Microseeps/Pace Analytical Energy Services, LLC
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

May 27, 2015

Anna Zabierek
GSI
9600 Great Hills Trail
Suite 350E
Austin, TX 78759

RE: **SWMV207 / 3969-211**
Microseeps Workorder: 15363

Dear Anna Zabierek:

Enclosed are the analytical results for sample(s) received by the laboratory on Friday, May 01, 2015.

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

Sincerely,

Robbin Robl 05/27/2015
rrobl@microseeps.com RW 5/27/15

Customer Service Representative

Enclosures

As a valued client we would appreciate your comments on our service.
Please email info@microseeps.com.

Total Number of Pages 8

CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Microseeps/Pace Analytical Energy Services, LLC.

Pace Analytical®

Client:	GSI Environmental		PACE Analytical CSIA Center
	9600 Great Hills TRL, STE 350E		220 William Pitt Way
	Austin, TX 78759-5744		Pittsburgh, PA 15238
Tel:	512.346.4474		Tel: 412.826.5245
Report to	Anna Zabierek/Julie Spencer		Report by: Dr. Yi Wang
Project:	SWMV207		Director, CSIA Center of Excellence
Project #	3969-211		Cell: 609.721.2843
Email:	alw @ gsi-net.com		Email: yi.wang @ zymaxusa.com

REPORT OF FORENSICS ISOTOPIC ANALYTICAL RESULTS

Date Received: 4/30/2015
Date Reported: 5/27/2015

Samples submitted for $\delta^{13}C$ (‰ PDB), stable carbon isotope ratios of dissolved chlorinated solvents

Pace CSIA Lab ID	Client's Sample ID Description	$\delta^{13}C$ VC	$\delta^{13}C$ cDCE	$\delta^{13}C$ TCE
15363-1	54400-MW180-0415	-7.63	-19.49	-22.97
15363-2	54400-MW181-0415	U -	U -	-22.96
15363-3	54401-MW181-0415	U -	U -	-23.08

J-Target analyte produced a low peak signal and the result is considered usable to ± 2‰, but not the standard ± 0.5‰
U-Either not run or there was no peak corresponding to the target analyte & such a peak did not produce a reliable CSIA result

VC: Vinyl Chloride
cDCE: cis-1,2-Dichloroethene
TCE: Trichloroethene

Method: Compound Specific Isotope Analysis for ^{13}C and ^{2}H by GC-IRMS, for ^{37}Cl by GC-qMS

Quality Control STDs	$\delta^{13}C$ VC	$\delta^{13}C$ cDCE	$\delta^{13}C$ TCE
QC-1	-27.71	-12.20	-26.14
QC-2	-27.47	-12.29	-26.17
Mean	-27.59	-12.25	-26.16
Analytical Precision (1σ)	0.17	0.06	0.02

Pace CSIA Forensic Isotope Services

Product or Dissolved Organics: Chlorinated Solvents, Oil, Extract, Fraction and Kerogen
3D-CSIA of ^{13}C, ^{37}Cl, and ^{2}H for PCE, TCE, DCE, MTBE, BTEX, PAHs, Pesticides, Alkanes, Gasoline and Oil; Bulk ^{13}C, ^{2}H, ^{18}O, ^{34}S, and ^{15}N
Gas Sample
Gas Composition and 2D-CSIA of ^{13}C and ^{2}H of C1 to C5; ^{13}C of CO_2; ^{14}C of C1 and CO_2; ^{34}S of H_2S; ^{15}N and ^{18}O of N_2O gas
Water and Dissolved Inorganics
^{2}H, ^{3}H and ^{18}O; ^{34}S and ^{18}O of dissolved sulfate; ^{34}S of dissolved H_2S
^{15}N and ^{18}O of dissolved Nitrate; ^{15}N of Ammonia; ^{13}C of dissolved CO_2 and Carbonate/Bicarbonate
Soil and Minerals
^{13}C, ^{18}O, ^{15}N, ^{34}S, D/H; ^{14}C of carbonate or organics
Post-Analysis Forensic Isotope Data Interpretation

Pace CSIA Center of Excellence
220 William Pitt Way
Pittsburgh, PA 15238
phone: 412-826-5245

CSIA Report
Carbon

15363
GSI
Client Project Name: SWMV207
Client Project #: 3969-211

Vinyl Chloride		Concentration (ug/l)			CSIA (Carbon)					
					Area		Co-elution	Analysis	Date	Delta (‰)
Lab ID	Client ID	Sample	PQL	Date	Sample	PQL				
153630001	54400-MW180-0415	1	1.5	5/8/15	2	1	No	2702	5/22/15	-7.63
153630002	54400-MW181-0415	ND	1.5	5/8/15	-	1	No	2704	5/22/15	-
153630003	54401-MW181-0415	ND	1.5	5/8/15	-	1	No	2705	5/22/15	-
Duplicate	54400-MW180-0415	1	1.5	5/8/15	2	1	No	2703	5/22/15	-8.41
Blank	-	0	-	-	<1 (U)	1	No	2699	5/22/15	-
LCS_Lo	-	10	-	-	6.8	1	No	2710	5/22/15	-27.71
LCS_Hi	-	20	-	-	15	1	No	2711	5/22/15	-27.47
LCS acceptance range								-27.87	<=>	-26.87

Method	8260B	AM-24-AR_C	AM-24-DL_C
Units	ug/l	Vs	‰, VPDB
Analyst	NA	CJS	CJS

Pace CSIA Center of Excellence
220 William Pitt Way
Pittsburgh, PA 15238
phone: 412-826-5245

CSIA Report
Carbon

15363
GSI
Client Project Name: SWMV207
Client Project #: 3969-211

cis-Dichloroethene		Concentration (ug/l)			CSIA (Carbon)					
					Area		Co-elution	Analysis	Date	Delta (‰)
Lab ID	Client ID	Sample	PQL	Date	Sample	PQL				
153630001	54400-MW180-0415	3	1	5/8/15	3	1	No	2702	5/22/15	-19.49
153630002	54400-MW181-0415	ND	1	5/8/15	-	1	No	2704	5/22/15	-
153630003	54401-MW181-0415	ND	1	5/8/15	-	1	No	2705	5/22/15	-
Duplicate	54400-MW180-0415	3	1	5/8/15	3	1	No	2703	5/22/15	-20.45
Blank	-	0	-	-	<1 (U)	1	No	2699	5/22/15	-
LCS_Lo	-	10	-	-	11.9	1	No	2700	5/22/15	-12.20
LCS_Hi	-	50	-	-	70	1	No	2701	5/22/15	-12.29
LCS acceptance range								-12.22	<=>	-11.22

Method	8260B	AM-24-AR_C	AM-24-DL_C
Units	ug/l	Vs	‰, VPDB
Analyst	NA	CJS	CJS

Pace CSIA Center of Excellence
220 William Pitt Way
Pittsburgh, PA 15238
phone: 412-826-5245

CSIA Report
Carbon

15363
GSI
Client Project Name: SWMV207
Client Project #: 3969-211

Trichloroethene		Concentration (ug/l)			CSIA (Carbon)					
					Area		Co-elution	Analysis	Date	Delta (‰)
Lab ID	Client ID	Sample	PQL	Date	Sample	PQL				
153630001	54400-MW180-0415	45	1	5/8/15	32	1	No	2702	5/22/15	-22.97
153630002	54400-MW181-0415	16	1	5/8/15	10	1	No	2704	5/22/15	-22.96
153630003	54401-MW181-0415	16	1	5/8/15	11	1	No	2705	5/22/15	-23.08
Duplicate	54400-MW180-0415	45	1	5/8/15	32	1	No	2703	5/22/15	-23.33
Blank	-	0	-	-	<1 (U)	1	No	2699	5/22/15	-
LCS_Lo	-	10	-	-	5.4	1	No	2700	5/22/15	-26.14
LCS_Hi	-	50	-	-	35	1	No	2701	5/22/15	-26.17
LCS acceptance range								-26.48	<=>	-25.48

Method	8260B	AM-24-AR_C	AM-24-DL_C
Units	ug/l	Vs	‰, VPDB
Analyst	NA	CJS	CJS

Pace CSIA Center of Excellence
220 William Pitt Way
Pittsburgh, PA 15238
phone: 412-826-5245

CSIA Report
Carbon

15363
GSI
Client Project Name: SWMV207
Client Project #: 3969-211

1CP (Surrogate)		Sample Collection	CSIA (Carbon)						
Lab ID	Client ID		Area	Dilution	PQL	Co-elution	Analysis	Date	Delta (‰)
153630001	54400-MW180-0415	04/30/15	22.4	1	1	No	2702	05/22/15	-37.52
153630002	54400-MW181-0415	04/30/15	20.3	1	1	No	2704	05/22/15	-37.53
153630003	54401-MW181-0415	04/30/15	18.4	1	1	No	2705	05/22/15	-37.47
Duplicate	54400-MW180-0415	04/30/15	21.8	1	1	No	2703	05/22/15	-37.99
Blank	-	-	22.6	1	1	No	2699	05/22/15	-37.84
LCS_Lo	-	-	23.1	1	1	No	2700	05/22/15	-37.12
LCS_Hi	-	-	22.9	1	1	No	2701	05/22/15	-37.17
Surrogate acceptance range							-37.49	<=>	-36.49

Method		AM-24-AR_C	AM-24-DL_C
Units		Vs	‰, VPDB
Analyst		CJS	CJS

Case Narrative: The blank, LCS's, duplicate and surrogates were all close to or within the acceptance range and the data is reported as valid and representative of the samples as received.

~~URS Corporation~~ GSI Environmental
~~12120 Shamrock Plaza, Suite 100, Omaha, NE 68154 (402) 334-8181 Fax (402) 334-1984~~ 9600 Great Hills Trail Suite 350E Austin TX 78759

CHAIN OF CUSTODY RECORD

Project Name: SWMU207
Project No.: 3969-211
Project Location: MAFB - SWMU207
Project Manager: Julie Spencer 15363
Sampler(s): A. Zabierek 512-346-4474

Sample Date	Sample Time	Type Comp.	Type Grab	Sample Identification	Matrix	Containers No.	Containers Type	Analytical Parameters: CSIT A										Preservative / Remarks
4.30.15	1045		X	5440Ø-MW180-Ø415	W	6	VOA	X										HCL
↓	1105		↓	5440Ø-MW181-Ø415	↓	↓	↓	↓										HCL
↓	1105		↓	5440Ø1-MW181-Ø415	↓	↓	↓	↓										HCL

Signatures	Date	Time	Shipping Details	Special Instructions
Relinquished by: [signature]	4.30.15	1900	Method of Shipment: Fedex ~~8077 7443 6341~~	Pace Analytical Robbin Robl 412-826-4483 3.2°C
Received by: [signature] PACE	5.1.15	0830	Airbill No.: 8077 7443 6341	
Relinquished by:			Lab Address: 220 William Pitt Way Pittsburgh, PA 15238	
Received for Laboratory by:				

128521

Cooler Receipt Form

Client Name: GSI Project: SWMV2071 3969-211 Lab Work Order: 15363

A. Shipping/Container Information (circle appropriate response)

Courier: (FedEx) UPS USPS Client Other:_____ Air bill Present: (Yes) No

Tracking Number: 8077 7443 6341

Custody Seal on Cooler/Box Present: Yes (No) Seals Intact: Yes No

Cooler/Box Packing Material: Bubble Wrap Absorbent (Foam) Other:_____

Type of Ice: (Wet) Blue None Ice Intact: (Yes) Melted

Cooler Temperature: 3.2°C Radiation Screened: Yes (No) Chain of Custody Present: (Yes) No

Comments:_____

B. Laboratory Assignment/Log-in (check appropriate response)

	YES	NO	N/A	Comment Reference non-Conformance
Chain of Custody properly filled out	✓			
Chain of Custody relinquished	✓	LY 5/1/15		
Sampler Name & Signature on COC	✓	✓		
Containers intact	✓			
Were samples in separate bags			✓	
Sample container labels match COC Sample name/date and time collected	✓			
Sufficient volume provided	✓			
PAES containers used	✓			
Are containers properly preserved for the requested testing? (as labeled)	✓			
If an unknown preservation state, were containers checked? Exception: VOA's coliform			✓	If yes, see pH form.
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			✓	

Comments:_____

Cooler contents examined/received by: LY Date: 5.1.15

Project Manager Review: RR Date: 5/1/15