument ID: NT3 Cont. Calib. Date: 12/22/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 1025

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Chloromethane	0.666	0.6785	0.100	AVRG	1.9
Vinyl Chloride	0.794	0.8305	0.010	AVRG	4.6
Bromomethane	0.461	0.4526	0.010	AVRG	-1.8
Chloroethane	0.482	0.4908	0.010	AVRG	1.8
Trichlorofluoromethane	0.784	0.7792	0.010	AVRG	-0.6
Acrolein	0.068	0.0576	0.010	AVRG	-15.3
112Trichloro122Trifluoroetha	0.520	0.5713	0.010	AVRG	9.9
Acetone	0.113	0.0980	0.010	AVRG	-13.3
1,1-Dichloroethene	0.530	0.5876	0.010	AVRG	10.9
Bromoethane	0.280	0.2738	0.010	AVRG	-2.2
Iodomethane	0.512	0.5812	0.010	AVRG	13.5
Methylene Chloride	10.000	10.024	0.010	LINR	0.2
Acrylonitrile	0.186	0.1662	0.010	AVRG	-10.6
Carbon Disulfide	1.983	2.0642	0.010	AVRG	4.1
Trans-1,2-Dichloroethene	0.633	0.6398	0.010	AVRG	1.1
Vinyl Acetate	0.213	0.1924	0.010	AVRG	-9.7
1,1-Dichloroethane	1.058	1.0686	0.100	AVRG	1.0
2-Butanone	0.216	0.1962	0.010	AVRG	-9.2
2,2-Dichloropropane	0.814	0.8520	0.010	AVRG	4.7
Cis-1,2-Dichloroethene	0.642	0.6256	0.010	AVRG	-2.6
Chloroform	0.964	0.9762	0.010	AVRG	1.3
Bromochloromethane	0.274	0.2825	0.010	AVRG	3.1
1,1,1-Trichloroethane	0.807	0.8126	0.010	AVRG	0.7
1,1-Dichloropropene	0.464	0.4698	0.010	AVRG	1.2
Carbon Tetrachloride	0.355	0.3655	0.010	AVRG	3.0
1,2-Dichloroethane	0.374	0.3554	0.010	AVRG	-5.0
Benzene	1.379	1.3940	0.010	AVRG	1.1
Trichloroethene	0.333	0.3319	0.010	AVRG	-0.3
1,2-Dichloropropane	0.353	0.3558	0.010	AVRG	0.8
Bromodichloromethane	0.396	0.3920	0.010	AVRG	-1.0
Dibromomethane	0.173	0.1688	0.010	AVRG	-2.4
2-Chloroethyl Vinyl Ether	0.199	0.1890	0.010	AVRG	-5.0
4-Methyl-2-Pentanone	0.261	0.2573	0.010	AVRG	-1.4
Cis 1,3-dichloropropene	0.534	0.5334	0.010	AVRG	-0.1
Toluene	0.889	0.8904	0.010	AVRG	0.2
Trans 1,3-Dichloropropene	0.469	0.4731	0.010	AVRG	0.9
2-Hexanone	0.194	0.1884	0.010	AVRG	-2.9

<- 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: ZO53 — Project: 0186-846-01 TASK 1520

Instrument ID: NT3 — Cont. Calib. Date: 12/22/14

Init. Calib. Date: 12/17/14 — Cont. Calib. Time: 1025

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
1,1,2-Trichloroethane	0.268	0.2617	0.010	AVRG	-2.4
1,3-Dichloropropane	0.560	0.5448	0.010	AVRG	-2.7
Tetrachloroethene	0.330	0.3334	0.010	AVRG	1.0
Chlorodibromomethane	0.289	0.2880	0.010	AVRG	-0.3
1,2-Dibromoethane	0.262	0.2565	0.010	AVRG	-2.1
Chlorobenzene	1.073	1.0070	0.300	AVRG	-6.2
Ethyl Benzene	1.736	1.7742	0.010	AVRG	2.2
1,1,1,2-Tetrachloroethane	0.308	0.3085	0.010	AVRG	0.2
m,p-xylene	0.680	0.6993	0.010	AVRG	2.8
o-Xylene	0.681	0.6749	0.010	AVRG	-0.9
Styrene	1.085	1.1244	0.010	AVRG	3.6
Bromoform	0.315	0.3083	0.100	AVRG	-2.1
1,1,2,2-Tetrachloroethane	0.750	0.6968	0.300	AVRG	-7.1
1,2,3-Trichloropropane	0.219	0.2003	0.010	AVRG	-8.5
Trans-1,4-Dichloro 2-Butene	0.210	0.1920	0.010	AVRG	-8.6
N-Propyl Benzene	3.625	3.7908	0.010	AVRG	4.6
Bromobenzene	0.742	0.7430	0.010	AVRG	0.1
Isopropyl Benzene	3.207	3.2526	0.010	AVRG	1.4
2-Chloro Toluene	2.291	2.3360	0.010	AVRG	2.0
4-Chloro Toluene	2.427	2.4865	0.010	AVRG	2.4
T-Butyl Benzene	2.149	2.1972	0.010	AVRG	2.2
1,3,5-Trimethyl Benzene	2.595	2.6749	0.010	AVRG	3.1
1,2,4-Trimethylbenzene	2.635	2.7083	0.010	AVRG	2.8
S-Butyl Benzene	3.046	3.1500	0.010	AVRG	3.4
4-Isopropyl Toluene	2.468	2.5890	0.010	AVRG	4.9
1,3-Dichlorobenzene	1.447	1.4666	0.010	AVRG	1.4
1,4-Dichlorobenzene	1.498	1.4885	0.010	AVRG	-0.6
N-Butyl Benzene	2.280	2.3926	0.010	AVRG	4.9
1,2-Dichlorobenzene	1.418	1.3623	0.010	AVRG	-3.9
1,2-Dibromo 3-Chloropropane	0.124	0.1111	0.010	AVRG	-10.4
1,2,4-Trichlorobenzene	0.796	0.7618	0.010	AVRG	-4.3
Hexachloro 1,3-Butadiene	0.245	0.2301	0.010	AVRG	-6.1
Naphthalene	1.993	1.8152	0.010	AVRG	-8.9
1,2,3-Trichlorobenzene	0.673	0.6139	0.010	AVRG	-8.8
Dichlorodifluoromethane	0.490	0.5200	0.010	AVRG	6.1
Methyl tert butyl ether	1.665	1.6416	0.010	AVRG	-1.4

<- 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: ZO53 Project: 0186-846-01 TASK 1520

Instrument ID: NT3 Cont. Calib. Date: 12/22/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 1025

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
d4-1,2-Dichloroethane	0.533	0.5378	0.010	AVRG	0.9
d8-Toluene	1.240	1.2419	0.010	AVRG	0.2
4-Bromofluorobenzene	0.511	0.5019	0.010	AVRG	-1.8
d4-1,2-Dichlorobenzene	0.914	0.9159	0.010	AVRG	0.2
Dibromofluoromethane	0.487	0.4921	0.010	AVRG	1.0

<- 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: ZO53 Project: 0186-846-01 TASK 1520

Instrument ID: NT3 Cont. Calib. Date: 12/23/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 0941

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Chloromethane	0.666	0.7268	0.100	AVRG	9.1
Vinyl Chloride	0.794	0.8704	0.010	AVRG	9.6
Bromomethane	0.461	0.3691	0.010	AVRG	-19.9
Chloroethane	0.482	0.5112	0.010	AVRG	6.0
Trichlorofluoromethane	0.784	0.7808	0.010	AVRG	-0.4
Acrolein	0.068	0.0606	0.010	AVRG	-10.9
112Trichloro122Trifluoroetha	0.520	0.5706	0.010	AVRG	9.7
Acetone	0.113	0.1159	0.010	AVRG	2.6
1,1-Dichloroethene	0.530	0.6047	0.010	AVRG	14.1
Bromoethane	0.280	0.2894	0.010	AVRG	3.4
Iodomethane	0.512	0.4851	0.010	AVRG	-5.2
Methylene Chloride	10.000	10.904	0.010	LINR	9.0
Acrylonitrile	0.186	0.1769	0.010	AVRG	-4.9
Carbon Disulfide	1.983	2.1503	0.010	AVRG	8.4
Trans-1,2-Dichloroethene	0.633	0.6723	0.010	AVRG	6.2
Vinyl Acetate	0.213	0.1951	0.010	AVRG	-8.4
1,1-Dichloroethane	1.058	1.1282	0.100	AVRG	6.6
2-Butanone	0.216	0.2145	0.010	AVRG	-0.7
2,2-Dichloropropane	0.814	0.8132	0.010	AVRG	-0.1
Cis-1,2-Dichloroethene	0.642	0.7036	0.010	AVRG	9.6
Chloroform	0.964	1.0221	0.010	AVRG	6.0
Bromochloromethane	0.274	0.2979	0.010	AVRG	8.7
1,1,1-Trichloroethane	0.807	0.8524	0.010	AVRG	5.6
1,1-Dichloropropene	0.464	0.4725	0.010	AVRG	1.8
Carbon Tetrachloride	0.355	0.3682	0.010	AVRG	3.7
1,2-Dichloroethane	0.374	0.3706	0.010	AVRG	-0.9
Benzene	1.379	1.4198	0.010	AVRG	3.0
Trichloroethene	0.333	0.3332	0.010	AVRG	0.1
1,2-Dichloropropane	0.353	0.3561	0.010	AVRG	0.9
Bromodichloromethane	0.396	0.4016	0.010	AVRG	1.4
Dibromomethane	0.173	0.1735	0.010	AVRG	0.3
2-Chloroethyl Vinyl Ether	0.199	0.2016	0.010	AVRG	1.3
4-Methyl-2-Pentanone	0.261	0.2720	0.010	AVRG	4.2
Cis 1,3-dichloropropene	0.534	0.5435	0.010	AVRG	1.8
Toluene	0.889	0.9180	0.010	AVRG	3.3
Trans 1,3-Dichloropropene	0.469	0.4687	0.010	AVRG	-0.1
2-Hexanone	0.194	0.2019	0.010	AVRG	4.1

<- 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: ZO53 Project: 0186-846-01 TASK 1520

Instrument ID: NT3 Cont. Calib. Date: 12/23/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 0941

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
1,1,2-Trichloroethane	0.268	0.2690	0.010	AVRG	0.4
1,3-Dichloropropane	0.560	0.5490	0.010	AVRG	-2.0
Tetrachloroethene	0.330	0.3306	0.010	AVRG	0.2
Chlorodibromomethane	0.289	0.3007	0.010	AVRG	4.0
1,2-Dibromoethane	0.262	0.2664	0.010	AVRG	1.7
Chlorobenzene	1.073	1.0094	0.300	AVRG	-5.9
Ethyl Benzene	1.736	1.8088	0.010	AVRG	4.2
1,1,1,2-Tetrachloroethane	0.308	0.3203	0.010	AVRG	4.0
m,p-xylene	0.680	0.7028	0.010	AVRG	3.4
o-Xylene	0.681	0.6904	0.010	AVRG	1.4
Styrene	1.085	1.1574	0.010	AVRG	6.7
Bromoform	0.315	0.3092	0.100	AVRG	-1.8
1,1,2,2-Tetrachloroethane	0.750	0.7176	0.300	AVRG	-4.3
1,2,3-Trichloropropane	0.219	0.2066	0.010	AVRG	-5.7
Trans-1,4-Dichloro 2-Butene	0.210	0.2002	0.010	AVRG	-4.7
N-Propyl Benzene	3.625	3.8675	0.010	AVRG	6.7
Bromobenzene	0.742	0.7345	0.010	AVRG	-1.0
Isopropyl Benzene	3.207	3.2912	0.010	AVRG	2.6
2-Chloro Toluene	2.291	2.4530	0.010	AVRG	7.1
4-Chloro Toluene	2.427	2.4813	0.010	AVRG	2.2
T-Butyl Benzene	2.149	2.2278	0.010	AVRG	3.7
1,3,5-Trimethyl Benzene	2.595	2.6852	0.010	AVRG	3.5
1,2,4-Trimethylbenzene	2.635	2.7059	0.010	AVRG	2.7
S-Butyl Benzene	3.046	3.1949	0.010	AVRG	4.9
4-Isopropyl Toluene	2.468	2.6078	0.010	AVRG	5.7
1,3-Dichlorobenzene	1.447	1.4671	0.010	AVRG	1.4
1,4-Dichlorobenzene	1.498	1.4985	0.010	AVRG	0.0
N-Butyl Benzene	2.280	2.3479	0.010	AVRG	3.0
1,2-Dichlorobenzene	1.418	1.3841	0.010	AVRG	-2.4
1,2-Dibromo 3-Chloropropane	0.124	0.1118	0.010	AVRG	-9.8
1,2,4-Trichlorobenzene	0.796	0.7164	0.010	AVRG	-10.0
Hexachloro 1,3-Butadiene	0.245	0.2054	0.010	AVRG	-16.2
Naphthalene	1.993	1.7724	0.010	AVRG	-11.1
1,2,3-Trichlorobenzene	0.673	0.5973	0.010	AVRG	-11.2
Dichlorodifluoromethane	0.490	0.5205	0.010	AVRG	6.2
Methyl tert butyl ether	1.665	1.7267	0.010	AVRG	3.7

<- 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: ZO53 Project: 0186-846-01 TASK 1520

Instrument ID: NT3 Cont. Calib. Date: 12/23/14

Init. Calib. Date: 12/17/14 Cont. Calib. Time: 0941

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
d4-1,2-Dichloroethane	0.533	0.5499	0.010	AVRG	3.2
d8-Toluene	1.240	1.2389	0.010	AVRG	-0.1
4-Bromofluorobenzene	0.511	0.5110	0.010	AVRG	0.0
d4-1,2-Dichlorobenzene	0.914	0.8956	0.010	AVRG	-2.0
Dibromofluoromethane	0.487	0.5086	0.010	AVRG	4.4

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

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC | Client: GEOENGINEERS

ARI Job No: ZO53 | Project: 0186-846-01 TASK 1520

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							
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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: ZO53 | Project: 0186-846-01 TASK 1520

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							
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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: ZO53 Project: 0186-846-01 TASK 1520

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

Instrument ID: NT3 Project Run Date: 12/22/14

		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	LCS1222	441573	4.76	791590	5.18	739585	7.46
02	LCS1222	443385	4.76	789970	5.18	735525	7.46
03	MB1222	433005	4.76	785829	5.18	737611	7.46
04	TRIP BLANK	432628	4.76	770937	5.18	728245	7.46
05							
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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: ZO53 | Project: 0186-846-01 TASK 1520

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

Instrument ID: NT3 | Project Run Date: 12/22/14

		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	LCS1222	389095	9.32				
02	LCS1222	382146	9.32				
03	MB1222	383621	9.32				
04	TRIP BLANK	381226	9.32				
05							
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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: ZO53 Project: 0186-846-01 TASK 1520

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

Instrument ID: NT3 Project Run Date: 12/23/14

		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	LCS1223	359845	4.76	654479	5.18	612560	7.46
02	LCS1223	362464	4.76	652396	5.18	613729	7.46
03	MB1223	357879	4.77	654670	5.18	614244	7.46
04	PAI-10GW	369842	4.77	670096	5.18	620542	7.46
05							
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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: Z053 | Project: 0186-846-01 TASK 1520

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

Instrument ID: NT3 | Project Run Date: 12/23/14

		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	LCS1223	314672	9.32				
02	LCS1223	320110	9.32				
03	MB1223	317255	9.32				
04	PAI-10GW	310952	9.32				
05							
06							
07							
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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: ZO53

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-10GW**
Extraction Method: SW3520C **SAMPLE**
Page 1 of 1

Lab Sample ID: ZO53A
LIMS ID: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Date Extracted: 12/18/14
Date Analyzed: 01/14/15 20:39
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**	**130 ES**
208-96-8	**Acenaphthylene**	**0.038**	**0.10**	**1.4**
83-32-9	**Acenaphthene**	**0.030**	**0.10**	**15 E**
86-73-7	**Fluorene**	**0.028**	**0.10**	**4.8**
85-01-8	**Phenanthrene**	**0.028**	**0.10**	**6.8**
120-12-7	**Anthracene**	**0.035**	**0.10**	**1.0**
206-44-0	**Fluoranthene**	**0.035**	**0.10**	**1.6**
129-00-0	**Pyrene**	**0.043**	**0.10**	**1.1**
56-55-3	**Benzo(a)anthracene**	**0.040**	**0.10**	**0.10**
218-01-9	**Chrysene**	**0.032**	**0.10**	**0.11**
205-99-2	**Benzo(b)fluoranthene**	**0.042**	**0.10**	**0.06 J**
207-08-9	Benzo(k)fluoranthene	0.043	0.10	< 0.10 U
50-32-8	**Benzo(a)pyrene**	**0.043**	**0.10**	**0.09 J**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**0.042**	**0.10**	**0.07 J**
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**	**0.11**
TOTBFA	**Total Benzofluoranthenes**	**0.041**	**0.10**	**0.15**

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	89.0%
d10-2-Methylnaphthalene	34.7%
d14-Dibenzo(a,h)anthracene	53.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-10GW**
Extraction Method: SW3520C **DILUTION**

Lab Sample ID: ZO53A
LIMS ID: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 12:02
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**	**1,800 E**
208-96-8	Acenaphthylene	3.8	10	< 10 U
83-32-9	**Acenaphthene**	**3.0**	**10**	**16**
86-73-7	Fluorene	2.8	10	< 10 U
85-01-8	**Phenanthrene**	**2.8**	**10**	**6.9 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-10GW**
Extraction Method: SW3520C **DILUTION2**
Page 1 of 1

Lab Sample ID: ZO53A
LIMS ID: 14-27173
Matrix: Water
Data Release Authorized: MW
Reported: 01/16/15

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 14:09
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**	**2,000**
208-96-8	Acenaphthylene	11	30	< 30 U
83-32-9	**Acenaphthene**	**9.1**	**30**	**17 J**
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

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-10GW**
Extraction Method: SW3520C **SAMPLE**

Lab Sample ID: ZO53B
LIMS ID: 14-27174
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Date Extracted: 12/18/14
Date Analyzed: 01/14/15 21:04
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**	**130 ES**
208-96-8	**Acenaphthylene**	**0.038**	**0.10**	**1.1**
83-32-9	**Acenaphthene**	**0.030**	**0.10**	**14 E**
86-73-7	**Fluorene**	**0.028**	**0.10**	**4.2**
85-01-8	**Phenanthrene**	**0.028**	**0.10**	**5.2**
120-12-7	**Anthracene**	**0.035**	**0.10**	**0.54**
206-44-0	**Fluoranthene**	**0.035**	**0.10**	**0.47**
129-00-0	**Pyrene**	**0.043**	**0.10**	**0.29**
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	69.3%
d10-2-Methylnaphthalene	33.7%
d14-Dibenzo(a,h)anthracene	49.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Selected Ion Monitoring GC/MS **Sample ID: PAI-10GW**
Extraction Method: SW3520C **DILUTION**

Lab Sample ID: ZO53B
LIMS ID: 14-27174
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 12:28
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	< 10 U
83-32-9	**Acenaphthene**	**3.0**	**10**	**12**
86-73-7	Fluorene	2.8	10	< 10 U
85-01-8	**Phenanthrene**	**2.8**	**10**	**5.3 J**
120-12-7	**Anthracene**	**3.5**	**10**	**5.4 J**
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-10GW**
Extraction Method: SW3520C **DILUTION2**

Lab Sample ID: ZO53B
LIMS ID: 14-27174
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Date Extracted: 12/18/14
Date Analyzed: 01/15/15 14:34
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**	**1,700**
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

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
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-10GW	89.0%	34.7%	53.0%	0
PAI-10GW DL	D	D	D	0
PAI-10GW DL2	d	D	D	0
PAI-10GW	69.3%	33.7%	49.3%	0
PAI-10GW DL	D	D	D	0
PAI-10GW 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: 14-27173 to 14-27174

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: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 01/16/15

QC Report No: Z053-Geoengineers
Project: Gas Works Park-Play Area
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.

ZO53MBW1

Lab Name: ANALYTICAL RESOURCES INC

Client: GEOENGINEERS

ARI Job No: ZO53

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-10GW	ZO53A	01141525	01/14/15
04	PAI-10GW	ZO53B	01141526	01/14/15
05	PAI-10GW	ZO53A	01151507	01/15/15
06	PAI-10GW	ZO53B	01151508	01/15/15
07	PAI-10GW	ZO53A	01151512	01/15/15
08	PAI-10GW	ZO53B	01151513	01/15/15
09				
10				
11				
12				
13				
14				
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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
LIMS ID: 14-27173
Matrix: Water
Data Release Authorized: MW
Reported: 01/16/15

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Date Extracted: 12/18/14
Date Analyzed: 01/14/15 05:46
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	< 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					
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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-10GW	ZO53A	01141525	01/14/15	2039
04	PAI-10GW	ZO53B	01141526	01/14/15	2104
05					
06					
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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-10GW	ZO53A	01151507	01/15/15	1202
03	PAI-10GW	ZO53B	01151508	01/15/15	1228
04	PAI-10GW	ZO53A	01151512	01/15/15	1409
05	PAI-10GW	ZO53B	01151513	01/15/15	1434
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FORM V SV

6B

SEMIVOLATILE 8270-D INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC Client: GEOENGINEERS

ARI Job No: ZO53 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: ZO53 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: ZO53 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: ZO53 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: ZO53 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
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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: ZO53 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		
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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: ZO53 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-10GW	674811	4.63	295102	6.85	538690	8.86
03	PAI-10GW	657669	4.63	270921	6.85	502324	8.85
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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: ZO53 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-10GW	555434	13.51	506626	17.27		
03	PAI-10GW	541536	13.51	486864	17.27		
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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: ZO53 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-10GW	359138	4.59	234367	6.84	418164	8.85
02	PAI-10GW	372525	4.59	249786	6.85	436726	8.85
03	PAI-10GW	342353	4.59	223743	6.85	398954	8.85
04	PAI-10GW	375781	4.59	248467	6.85	427696	8.85
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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: ZO53 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-10GW	463469	13.51	412484	17.27		
02	PAI-10GW	494908	13.51	430448	17.27		
03	PAI-10GW	444511	13.50	395639	17.26		
04	PAI-10GW	482314	13.50	426518	17.26		
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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: ZO53

Cover Page

INORGANIC ANALYSIS DATA PACKAGE

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO53

CLIENT ID	ARI ID	ARI LIMS ID	REPREP
PAI-10GW	ZO53A	14-27173	
PAI-10GWD	ZO53ADUP	14-27173	
PAI-10GWS	ZO53ASPK	14-27173	
PBW	ZO53MB1	14-27173	
LCSW	ZO53MB1SPK	14-27173	

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: 12/19/14 Title: Inorganics Director

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PAI-10GW
SAMPLE

Lab Sample ID: ZO53A
LIMS ID: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
200.8	12/16/14	200.8	12/17/14	**7440-38-2**	**Arsenic**	2.4	10	**2,470**	
6010C	12/15/14	6010C	12/18/14	**7440-70-2**	**Calcium**	11.3	50	**63,000**	
6010C	12/15/14	6010C	12/18/14	**7439-89-6**	**Iron**	7.5	50	**1,010**	
6010C	12/15/14	6010C	12/18/14	**7439-95-4**	**Magnesium**	9.6	50	**10,200**	
6010C	12/15/14	6010C	12/18/14	**7439-96-5**	**Manganese**	0.28	1	**365**	
6010C	12/15/14	6010C	12/18/14	**7440-09-7**	**Potassium**	65.7	500	**3,250**	
6010C	12/15/14	6010C	12/18/14	**7440-23-5**	**Sodium**	11.4	500	**46,500**	

Reported In µg/L (ppb)
U-Analyte undetected at given LOQ
LOQ-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PAI-10GW
MATRIX SPIKE

Lab Sample ID: ZO53A
LIMS ID: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	200.8	2,470	2,630	25.0	640%	H
Calcium	6010C	63,000	73,600	10,000	106%	H
Iron	6010C	1,010	3,120	2,000	106%	
Magnesium	6010C	10,200	21,000	10,000	108%	
Manganese	6010C	365	890	500	105%	
Potassium	6010C	3,250	13,700	10,000	104%	
Sodium	6010C	46,500	57,500	10,000	110%	H

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-10GW
DUPLICATE

Lab Sample ID: ZO53A
LIMS ID: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: 12/11/14
Date Received: 12/11/14

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	200.8	2,470	2,540	2.8%	+/- 20%	
Calcium	6010C	63,000	62,600	0.6%	+/- 20%	
Iron	6010C	1,010	990	2.0%	+/- 20%	
Magnesium	6010C	10,200	10,100	1.0%	+/- 20%	
Manganese	6010C	365	363	0.5%	+/- 20%	
Potassium	6010C	3,250	3,220	0.9%	+/- 20%	
Sodium	6010C	46,500	45,900	1.3%	+/- 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: ZO53LCS
LIMS ID: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
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	200.8	27.7	25.0	111%	
Calcium	6010C	10100	10000	101%	
Iron	6010C	2110	2000	106%	
Magnesium	6010C	10300	10000	103%	
Manganese	6010C	490	500	98.0%	
Potassium	6010C	10000	10000	100%	
Sodium	6010C	9990	10000	99.9%	

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: ZO53MB
LIMS ID: 14-27173
Matrix: Water
Data Release Authorized:
Reported: 12/19/14

QC Report No: ZO53-Geoengineers
Project: Gas Works Park-Play Area
0186-846-01 Task 1520
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
200.8	12/16/14	200.8	12/17/14	7440-38-2	Arsenic	0.048	0.2	0.2	U
6010C	12/15/14	6010C	12/18/14	7440-70-2	Calcium	11.3	50	50	U
6010C	12/15/14	6010C	12/18/14	7439-89-6	Iron	7.5	50	50	U
6010C	12/15/14	6010C	12/18/14	7439-95-4	Magnesium	9.6	50	50	U
6010C	12/15/14	6010C	12/18/14	7439-96-5	Manganese	0.28	1	1	U
6010C	12/15/14	6010C	12/18/14	7440-09-7	Potassium	65.7	500	500	U
6010C	12/15/14	6010C	12/18/14	7440-23-5	Sodium	11.4	500	500	U

Reported In µg/L (ppb)
U-Analyte undetected at given LOQ
LOQ-Reporting Limit

Calibration Verification

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

UNITS: ug/L

SDG: Z053

ANALYTE	EI	M	RUN	ICVTV	ICV	%R	CCVTV	CCV1	%R	CCV2	%R	CCV3	%R	CCV4	%R	CCV5	%R
Arsenic	AS	PMS	MS121781	50.0	52.91	**105.8**	50.0	50.53	**101.1**	50.15	**100.3**	49.88	**99.8**	50.09	**100.2**	50.11	**100.2**
Calcium	CA	ICP	IP121871	2000.0	2069.62	**103.5**	2000.0	2105.50	**105.3**	2069.79	**103.5**	2034.29	**101.7**	2098.42	**104.9**	2069.60	**103.5**
Iron	FE	ICP	IP121871	2000.0	2058.97	**102.9**	2000.0	2095.95	**104.8**	2034.89	**101.7**	2012.83	**100.6**	2063.69	**103.2**	2060.54	**103.0**
Magnesium	MG	ICP	IP121871	2000.0	1980.77	**99.0**	2000.0	2015.47	**100.8**	1979.90	**99.0**	1952.26	**97.6**	2002.49	**100.1**	1968.97	**98.4**
Manganese	MN	ICP	IP121871	1000.0	1007.90	**100.8**	1000.0	1016.34	**101.6**	958.57	**95.9**	947.73	**94.8**	971.60	**97.2**	1005.76	**100.6**
Potassium	K	ICP	IP121871	20000.0	20035.23	**100.2**	20000.0	20171.06	**100.9**	20105.67	**100.5**	19704.42	**98.5**	20200.41	**101.0**	20102.63	**100.5**
Sodium	NA	ICP	IP121871	50000.0	51114.19	**102.2**	50000.0	51244.90	**102.5**	51089.83	**102.2**	49176.76	**98.4**	51213.31	**102.4**	50976.94	**102.0**

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

Calibration Verification

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

UNITS: ug/L

SDG: Z053

ANALYTE	EL	M	RUN	CCVTV	CCV6	%R	CCV7	%R	CCV8	%R	CCV9	%R	CCV10	%R	CCV11	%R
Arsenic	AS	PMS	MS121781	50.0												
Calcium	CA	ICP	IP121871	2000.0	2069.20	**103.5**	2082.72	**104.1**								
Iron	FE	ICP	IP121871	2000.0	2061.75	**103.1**	2085.15	**104.3**								
Magnesium	MG	ICP	IP121871	2000.0	1974.76	**98.7**	1986.89	**99.3**								
Manganese	MN	ICP	IP121871	1000.0	971.14	**97.1**	977.78	**97.8**								
Potassium	K	ICP	IP121871	20000.0	20058.29	**100.3**	20128.94	**100.6**								
Sodium	NA	ICP	IP121871	50000.0	50954.02	**101.9**	51223.85	**102.4**								

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

CRDL Standard

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

UNITS: ug/L

SDG: ZO53

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	PMS	MS121781		0.2	0.22	**110.0**										
Calcium	CA	ICP	IP121871		50.0	34.54	**69.1**	35.16	**70.3**								
Iron	FE	ICP	IP121871		50.0	49.89	**99.8**	50.68	**101.4**								
Magnesium	MG	ICP	IP121871		50.0	48.49	**97.0**	44.90	**89.8**								
Manganese	MN	ICP	IP121871		1.0	0.94	**94.0**	0.93	**93.0**								
Potassium	K	ICP	IP121871		500.0	484.70	**96.9**	482.49	**96.5**								
Sodium	NA	ICP	IP121871		500.0	487.78	**97.6**	495.82	**99.2**								

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: Z053

ANALYTE	EL	METH	RUN	CRDL	IDL	ICB	C	CCB1	C	CCB2	C	CCB3	C	CCB4	C	CCB5	C
Arsenic	AS	PMS	MS121781	10.0	0.2	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Calcium	CA	ICP	IP121871	5000.0	50.0	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U
Iron	FE	ICP	IP121871	100.0	50.0	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U
Magnesium	MG	ICP	IP121871	5000.0	50.0	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U	50.0	U
Manganese	MN	ICP	IP121871	15.0	1.0	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Potassium	K	ICP	IP121871	5000.0	500.0	500.0	U	500.0	U	500.0	U	500.0	U	500.0	U	500.0	U
Sodium	NA	ICP	IP121871	5000.0	500.0	500.0	U	500.0	U	500.0	U	500.0	U	500.0	U	500.0	U

Calibration Blanks

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

UNITS: ug/L

SDG: ZO53

ANALYTE	LL	METH	RUN	CRDL	IDL	CCB6	C	CCB7	C	CCB8	C	CCB9	C	CCB10	C	CCB11	C
Arsenic	AS	PMS	MS121781	10.0	0.2												
Calcium	CA	ICP	IP121871	5000.0	50.0	50.0	U	50.0	U								
Iron	FE	ICP	IP121871	100.0	50.0	50.0	U	50.0	U								
Magnesium	MG	ICP	IP121871	5000.0	50.0	50.0	U	50.0	U								
Manganese	MN	ICP	IP121871	15.0	1.0	1.0	U	1.0	U								
Potassium	K	ICP	IP121871	5000.0	500.0	500.0	U	500.0	U								
Sodium	NA	ICP	IP121871	5000.0	500.0	500.0	U	500.0	U								

ZO53 : 95957

ICP Interference Check Sample

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: Z053

ICS SOURCE: I.V.

RUNID: IP121871

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	201756.4	208448.6	**104.2**	197804.1	196876.5	**98.4**			
Antimony		1000	13.1	1062.7	**106.3**	10.7	1028.9	**102.9**			
Arsenic		1000	15.5	1065.0	**106.5**	14.3	1033.9	**103.4**			
Barium		1000	2.4	1041.0	**104.1**	2.5	1017.5	**101.8**			
Beryllium		1000	0.1	1035.0	**103.5**	0.0	1004.8	**100.5**			
Boron			-1.3	0.1		-0.6	-1.1				
Cadmium		1000	0.5	1045.6	**104.6**	0.5	1012.0	**101.2**			
Calcium	100000	100000	102665.2	103545.0	**103.5**	101743.3	100378.3	**100.4**			
Chromium		1000	-1.0	1045.5	**104.6**	-0.5	1015.1	**101.5**			
Cobalt		1000	2.5	984.9	**98.5**	2.4	956.9	**95.7**			
Copper		1000	-0.2	1064.1	**106.4**	-0.1	1035.1	**103.5**			
Iron	200000	200000	200488.6	207776.5	**103.9**	197334.3	195848.8	**97.9**			
Lead		1000	-4.1	1002.4	**100.2**	-4.4	971.7	**97.2**			
Magnesium	100000	100000	104682.7	104224.5	**104.2**	102630.0	97892.6	**97.9**			
Manganese		1000	0.2	989.3	**98.9**	0.0	938.8	**93.9**			
Molybdenum			0.5	0.9		0.4	0.5				
Nickel		1000	-0.2	1015.9	**101.6**	1.4	987.6	**98.8**			
Potassium			-17.3	-25.2		-9.6	-14.2				
Selenium		1000	31.4	1080.9	**108.1**	30.3	1045.1	**104.5**			
Silicon			5.7	1.8		30.4	2.0				
Silver		1000	-1.1	1115.6	**111.6**	-0.9	1089.8	**109.0**			
Sodium			1.8	-1.6		7.4	5.8				
Strontium			2.9	2.9		2.8	2.8				
Thallium		1000	-4.6	966.9	**96.7**	-5.0	940.7	**94.1**			
Tin			-8.1	-8.7		-7.8	-7.9				
Titanium			1.8	1.8		1.9	0.9				
Vanadium		1000	2.4	1014.0	**101.4**	1.9	984.9	**98.5**			
Zinc		1000	3.0	1015.5	**101.6**	2.2	980.9	**98.1**			

ICP Interference Check Sample

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

ICS SOURCE: I.V.

PROJECT: Gas Works Park-Play

RUNID: MS121781

SDG: Z053

INSTRUMENT ID: PE ELAN 6000

UNITS: ug/L

ANALYTE	ICSA TV	ICSAB TV	ICSA1	ICSAB1	%R	ICSA2	ICSAB2	%R	ICSA3	ICSAB3	%R
Arsenic		20	0.0	19.3	**96.5**						
Cadmium		20	0.1	19.7	**98.5**						
Chromium		20	0.4	20.1	**100.5**						
Cobalt		20	0.0	19.5	**97.5**						
Copper		20	0.5	19.6	**98.0**						
Manganese		20	0.2	19.9	**99.5**						
Molybdenum	400	400	389.9	387.0	**96.8**						
Nickel		20	0.3	19.2	**96.0**						
Selenium			-0.1	-0.1							
Silver		20	0.0	19.5	**97.5**						
Thorium			0.2	0.1							
Vanadium			0.0	-0.3							
Zinc		20	1.2	20.2	**101.0**						

Z053 : 66999

IDLs and ICP Linear Ranges

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: Z053 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	PMS	PE ELAN 6000 MS	0.00		10	0.2	4/1/2012		
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

IEC DATE: 10/27/2014

SDG: Z053

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

Z053-ICSOZ

ICP Interelement Correction Factors

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

IEC DATE: 10/27/2014

SDG: ZO53

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

ZO53-090192

FORM XI

Preparation Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO53

ANALYSIS METHOD: ICP

ARI PREP CODE: WMN

PREPDATE: 12/15/2014

CLIENT ID	ARI ID	MASS (g)	INITIAL VOLUME (mL)	FINAL VOLUME (mL)
PAI-10GW	ZO53A	0.000	50.0	50.0
PAI-10GWD	ZO53ADUP	0.000	50.0	50.0
PAI-10GWS	ZO53ASPK	0.000	50.0	50.0
PBW	ZO53MB1	0.000	50.0	50.0
LCSW	ZO53MB1SPK	0.000	50.0	50.0

Preparation Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: ZO53

ANALYSIS METHOD: PMS

ARI PREP CODE: REN

PREPDATE: 12/16/2014

CLIENT ID	ARI ID	MASS (g)	INITIAL VOLUME (mL)	FINAL VOLUME (mL)
PAI-10GW	ZO53A	0.000	50.0	25.0
PAI-10GWD	ZO53ADUP	0.000	50.0	25.0
PAI-10GWS	ZO53ASPK	0.000	50.0	25.0
PBW	ZO53MB1	0.000	50.0	25.0
LCSW	ZO53MB1SPK	0.000	50.0	25.0

Analysis Run Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play | INSTRUMENT ID: OPTIMA ICP 2 | START DATE: 12/18/2014

SDG: ZO53 | RUNID: IP121871 | METHOD: ICP | END DATE: 12/18/2014

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	08534								X					X		X	X	X		X											
S2	S2	1.00	08580																	X													
S3	S3	1.00	09000																														
S4	S4	1.00	09021																														
S5	S5	1.00	09043								X					X		X	X			X											
ICV	ICV	1.00	09065								X					X		X	X	X		X											
ICB	ICB	1.00	09110								X					X		X	X	X		X											
CRI	CRII	1.00	09150								X					X		X	X	X		X											
ICSA	ICSAI	1.00	09191								X					X		X	X	X		X											
ICSAB	ICSABI	1.00	09233								X					X		X	X	X		X											
CCV	CCV1	1.00	09283								X					X		X	X	X		X											
CCB	CCB1	1.00	09323								X					X		X	X	X		X											
ZZZZZZ	C4564	10.00	09365																														
ZZZZZZ	ZO56MB1	1.00	09405																														
ZZZZZZ	ZO56A-L	5.00	09450																														
ZZZZZZ	ZO56A	1.00	09492																														
ZZZZZZ	ZO56ADUP	1.00	09534																														
ZZZZZZ	ZO56ASPK	1.00	09581																														
ZZZZZZ	ZZZZZZ	1.00	10023																														
ZZZZZZ	ZO56B	1.00	10064																														
ZZZZZZ	ZO56C	1.00	10110																														
ZZZZZZ	ZO56MB1SPK	1.00	10151																														
CCV	CCV2	1.00	10191								X					X		X	X	X		X											
CCB	CCB2	1.00	10232								X					X		X	X	X		X											
CRI	CRIF	1.00	10273								X					X		X	X	X		X											
ICSA	ICSAF	1.00	10315								X					X		X	X	X		X											
ICSAB	ICSABF	1.00	10361								X					X		X	X	X		X											
CCV	CCV3	1.00	10413								X					X		X	X	X		X											
CCB	CCB3	1.00	10453								X					X		X	X	X		X											
ZZZZZZ	ZP33MB1	2.00	10495																														
ZZZZZZ	ZP33ADUP	2.00	10540																														
ZZZZZZ	ZP33A	10.00	11081																														
ZZZZZZ	ZP33ADUP	10.00	11121																														
ZZZZZZ	ZP33ASPK	10.00	11161																														
ZZZZZZ	ZP33C	10.00	11201																														

FORM XIV

ZO53 : 09105

Analysis Run Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play | INSTRUMENT ID: OPTIMA ICP 2 | START DATE: 12/18/2014

SDG: ZO53 | RUNID: IP121871 | METHOD: ICP | END DATE: 12/18/2014

CLIENT ID	PREP 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
ZZZZZZ	ZP33D	10.00	11241																														
ZZZZZZ	ZP33E	10.00	11281																														
ZZZZZZ	ZP33F	10.00	11321																														
ZZZZZZ	ZP33MB1SPK	2.00	11361																														
CCV	CCV4	1.00	11401								X					X		X	X	X		X											
CCB	CCB4	1.00	11441								X					X		X	X	X		X											
ZZZZZZ	ZP33B	10.00	11483																														
ZZZZZZ	ZP33G	10.00	11523																														
ZZZZZZ	ZP33H	10.00	11563																														
ZZZZZZ	ZP33I	10.00	12003																														
ZZZZZZ	ZP33J	10.00	12043																														
ZZZZZZ	ZO41ADUP	100.00	12083																														
ZZZZZZ	ZO68A	100.00	12135																														
ZZZZZZ	ZO68F	100.00	12194																														
ZZZZZZ	ZO41C	2.00	12240																														
ZZZZZZ	ZP33MB1SPD	2.00	12280																														
CCV	CCV5	1.00	12320								X					X		X	X	X		X											
CCB	CCB5	1.00	12360								X					X		X	X	X		X											
ZZZZZZ	ZO41MB1	2.00	12400																														
ZZZZZZ	ZO41D	2.00	12442																														
ZZZZZZ	ZO41K	2.00	12483																														
ZZZZZZ	ZO68A	10.00	12523																														
ZZZZZZ	ZO68B	2.00	12564																														
ZZZZZZ	ZO68C	2.00	13004																														
ZZZZZZ	ZO68D	2.00	13044																														
ZZZZZZ	ZO68F	10.00	13084																														
ZZZZZZ	ZO68G	10.00	13125																														
ZZZZZZ	ZO41MB1SPK	2.00	13165																														
CCV	CCV6	1.00	13205								X					X		X	X	X		X											
CCB	CCB6	1.00	13250								X					X		X	X	X		X											
PBW	ZO53MB1	1.00	13291								X					X		X	X	X		X											
PAI-10GWD	ZO53ADUP	1.00	13333								X					X		X	X	X		X											
PAI-10GW	ZO53A	1.00	13375								X					X		X	X	X		X											
PAI-10GWS	ZO53ASPK	1.00	13420								X					X		X	X	X		X											
ZZZZZZ	ZO41ADUP	10.00	13460																														

FORM XIV

ZO53 : 95156

Analysis Run Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play | INSTRUMENT ID: OPTIMA ICP 2 | START DATE: 12/18/2014

SDG: ZO53 | RUNID: IP121871 | METHOD: ICP | END DATE: 12/18/2014

CLIENT ID	LAB ID	DIL	TIME	SB	AG	AL	AS	B	BA	BE	CA	CD	CO	CR	CU	FE	K	MG	MN	MO	NA	NI	PB	SB	SE	SI	SN	TI	TL	U	V	ZN
ZZZZZZ	ZO41A	10.00	13500																												
ZZZZZZ	ZO41ASPK	10.00	13540																												
ZZZZZZ	ZO68H	2.00	13580																												
LCSW	ZO53MB1SPK	1.00	14020								X					X		X	X	X		X									
CCV	CCV7	1.00	14060								X					X		X	X	X		X									
CCB	CCB7	1.00	14101								X					X		X	X	X		X									

ZO53-091527

Analysis Run Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play | INSTRUMENT ID: PE ELAN 6000 MS | START DATE: 12/17/2014

SDG: Z053 | RUNID: MS121781 | METHOD: PMS | END DATE: 12/17/2014

CLIENT	ANALYTE	VOL	ENT	SB	AG	AL	AS	B	BA	BE	CA	CD	CO	CR	CU	FE	K	MG	MN	MO	NA	NI	PB	SB	SE	SR	TI	TL	U	V	ZN
S0	S0	1.00	10140				X																								
S1	S1	1.00	10200				X																								
S2	S2	1.00	10260				X																								
S3	S3	1.00	10320				X																								
S4	S4	1.00	10370				X																								
ZZZZZZ	Rinse Sampl	1.00	10440																												
ICV	MICV	1.00	10530				X																								
ICB	ICB	1.00	10590				X																								
CCV	MCCV1	1.00	11040				X																								
CCB	CCB1	1.00	11110				X																								
CRI	MCRI	1.00	11160				X																								
ICSA	ICSAI	1.00	11220				X																								
ICSAB	ICSABI	1.00	11280				X																								
ZZZZZZ	LR200	1.00	11340																												
ZZZZZZ	LR300	1.00	11400																												
CCV	MCCV2	1.00	11460				X																								
ZZZZZZ	ZZZZZZ	1.00	11530																												
CCB	CCB2	1.00	12000				X																								
ZZZZZZ	Z034MB1	2.00	12110																												
ZZZZZZ	Z034MB2	2.00	12170																												
ZZZZZZ	Z034A	2.00	12230																												
ZZZZZZ	Z034B	2.00	12290																												
ZZZZZZ	Z034C	2.00	12350																												
ZZZZZZ	Z034E	2.00	12410																												
ZZZZZZ	Z034F	2.00	12470																												
ZZZZZZ	Z034G	2.00	12530																												
ZZZZZZ	Z034MB1SPK	2.00	12590																												
ZZZZZZ	Z034MB2SPK	2.00	13050																												
CCV	MCCV3	1.00	13110				X																								
CCB	CCB3	1.00	13180				X																								
PBW	Z053MB1	2.00	13260				X																								
ZZZZZZ	Z057MB	2.00	13320																												
ZZZZZZ	Z057A	2.00	13380																												
ZZZZZZ	Z057B	2.00	13440																												
ZZZZZZ	Z057C	2.00	13500																												

FORM XIV

Z053 - 091509

Analysis [illegible] Log

ANALYTICAL RESOURCES INCORPORATED

CLIENT: Geoengineers

PROJECT: Gas Works Park-Play

SDG: Z053

INSTRUMENT ID: PE ELAN 6000 MS

RUNID: MS121781 METHOD: PMS

START DATE: 12/17/2014

END DATE: 12/17/2014

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PAI-10GWD	Z053ADUP	2.00	13560	
PAI-10GW	Z053A	2.00	14020	
PAI-10GWS	Z053ASPK	2.00	14080	
LCSW	Z053MB1SPK	2.00	14140	X
ZZZZZZ	Z057MBSPK	2.00	14200	
CCV	MCCV4	1.00	14260	X
CCB	CCB4	1.00	14320	X
ZZZZZZ	Z034MB1	2.00	14380	
ZZZZZZ	Z034MB2	2.00	14440	
PAI-10GWD	Z053ADUP	100.00	14500	X
PAI-10GW	Z053A	100.00	14560	X
PAI-10GWS	Z053ASPK	100.00	15020	X
CCV	MCCV5	1.00	15080	X
CCB	CCB5	1.00	15140	X

FORM XIV

General Chemistry Analysis
Report and Summary QC Forms

ARI Job ID: ZO53

SAMPLE RESULTS-CONVENTIONALS
ZO53-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

Client ID: PAI-10GW
ARI ID: 14-27173 ZO53A

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	12/17/14 121714#1	SM 2320	mg/L CaCO3	1.0	243
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	243
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	388
Ferrous Iron	12/11/14 121114#1	SM3500 FeD	mg/L	0.040	0.957
Chloride	12/17/14 121714#1	EPA 300.0	mg/L	0.5	5.7
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	1.0	35.1
Sulfide	12/17/14 121714#1	SM4500-S2D	mg/L	5.00	39.1

RL Analytical reporting limit
U Undetected at reported detection limit

MS/MSD 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	Spike	Spike Added	Recovery
ARI ID: Z053A Client ID: PAI-10GW							
Ferrous Iron	SM3500 FeD	12/11/14	mg/L	0.957	1.34	0.400	95.8%
Chloride	EPA 300.0	12/17/14	mg/L	5.7	26.0	20.0	101.5%
N-Nitrate	EPA 300.0	12/13/14	mg-N/L	< 0.1	1.9	2.0	95.0%
Sulfate	EPA 300.0	12/17/14	mg/L	35.1	81.6	40.0	116.2%