CONESTOGA-ROVERS & ASSOCIATES

200 W. Allegan Street, Suite 300
Plainwell, Michigan 49080-1397
Telephone: (269) 685-5181 Fax: (269) 685-5223
www.CRAworld.com

MEMORANDUM

TO: Darlene Stringer, MDEQ
Matt Gamble, MDEQ

REF. NO.: 017360-T05Y14

FROM: Jeni Quigley/jq/73/Pwl.

DATE: September 10, 2014

CC: David Favero, RACER

RE: Summary of Activities
Well Abandonment/Installation and Groundwater Sampling
Former Grand Rapids Metal Plant
Wyoming, Michigan

Conestoga-Rovers & Associates (CRA), on behalf of Revitalizing Auto Communities Environmental Response (RACER) Trust, conducted additional investigation activities at the former Grand Rapids Metal Plant property located at 300 36th Street SW in Wyoming, Michigan (Site) in June 2014. This memorandum (Memorandum) presents a summary of the activities and results therefrom.

Monitoring Well Abandonment and Installation

CRA, on behalf of RACER Trust, submitted a memorandum entitled *Proposed Groundwater Monitoring Program Modifications, Former Grand Rapids Metal Plant, Wyoming, Michigan* to the Michigan Department of Environmental Quality (MDEQ) on June 3, 2014. The memorandum requested modifications to the current groundwater monitoring program being implemented at the Site, and provided justification for each requested modification. As part of the modifications, two of the existing monitoring wells, 85-7 and 87-11, were proposed to be abandoned in accordance with State of Michigan requirements and two new monitoring wells installed adjoining the abandoned locations. Analytical results for 85-7 and 87-11 exhibited concentrations of elevated metals (i.e., zinc, copper, etc.). The detected concentrations of metals could potentially be attributed to the construction material of the wells, which consisted of a galvanized steel well casing and steel screen, as opposed to contamination resulting from historical operations at the Site. In order to evaluate current groundwater conditions, on June 17, 2014, monitoring wells 87-11 and 85-7 were abandoned by removal and off-Site disposal of all components. Upon removal of the well components, the borehole was filled with bentonite grout to approximately 3 inches below surrounding grade, and filled to grade with topsoil. Upon completion of abandonment of the existing wells, two new monitoring wells, MW59-14 and MW60-14, respectively, were installed adjacent to the former well locations. MW59-14 and MW60-14 were constructed at similar elevations to the previous wells as polyvinyl chloride (PVC) well casing and screen installations. MW59-14 and MW60-14 were developed upon completion of the installation. The monitoring well locations are presented on Figure 1. Monitoring well construction logs are presented in Attachment A.

Subsequent to well installation, groundwater samples were collected from MW59-14 and MW60-14 on June 30, 2014. Prior to groundwater sample collection, static water levels were measured and recorded for the monitoring wells. Well caps were unlocked and removed allowing the water levels in the wells to stabilize. Static water levels were measured relative to the top of each riser.

Dedicated ¼-inch diameter polyethylene tubing is utilized in each of the wells to be sampled. The bottom intake of the tubing was set in the middle of the screened interval for each of the wells. The wells were purged with a peristaltic pump using low-flow purge (LFP) techniques. Wells were purged between 100 and 200 mL per minute with continuous monitoring to confirm less than 0.3 feet of drawdown of the water level. Groundwater quality measurements were recorded in consecutive timed intervals using a YSI® water quality meter and HACH® turbidity meter. Groundwater quality parameters included pH, specific conductivity, temperature, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity. Upon groundwater parameter stabilization, based on three consecutive similar readings, groundwater samples were collected.

Groundwater samples were submitted to the analytical laboratory for chemical analysis for Site-specific total metals (antimony, arsenic, barium, beryllium, cadmium, total chromium, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc), consistent with the groundwater monitoring program. A sample summary if presented in Table 1.

Monitoring Well Re-Sampling

Analytical results for the groundwater sample collected from MW52-12 during the April 2014 semi-annual groundwater monitoring event identified pentachlorophenol at a concentration of 61 micrograms per liter (µg/L), which is above the Michigan Act 451, Part 201 Residential and Non-Residential Drinking Water Criterion of 1 µg/L and the Groundwater-Surface Water Interface Criterion of 2.8 µg/L, respectively. In order to confirm the April 2014 detection of pentachlorophenol, a groundwater sample was collected from MW52-12 on June 30, 2014 utilizing low-level analysis for pentachlorophenol. The groundwater sample was collected utilizing the procedures described above. A sample summary is presented in Table 1.

Analytical Results

Analytical results for the groundwater samples were evaluated against the Generic Residential and Non-Residential Cleanup Criteria and Screening Levels established in Part 7 of Administrative Rules, effective December 30, 2013, pursuant to Part 201, Environmental Remediation, 1994 PA 451, as amended.

Based on the results, no Site-specific metals or pentachlorophenol were detected in the groundwater samples at concentrations above the Part 201 Generic Residential or Non-Residential Cleanup Criteria. Analytical results for groundwater compared to the aforementioned criteria are presented in Table 2.

A QA/QC data validation was conducted on the analytical data. Copies of analytical data and the data validation memorandum summarizing the results of the data validation are presented in Attachment B and Attachment C, respectively. Estimated concentrations and rejected data are identified in the tables of each memo which include qualifications due to contamination in the laboratory method blank, surrogate recoveries outside the laboratory control limits, laboratory control sample recovery, matrix spike/matrix

spike duplicate percent recovery and relative percent difference, and field duplicate variability. Based on the review of the data validation memorandum, the data produced by ALS-MI were found to exhibit acceptable levels of accuracy and precision and may be used with the qualifications noted in the tables in the data validation memoranda. Data was qualified for vanadium and zinc for the groundwater samples collected from MW59-14 and MW60-14 due to the detection of these analytes in the method blank.

Conclusions and Future Work

Based on the results, it appears that the historical detections of metals in groundwater samples collected from monitoring wells 85-7 and 87-11 can be attributed to the well construction materials. Additionally, it appears that the detection of pentachlorophenol in monitoring well MW52-12 in April 2014 may not be reflective of groundwater conditions; however, analysis for this compound in the samples from MW52-12 and the currently monitored additional wells (i.e., 85-6, MW44-12, MW45-12, MW46-12, MW50-12, and MW51-12) utilizing appropriate low-level method detection limits will continue to be performed to confirm this conclusion. Results for pentachlorophenol in other monitoring wells in the vicinity of MW52-12 during the April 2014 monitoring event did not identify the presence of pentachlorophenol; however, one of the results was rejected due to low surrogate recovery and the others were analyzed at an elevated detection level. Historical results did not always meet the low-level detection limits and; therefore, were not always below Part 201 Residential and Non-Residential DWC.

The routine semi-annual groundwater monitoring program will be conducted in accordance with the activities outlined in the memorandum submitted to the MDEQ on June 3, 2014, with the exception that MW37-12, which was proposed to be dropped from the existing program, will continue to be monitored at the request of the MDEQ. The activities outlined in the aforementioned memorandum include monitoring of Site-specific total metals at MW59-14 and MW60-14, and SVOCs at MW52-12, as well as surrounding monitoring wells 85-6, MW44-12, MW45-12, MW46-12, MW50-12, and MW51-12 utilizing low-level analytical method detection limits for pentachlorophenol.

Please contact David Favero at (217) 741-6235 or Jeni Quigley at (269) 685-5181 with any questions regarding this Memorandum or the enclosed information.

List of Figures

Figure 1	Sample Locations

List of Tables

Table 1	Sample Summary
Table 2	Summary of Analytical Results for Groundwater

List of Attachments

Attachment A	Stratigraphic Soil Boring and Monitoring Well Construction Logs
Attachment B	Analytical Laboratory Data
Attachment C	Data Validation Memorandum

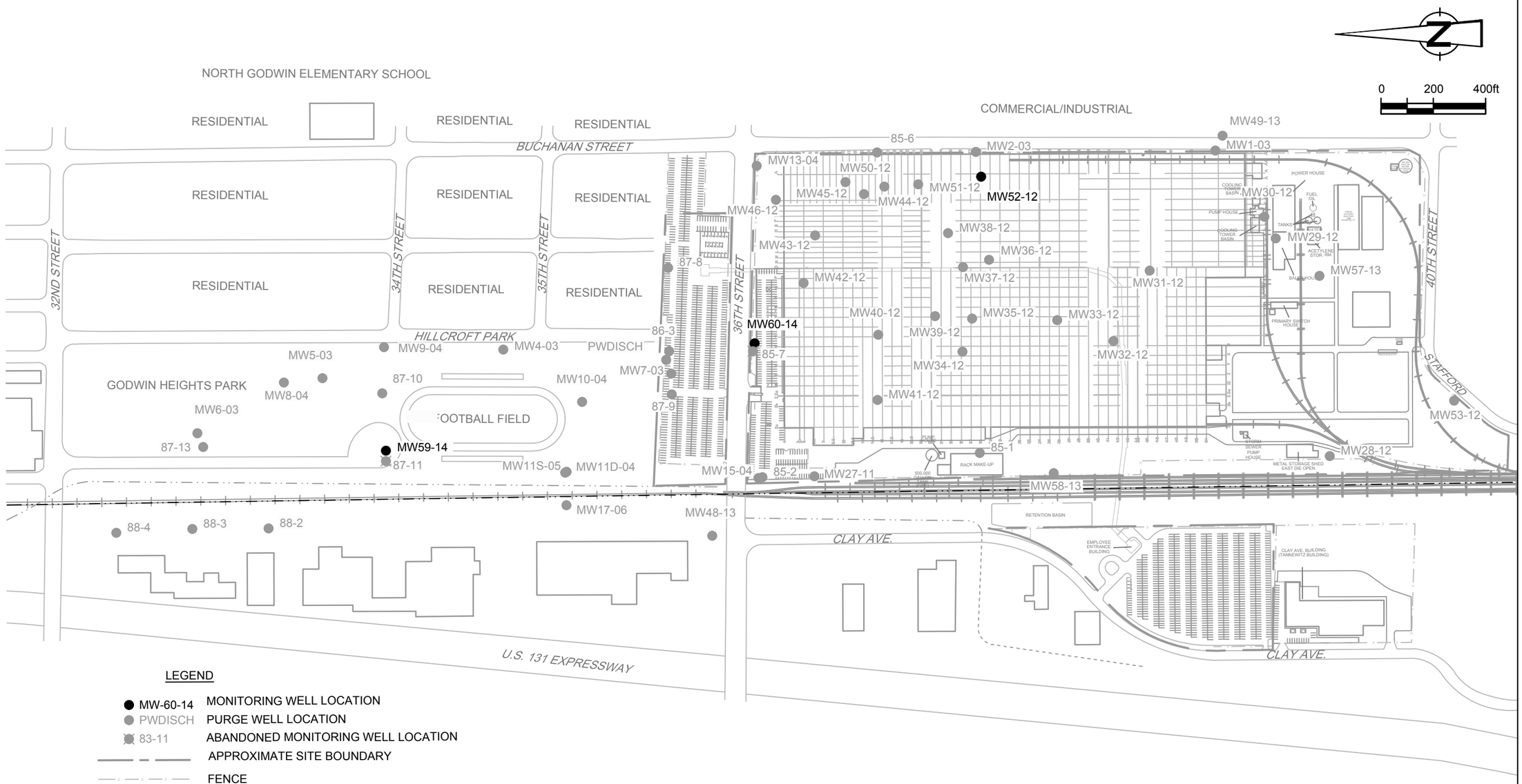


figure 1

SAMPLE LOCATIONS
SEMI-ANNUAL GROUNDWATER MONITORING
FORMER GRAND RAPIDS METAL PLANT
Wyoming, Michigan

SAMPLE SUMMARY
FORMER GRAND RAPIDS METAL PLANT
WYOMING, MICHIGAN

Sample Date	*Sample Identification*	*Sample Location*	*Matrix*	*QC Sample*	*Analysis*
6/30/2014	WG-017360-063014-MR-001	MW59-14	Groundwater		Site-specific metals
6/30/2014	WG-017360-063014-MR-002	MW52-12	Groundwater		pentachlorophenol
6/30/2014	WG-017360-063014-MR-003	MW60-14	Groundwater		Site-specific metals

Notes:
Metals - Antimony, Arsenic, Barium, Beryllium, Cadmium, total Chromium, Cobalt, Copper,
Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc
QC - Quality Control

TABLE 2

SUMMARY OF ANALYTICAL RESULTS IN GROUNDWATER SAMPLES
FORMER GRAND RAPIDS METAL PLANT
WYOMING, MICHIGAN

Sample Location:				*MDEQ Generic Groundwater Cleanup Criteria: Residential and Nonresidential* [(1)]					*MW52-12*	*MW59-14*	*MW60-14*
Sample Identification:		*Residential Drinking Water*	*Non-Residential Drinking Water*	*Groundwater Surface Water Interface*	*Residential Groundwater Volatilization to Indoor Air Inhalation*	*Non-Residential Groundwater Volatilization to Indoor Air Inhalation*	*Water Solubility*	*Flammability and Explosivity Screening Levels*	*WG-017360-063014-MR-002*	*WG-017360-063014-MR-001*	*WG-017360-063014-MR-003*
Sample Date:									*6/30/2014*	*6/30/2014*	*6/30/2014*
		a	*b*	*c*	*d*	*e*	*f*	*g*			
Metals	***Units***										
Antimony	µg/L	6	6	130	NLV	NLV	NA	ID	--	5 U	0.051 J
Arsenic	µg/L	10	10	10	NLV	NLV	NA	ID	--	2.2 J	0.67 J
Barium	µg/L	2000	2000	1600	NLV	NLV	NA	ID	--	110	50
Beryllium	µg/L	4	4	54	NLV	NLV	NA	ID	--	2 U	2 U
Cadmium	µg/L	5	5	5.6	NLV	NLV	NA	ID	--	0.12 J	2 U
Chromium	µg/L	100	100	11	NLV	NLV	NA	ID	--	5 U	0.71 J
Cobalt	µg/L	40	100	100	NLV	NLV	NA	ID	--	0.078 J	3.8 J
Copper	µg/L	1000	1000	26	NLV	NLV	NA	ID	--	0.66 J	1.8 J
Lead	µg/L	4	4	54	NLV	NLV	NA	ID	--	0.45 J	5 U
Manganese	µg/L	50	50	5800	NLV	NLV	NA	ID	--	48	16
Mercury	µg/L	2	2	0.0013	56	56	56	ID	--	0.2 U	0.2 U
Molybdenum	µg/L	73	210	3200	NLV	NLV	NA	ID	--	0.39 J	0.45 J
Nickel	µg/L	100	100	150	NLV	NLV	NA	ID	--	2.1 J	3.3 J
Selenium	µg/L	50	50	5	NLV	NLV	NA	ID	--	0.98 J	0.81 J
Silver	µg/L	34	98	0.2	NLV	NLV	NA	ID	--	5 U	5 U
Thallium	µg/L	2	2	3.7	NLV	NLV	NA	ID	--	5 U	5 U
Vanadium	µg/L	4.5	62	27	NLV	NLV	NA	ID	--	5 U	5 U
Zinc	µg/L	2400	5000	340	NLV	NLV	NA	ID	--	10 U	10 U
Semi-Volatile Organic Compounds (SVOCs)											
Pentachlorophenol	µg/L	1	1	2.8	NLV	NLV	1850000	ID	1 U	--	--

Notes:
[(1)]MDEQ (Michigan) Generic groundwater cleanup criteria, administrative rule R 299.44 effective December 30, 2013, pursuant to Part 201 of 1994 PA 451 as amended (Part 201 Groundwater Criteria
U - Not detected at the associated reporting limit.
J - Estimated concentration.

Attachment A

Stratigraphic Soil Boring and Monitoring Well Construction Logs

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: FORMER GRAND RAPIDS METAL PLANT
PROJECT NUMBER: 017360
CLIENT: RACER TRUST
LOCATION: WYOMING, MI

HOLE DESIGNATION: MW59-14
DATE COMPLETED: June 17, 2014
DRILLING METHOD: 4-1/4" HSA/ SPLIT SPOON
FIELD PERSONNEL: E. BATENBURG

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	GROUND SURFACE TOP OF CASING	666.86 666.55					
0	ASPHALT	666.56	CONCRETE	1SS		80	5
2	SP-SAND, trace fine gravel, compact, fine grained, poorly graded, brown, dry - light brown at 1.0ft BGS		BENTONITE GROUT	2SS		75	19
4	- with fine gravel, dark brown at 3.6ft BGS	662.86	2" PVC WELL CASING	3SS		95	7
6	SP-SAND, with fine gravel, trace silt, loose, fine to medium grained, poorly gravel, grayish brown, multicolored, moist		8" BOREHOLE	4SS			5
8	- well graded at 6.0ft BGS - medium to coarse grained at 8.0ft BGS			5SS		60	6
10	- 2" oxidized sand seam, orange brown at 9.3ft BGS			6SS		50	3
12	- wet at 11.0ft BGS - light brown at 11.6ft BGS			7SS		65	3
14	- brown at 12.1ft BGS			8SS		50	3
16	SP/GP-SAND/GRAVEL, trace silt, loose, fine to coarse sand, fine gravel, medium graded, light brown, multicolored gravel, wet	651.36		9SS		20	3
18	- grayish brown at 16.0ft BGS - light brown at 18.0ft BGS			10SS		50	3
20	- grayish brown at 20.5ft BGS			11SS		50	5
22	- gray/brown mix at 22.0ft BGS			12SS		50	
24	- gray/brown/light brown mix at 24.0ft BGS			13SS		50	
26	- grayish brown at 26.0ft BGS			14SS		50	
28	- brown and gray at 28.0ft BGS			15SS		50	
30	- gray at 30.0ft BGS			16SS		50	
32	- gray and brown at 32.0ft BGS		2" PVC WELL SCREEN	17SS		50	
34	- light brown and gray at 34.0ft BGS		SAND PACK	18SS		50	
36	END OF BOREHOLE @ 36.0ft BGS	630.86					
38							
40							
42							
44							
46							
48							

WELL DETAILS
Screened interval:
636.86 to 631.86ft
30.00 to 35.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
666.11 to 638.86ft
0.75 to 28.00ft BGS
Material: BENTONITE GROUT
Sand Pack:
638.86 to 631.86ft
28.00 to 35.00ft BGS
Material: SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

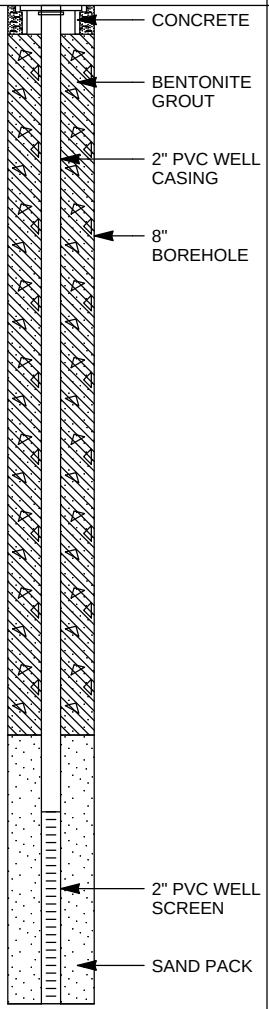
OVERBURDEN LOG 017360-T05-WI.GPJ CRA_CORP.GDT 9/10/14

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: FORMER GRAND RAPIDS METAL PLANT
PROJECT NUMBER: 017360
CLIENT: RACER TRUST
LOCATION: WYOMING, MI

HOLE DESIGNATION: MW60-14
DATE COMPLETED: June 17, 2014
DRILLING METHOD: 4-1/4" HSA/ SPLIT SPOON
FIELD PERSONNEL: M. RAMSEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft
	GROUND SURFACE TOP OF CASING	678.02 677.63
0	SP/GP-SAND/GRAVEL, trace asphalt, loose, fine to coarse sand, fine gravel, poorly graded, dark brown, damp	677.52
2	SP-SAND, trace fine gravel, loose, fine to medium grained, poorly graded, red brown, damp - dark brown at 1.5ft BGS trace silt, medium graded, light brown, dry - brown, damp at 4.0ft BGS	
4		
6		
8	- trace fine gravel, loose, fine to coarse grained, poorly graded, brown, moist at 7.0ft BGS	671.02
10	- light brown at 8.0ft BGS - fine to medium gravel, light brown at 9.0ft BGS - trace fine gravel, brown at 10.0ft BGS	
12	SP/GP-SAND/GRAVEL, loose, fine to coarse sand, fine gravel, poorly graded, brown, moist	666.02
14		
16	SP-SAND, trace fine gravel, loose, fine to medium grained, poorly graded, light brown, moist to wet	662.02
18	- trace silt, loose to compact, wet at 18.0ft BGS	
20	- trace fine to coarse gravel at 20.0ft BGS	
22	SP/GP-SAND/GRAVEL, trace silt, slightly compact, fine to coarse sand, fine to coarse gravel, poorly graded, brown, wet	656.02
24		
26	END OF BOREHOLE @ 26.0ft BGS	652.02
28		
30		
32		
34		



WELL DETAILS
Screened interval:
657.02 to 652.02ft
21.00 to 26.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 0.010
Material: PVC
Seal:
677.27 to 659.02ft
0.75 to 19.00ft BGS
Material: BENTONITE GROUT
Sand Pack:
659.02 to 652.02ft
19.00 to 26.00ft BGS
Material: SAND

SAMPLE NUMBER	INTERVAL	REC (%)	'N' VALUE
1SS		80	
2SS		60	
3SS		60	
4SS		50	
5SS		80	
6SS		60	
7SS		80	
8SS		60	
9SS		60	
10SS		80	
11SS		80	
12SS		100	
13SS			

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

Attachment B

Analytical Laboratory Data

22-Jul-2014

Rawa Fleisher
Conestoga-Rovers & Associates
14496 Sheldon Road
Suite 200
Plymouth, MI 48170

Re: **Former GRMP (17360)** Work Order: **14061557**

Dear Rawa, Revision: **1**

ALS Environmental received 7 samples on 30-Jun-2014 for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with NELAP standard requirements and QC results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 37.

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

Sincerely,

Chad Whelton

Electronically approved by: Tom Beamish

Chad Whelton
Project Manager

Certificate No: MN 532786

ADDRESS 3352 128th Avenue Holland, Michigan 49424-9263 | PHONE (616) 399-6070 | FAX (616) 399-6185
ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

ALS Group USA, Corp

Date: 22-Jul-14

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Work Order: **14061557**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
14061557-01	WG-017360-063014-MR-001	Groundwater		06/30/14 11:23	06/30/14 15:20	☐
14061557-02	WG-017360-063014-MR-002	Groundwater		06/30/14 12:27	06/30/14 15:20	☐
14061557-03	WG-017360-063014-MR-003	Groundwater		06/30/14 13:11	06/30/14 15:20	☐
14061557-04	WW-017360-063014-MR-004	Wastewater		06/30/14 13:40	06/30/14 15:20	☐
14061557-05	WW-017360-063014-MR-004 TCLP	Tclp Extract		06/30/14 13:40	06/30/14 15:20	☐
14061557-06	SO-017360-063014-MR-005	Soil		06/30/14 14:05	06/30/14 15:20	☐
14061557-07	SO-017360-063014-MR-005 TCLP	Tclp Extract		06/30/14 14:05	06/30/14 15:20	☐

Revision: 1

ALS Group USA, Corp

Date: 22-Jul-14

Client:	Conestoga-Rovers & Associates
Project:	Former GRMP (17360)
WorkOrder:	**14061557**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
% of sample	Percent of Sample
°F	Degrees Fahrenheit
µg/Kg-dry	Micrograms per Kilogram Dry Weight
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter
s.u.	Standard Units

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Work Order: 14061557

Case Narrative

Batch R143662, Method PH_9040_W, Sample 14061557-04A: This is considered a "field test" and, as such, the recommended sample holding time expired prior to sample receipt.

ALS Group USA, Corp

Date: *22-Jul-14*

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Sample ID: WG-017360-063014-MR-001
Collection Date: 06/30/14 11:23 AM

Work Order: 14061557
Lab ID: 14061557-01
Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			**SW7470**		Prep: SW7470 / 7/1/14		Analyst: **LR**
BatchID: 60199							
Mercury	U		0.00010	0.00020	mg/L	1	07/02/14 13:48
METALS BY ICP-MS			**SW6020A**		Prep: SW3005A / 7/2/14		Analyst: **ML**
BatchID: 60263							
Antimony	U		0.000036	0.0050	mg/L	1	07/03/14 06:14
Arsenic	**0.0022**	J	**0.00058**	**0.0050**	**mg/L**	1	07/03/14 06:14
Barium	**0.11**		**0.000063**	**0.0050**	**mg/L**	1	07/03/14 06:14
Beryllium	U		0.000082	0.0020	mg/L	1	07/03/14 06:14
Cadmium	**0.00012**	J	**0.000045**	**0.0020**	**mg/L**	1	07/03/14 06:14
Chromium	U		0.00027	0.0050	mg/L	1	07/03/14 06:14
Cobalt	**0.000078**	J	**0.000041**	**0.0050**	**mg/L**	1	07/03/14 06:14
Copper	**0.00066**	J	**0.00053**	**0.0050**	**mg/L**	1	07/03/14 06:14
Lead	**0.00045**	J	**0.000051**	**0.0050**	**mg/L**	1	07/03/14 06:14
Manganese	**0.048**		**0.000054**	**0.0050**	**mg/L**	1	07/03/14 06:14
Molybdenum	**0.00039**	J	**0.000088**	**0.0050**	**mg/L**	1	07/03/14 06:14
Nickel	**0.0021**	J	**0.00025**	**0.0050**	**mg/L**	1	07/03/14 06:14
Selenium	**0.00098**	J	**0.00064**	**0.0050**	**mg/L**	1	07/03/14 06:14
Silver	U		0.000042	0.0050	mg/L	1	07/03/14 06:14
Thallium	U		0.000062	0.0050	mg/L	1	07/03/14 06:14
Vanadium	**0.00024**	J	**0.00016**	**0.0050**	**mg/L**	1	07/03/14 06:14
Zinc	**0.0052**	J	**0.00048**	**0.010**	**mg/L**	1	07/03/14 06:14

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

ALS Group USA, Corp

Date: *22-Jul-14*

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Sample ID: WG-017360-063014-MR-002
Collection Date: 06/30/14 12:27 PM

Work Order: 14061557
Lab ID: 14061557-02
Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
SEMI-VOLATILE ORGANIC COMPOUNDS			**SW8270**		Prep: SW3510 / 7/2/14		Analyst: **DD**
BatchID: 60244							
Pentachlorophenol	U		0.22	1.0	µg/L	1	07/18/14 11:39
Surr: 2,4,6-Tribromophenol	*86.5*			*32-115*	*%REC*	1	07/18/14 11:39
Surr: 2-Fluorobiphenyl	*68.6*			*32-100*	*%REC*	1	07/18/14 11:39
Surr: 2-Fluorophenol	*39.7*			*22-59*	*%REC*	1	07/18/14 11:39
Surr: 4-Terphenyl-d14	*92.8*			*23-112*	*%REC*	1	07/18/14 11:39
Surr: Nitrobenzene-d5	*76.4*			*31-93*	*%REC*	1	07/18/14 11:39
Surr: Phenol-d6	*28.4*			*13-36*	*%REC*	1	07/18/14 11:39

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

ALS Group USA, Corp

Date: *22-Jul-14*

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Sample ID: WG-017360-063014-MR-003
Collection Date: 06/30/14 01:11 PM

Work Order: 14061557
Lab ID: 14061557-03
Matrix: GROUNDWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			**SW7470**		Prep: SW7470 / 7/1/14		Analyst: **LR**
BatchID: 60199							
Mercury	U		0.00010	0.00020	mg/L	1	07/02/14 13:55
METALS BY ICP-MS			**SW6020A**		Prep: SW3005A / 7/2/14		Analyst: **ML**
BatchID: 60263							
Antimony	**0.000051**	J	**0.000036**	**0.0050**	**mg/L**	1	07/03/14 06:20
Arsenic	**0.00067**	J	**0.00058**	**0.0050**	**mg/L**	1	07/03/14 06:20
Barium	**0.050**		**0.000063**	**0.0050**	**mg/L**	1	07/03/14 06:20
Beryllium	U		0.000082	0.0020	mg/L	1	07/03/14 06:20
Cadmium	U		0.000045	0.0020	mg/L	1	07/03/14 06:20
Chromium	**0.00071**	J	**0.00027**	**0.0050**	**mg/L**	1	07/03/14 06:20
Cobalt	**0.0038**	J	**0.000041**	**0.0050**	**mg/L**	1	07/03/14 06:20
Copper	**0.0018**	J	**0.00053**	**0.0050**	**mg/L**	1	07/03/14 06:20
Lead	U		0.000051	0.0050	mg/L	1	07/03/14 06:20
Manganese	**0.016**		**0.000054**	**0.0050**	**mg/L**	1	07/03/14 06:20
Molybdenum	**0.00045**	J	**0.000088**	**0.0050**	**mg/L**	1	07/03/14 06:20
Nickel	**0.0033**	J	**0.00025**	**0.0050**	**mg/L**	1	07/03/14 06:20
Selenium	**0.00081**	J	**0.00064**	**0.0050**	**mg/L**	1	07/03/14 06:20
Silver	U		0.000042	0.0050	mg/L	1	07/03/14 06:20
Thallium	U		0.000062	0.0050	mg/L	1	07/03/14 06:20
Vanadium	**0.00080**	J	**0.00016**	**0.0050**	**mg/L**	1	07/03/14 06:20
Zinc	**0.0027**	J	**0.00048**	**0.010**	**mg/L**	1	07/03/14 06:20

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

ALS Group USA, Corp

Date: *22-Jul-14*

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Sample ID: WW-017360-063014-MR-004
Collection Date: 06/30/14 01:40 PM

Work Order: 14061557
Lab ID: 14061557-04
Matrix: WASTEWATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
PCBS			**SW8082**		Prep: SW3510 / 7/3/14		Analyst: **JC**
BatchID: 60280							
Aroclor 1016	U		0.067	0.20	µg/L	1	07/03/14 14:21
Aroclor 1221	U		0.067	0.20	µg/L	1	07/03/14 14:21
Aroclor 1232	U		0.067	0.20	µg/L	1	07/03/14 14:21
Aroclor 1242	U		0.067	0.20	µg/L	1	07/03/14 14:21
Aroclor 1248	U		0.067	0.20	µg/L	1	07/03/14 14:21
Aroclor 1254	U		0.058	0.20	µg/L	1	07/03/14 14:21
Aroclor 1260	U		0.058	0.20	µg/L	1	07/03/14 14:21
Surr: Decachlorobiphenyl	*45.0*			*40-110*	*%REC*	1	07/03/14 14:21
Surr: Tetrachloro-m-xylene	*54.0*			*40-110*	*%REC*	1	07/03/14 14:21
FLASHPOINT, P-M CLOSED-CUP			**D93**				Analyst: **RLF**
BatchID: R144042							
Flashpoint, P-M Closed-cup	**>200**		**0**		**°F**	1	07/08/14 08:45
PH			**SW9040**				Analyst: **KF**
BatchID: R143662							
pH (laboratory)	**7.61**		**0**		**s.u.**	1	06/30/14 13:45

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

ALS Group USA, Corp

Date: *22-Jul-14*

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Sample ID: WW-017360-063014-MR-004 TCLP
Collection Date: 06/30/14 01:40 PM

Work Order: 14061557
Lab ID: 14061557-05
Matrix: TCLP EXTRACT

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
TCLP MERCURY BY CVAA			**SW7470A**		Prep: SW7470 / 7/1/14		Analyst: **LR**
BatchID: 60199							
Mercury	U		0.0010	0.0020	mg/L	1	07/02/14 14:04
TCLP METALS ANALYSIS BY ICP-MS			**SW6020A**		Prep: SW3005A / 7/2/14		Analyst: **ML**
BatchID: 60263							
Arsenic	U		0.0072	0.010	mg/L	1	07/03/14 08:06
Barium	**0.043**	J	**0.0027**	**0.050**	**mg/L**	1	07/03/14 08:06
Cadmium	**0.00054**	J	**0.00034**	**0.0020**	**mg/L**	1	07/03/14 08:06
Chromium	**0.0040**	J	**0.00042**	**0.020**	**mg/L**	1	07/03/14 08:06
Lead	**0.0014**	J	**0.00027**	**0.010**	**mg/L**	1	07/03/14 08:06
Selenium	U		0.0041	0.020	mg/L	1	07/03/14 08:06
Silver	**0.00049**	J	**0.00025**	**0.0050**	**mg/L**	1	07/03/14 08:06
TCLP SEMI-VOLATILE ORGANICS			**SW8270**		Prep: SW3510 / 7/2/14		Analyst: **DD**
BatchID: 60241							
1,4-Dichlorobenzene	U		5.8	100	µg/L	1	07/02/14 21:38
2,4,5-Trichlorophenol	U		5.0	100	µg/L	1	07/02/14 21:38
2,4,6-Trichlorophenol	U		5.4	100	µg/L	1	07/02/14 21:38
2,4-Dinitrotoluene	U		5.4	100	µg/L	1	07/02/14 21:38
Hexachloro-1,3-butadiene	U		4.7	100	µg/L	1	07/02/14 21:38
Hexachlorobenzene	U		4.4	100	µg/L	1	07/02/14 21:38
Hexachloroethane	U		9.5	100	µg/L	1	07/02/14 21:38
m-Cresol	U		3.9	100	µg/L	1	07/02/14 21:38
Nitrobenzene	U		6.6	100	µg/L	1	07/02/14 21:38
o-Cresol	U		4.0	100	µg/L	1	07/02/14 21:38
p-Cresol	U		3.9	100	µg/L	1	07/02/14 21:38
Pentachlorophenol	U		4.4	400	µg/L	1	07/02/14 21:38
Pyridine	U		7.0	400	µg/L	1	07/02/14 21:38
Surr: 2,4,6-Tribromophenol	*77.8*			*38-115*	*%REC*	1	07/02/14 21:38
Surr: 2-Fluorobiphenyl	*72.0*			*32-100*	*%REC*	1	07/02/14 21:38
Surr: 2-Fluorophenol	*44.6*			*22-59*	*%REC*	1	07/02/14 21:38
Surr: 4-Terphenyl-d14	*96.5*			*23-112*	*%REC*	1	07/02/14 21:38
Surr: Nitrobenzene-d5	*65.1*			*31-93*	*%REC*	1	07/02/14 21:38
Surr: Phenol-d6	*26.1*			*13-36*	*%REC*	1	07/02/14 21:38
TCLP VOLATILE ORGANICS			**SW8260B**		Leachate: SW1311 / 7/1/14		Analyst: **RS**
BatchID: R143778							
1,1-Dichloroethene	U		4.7	20	µg/L	20	07/03/14 12:40
1,2-Dichloroethane	U		5.3	20	µg/L	20	07/03/14 12:40
2-Butanone	U		17	100	µg/L	20	07/03/14 12:40

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

ALS Group USA, Corp

Date: *22-Jul-14*

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Sample ID: WW-017360-063014-MR-004 TCLP
Collection Date: 06/30/14 01:40 PM

Work Order: 14061557
Lab ID: 14061557-05
Matrix: TCLP EXTRACT

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
Benzene	U		5.0	20	µg/L	20	07/03/14 12:40
Carbon tetrachloride	U		2.8	20	µg/L	20	07/03/14 12:40
Chlorobenzene	U		3.7	20	µg/L	20	07/03/14 12:40
Chloroform	U		4.9	20	µg/L	20	07/03/14 12:40
Tetrachloroethene	U		4.9	20	µg/L	20	07/03/14 12:40
Trichloroethene	U		6.9	20	µg/L	20	07/03/14 12:40
Vinyl chloride	U		3.8	20	µg/L	20	07/03/14 12:40
Surr: 1,2-Dichloroethane-d4	*96.2*			*70-130*	*%REC*	20	07/03/14 12:40
Surr: 4-Bromofluorobenzene	*102*			*70-130*	*%REC*	20	07/03/14 12:40
Surr: Dibromofluoromethane	*96.6*			*70-130*	*%REC*	20	07/03/14 12:40
Surr: Toluene-d8	*94.8*			*70-130*	*%REC*	20	07/03/14 12:40

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

ALS Group USA, Corp

Date: *22-Jul-14*

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Sample ID: SO-017360-063014-MR-005
Collection Date: 06/30/14 02:05 PM

Work Order: 14061557
Lab ID: 14061557-06
Matrix: SOIL

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
PCBS			**SW8082**		Prep: SW3541 / 7/2/14		Analyst: **JC**
BatchID: 60250							
Aroclor 1016	U		49	86	µg/Kg-dry	1	07/03/14 01:57
Aroclor 1221	U		49	86	µg/Kg-dry	1	07/03/14 01:57
Aroclor 1232	U		49	86	µg/Kg-dry	1	07/03/14 01:57
Aroclor 1242	U		49	86	µg/Kg-dry	1	07/03/14 01:57
Aroclor 1248	U		49	86	µg/Kg-dry	1	07/03/14 01:57
Aroclor 1254	U		32	86	µg/Kg-dry	1	07/03/14 01:57
Aroclor 1260	U		32	86	µg/Kg-dry	1	07/03/14 01:57
Surr: Decachlorobiphenyl	*55.1*			*40-140*	*%REC*	1	07/03/14 01:57
FLASHPOINT, OPEN-CUP			**D92**				Analyst: **RLF**
BatchID: R144042							
Flashpoint, Open-cup	**>200**		**0**		**°F**	1	07/08/14 08:45
MOISTURE			**A2540 G**				Analyst: **AT**
BatchID: R143935							
Moisture	**8.8**		**0.025**	**0.050**	**% of sample**	1	07/03/14 08:59
PH			**SW9045D**		Prep: EXTRACT / 7/2/14		Analyst: **AT**
BatchID: 60262							
pH	**7.9**		**0**		**s.u.**	1	07/02/14 16:19

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

ALS Group USA, Corp

Date: *22-Jul-14*

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Sample ID: SO-017360-063014-MR-005 TCLP
Collection Date: 06/30/14 02:05 PM

Work Order: 14061557
Lab ID: 14061557-07
Matrix: TCLP EXTRACT

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
TCLP MERCURY BY CVAA			**SW7470A**		Prep: SW7470 / 7/1/14		Analyst: **LR**
BatchID: 60199							
Mercury	U		0.0010	0.0020	mg/L	1	07/02/14 14:06
TCLP METALS ANALYSIS BY ICP-MS			**SW6020A**		Prep: SW3005A / 7/2/14		Analyst: **ML**
BatchID: 60263							
Arsenic	**0.015**		**0.0072**	**0.010**	**mg/L**	1	07/03/14 08:12
Barium	**0.34**		**0.0027**	**0.050**	**mg/L**	1	07/03/14 08:12
Cadmium	**0.0014**	J	**0.00034**	**0.0020**	**mg/L**	1	07/03/14 08:12
Chromium	**0.0017**	J	**0.00042**	**0.020**	**mg/L**	1	07/03/14 08:12
Lead	**0.0013**	J	**0.00027**	**0.010**	**mg/L**	1	07/03/14 08:12
Selenium	U		0.0041	0.020	mg/L	1	07/03/14 08:12
Silver	**0.00026**	J	**0.00025**	**0.0050**	**mg/L**	1	07/03/14 08:12
TCLP SEMI-VOLATILE ORGANICS			**SW8270**		Prep: SW3510 / 7/2/14		Analyst: **DD**
BatchID: 60241							
1,4-Dichlorobenzene	U		5.8	100	µg/L	1	07/02/14 22:04
2,4,5-Trichlorophenol	U		5.0	100	µg/L	1	07/02/14 22:04
2,4,6-Trichlorophenol	U		5.4	100	µg/L	1	07/02/14 22:04
2,4-Dinitrotoluene	U		5.4	100	µg/L	1	07/02/14 22:04
Hexachloro-1,3-butadiene	U		4.7	100	µg/L	1	07/02/14 22:04
Hexachlorobenzene	U		4.4	100	µg/L	1	07/02/14 22:04
Hexachloroethane	U		9.5	100	µg/L	1	07/02/14 22:04
m-Cresol	U		3.9	100	µg/L	1	07/02/14 22:04
Nitrobenzene	U		6.6	100	µg/L	1	07/02/14 22:04
o-Cresol	U		4.0	100	µg/L	1	07/02/14 22:04
p-Cresol	U		3.9	100	µg/L	1	07/02/14 22:04
Pentachlorophenol	U		4.4	400	µg/L	1	07/02/14 22:04
Pyridine	U		7.0	400	µg/L	1	07/02/14 22:04
Surr: 2,4,6-Tribromophenol	*73.5*			*38-115*	*%REC*	1	07/02/14 22:04
Surr: 2-Fluorobiphenyl	*68.3*			*32-100*	*%REC*	1	07/02/14 22:04
Surr: 2-Fluorophenol	*43.1*			*22-59*	*%REC*	1	07/02/14 22:04
Surr: 4-Terphenyl-d14	*96.7*			*23-112*	*%REC*	1	07/02/14 22:04
Surr: Nitrobenzene-d5	*60.3*			*31-93*	*%REC*	1	07/02/14 22:04
Surr: Phenol-d6	*25.0*			*13-36*	*%REC*	1	07/02/14 22:04
TCLP VOLATILE ORGANICS			**SW8260B**		Leachate: SW1311 / 7/1/14		Analyst: **RS**
BatchID: R143804							
1,1-Dichloroethene	U		4.7	20	µg/L	20	07/03/14 05:04
1,2-Dichloroethane	U		5.3	20	µg/L	20	07/03/14 05:04
2-Butanone	U		17	100	µg/L	20	07/03/14 05:04

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

ALS Group USA, Corp

Date: *22-Jul-14*

Client: Conestoga-Rovers & Associates
Project: Former GRMP (17360)
Sample ID: SO-017360-063014-MR-005 TCLP
Collection Date: 06/30/14 02:05 PM

Work Order: 14061557
Lab ID: 14061557-07
Matrix: TCLP EXTRACT

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
Benzene	U		5.0	20	µg/L	20	07/03/14 05:04
Carbon tetrachloride	U		2.8	20	µg/L	20	07/03/14 05:04
Chlorobenzene	U		3.7	20	µg/L	20	07/03/14 05:04
Chloroform	U		4.9	20	µg/L	20	07/03/14 05:04
Tetrachloroethene	U		4.9	20	µg/L	20	07/03/14 05:04
Trichloroethene	U		6.9	20	µg/L	20	07/03/14 05:04
Vinyl chloride	U		3.8	20	µg/L	20	07/03/14 05:04
Surr: 1,2-Dichloroethane-d4	*100*			*70-130*	*%REC*	20	07/03/14 05:04
Surr: 4-Bromofluorobenzene	*86.2*			*70-130*	*%REC*	20	07/03/14 05:04
Surr: Dibromofluoromethane	*103*			*70-130*	*%REC*	20	07/03/14 05:04
Surr: Toluene-d8	*97.8*			*70-130*	*%REC*	20	07/03/14 05:04

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

ALS Group USA, Corp

Date: 22-Jul-14

Client: Conestoga-Rovers & Associates

Work Order: 14061557

Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60250** Instrument ID **GC14** Method: **SW8082**

MBLK Sample ID: **PBLKS1-60250-60250** Units: **µg/Kg** Analysis Date: **07/03/14 12:04 AM**

Client ID: Run ID: **GC14_140702A** SeqNo: **2836178** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aroclor 1016	U	83								
Aroclor 1221	U	83								
Aroclor 1232	U	83								
Aroclor 1242	U	83								
Aroclor 1248	U	83								
Aroclor 1254	U	83								
Aroclor 1260	U	83								
Surr: Decachlorobiphenyl	*20.67*	0	*33.3*	0	*62.1*	*40-140*	0			

LCS Sample ID: **PLCSS1-60250-60250** Units: **µg/Kg** Analysis Date: **07/03/14 12:20 AM**

Client ID: Run ID: **GC14_140702A** SeqNo: **2836179** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aroclor 1016	774	83	833	0	92.9	50-130	0			
Aroclor 1260	814.7	83	833	0	97.8	50-130	0			
Surr: Decachlorobiphenyl	*20.33*	0	*33.3*	0	*61.1*	*40-140*	0			

MS Sample ID: **1407068-04A MS** Units: **µg/Kg** Analysis Date: **07/03/14 12:52 AM**

Client ID: Run ID: **GC14_140702A** SeqNo: **2836181** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aroclor 1016	1309	82	822.4	0	159	40-140	0			S
Aroclor 1260	1261	82	822.4	0	153	40-140	0			S
Surr: Decachlorobiphenyl	*21.06*	0	*32.87*	0	*64.1*	*40-140*	0			

MSD Sample ID: **1407068-04A MSD** Units: **µg/Kg** Analysis Date: **07/03/14 01:08 AM**

Client ID: Run ID: **GC14_140702A** SeqNo: **2836182** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aroclor 1016	1390	82	819.9	0	169	40-140	1309	5.94	50	S
Aroclor 1260	1163	82	819.9	0	142	40-140	1261	8.02	50	S
Surr: Decachlorobiphenyl	*20.01*	0	*32.78*	0	*61.1*	*40-140*	21.06	*5.1*	*50*	

The following samples were analyzed in this batch: 14061557-06A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60280** Instrument ID **GC14** Method: **SW8082**

MBLK Sample ID: **PBLKW1-60280-60280** Units: **µg/L** Analysis Date: **07/03/14 01:48 PM**
Client ID: Run ID: **GC14_140703A** SeqNo: **2839879** Prep Date: **07/03/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aroclor 1016	U	0.20								
Aroclor 1221	U	0.20								
Aroclor 1232	U	0.20								
Aroclor 1242	U	0.20								
Aroclor 1248	U	0.20								
Aroclor 1254	U	0.20								
Aroclor 1260	U	0.20								
Surr: Decachlorobiphenyl	*0.045*	0	*0.1*	0	*45*	*40-110*	0			
Surr: Tetrachloro-m-xylene	*0.051*	0	*0.1*	0	*51*	*40-110*	0			

LCS Sample ID: **PLCSW1-60280-60280** Units: **µg/L** Analysis Date: **07/03/14 02:05 PM**
Client ID: Run ID: **GC14_140703A** SeqNo: **2839880** Prep Date: **07/03/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aroclor 1016	1.864	0.20	2.5	0	74.6	50-130	0			
Aroclor 1260	1.931	0.20	2.5	0	77.2	50-130	0			
Surr: Decachlorobiphenyl	*0.042*	0	*0.1*	0	*42*	*40-110*	0			
Surr: Tetrachloro-m-xylene	*0.051*	0	*0.1*	0	*51*	*40-110*	0			

The following samples were analyzed in this batch: 14061557-04B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60199** Instrument ID **HG1** Method: **SW7470**

MBLK Sample ID: **MBLK-60199-60199** Units: **mg/L** Analysis Date: **07/02/14 01:34 PM**
Client ID: Run ID: **HG1_140702A** SeqNo: **2833597** Prep Date: **07/01/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	U	0.00020								

LCS Sample ID: **LCS-60199-60199** Units: **mg/L** Analysis Date: **07/02/14 01:36 PM**
Client ID: Run ID: **HG1_140702A** SeqNo: **2833598** Prep Date: **07/01/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.001795	0.00020	0.002	0	89.8	80-120	0			

MS Sample ID: **14061557-01AMS** Units: **mg/L** Analysis Date: **07/02/14 01:50 PM**
Client ID: **WG-017360-063014-MR-001** Run ID: **HG1_140702A** SeqNo: **2833604** Prep Date: **07/01/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.001972	0.00020	0.002	0.000003	98.4	75-125	0			

MSD Sample ID: **14061557-01AMSD** Units: **mg/L** Analysis Date: **07/02/14 01:53 PM**
Client ID: **WG-017360-063014-MR-001** Run ID: **HG1_140702A** SeqNo: **2833605** Prep Date: **07/01/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.001939	0.00020	0.002	0.000003	96.8	75-125	0.001972	1.69	20	

The following samples were analyzed in this batch:

14061557-01A	14061557-03A	14061557-05A
14061557-07A		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60263** Instrument ID **ICPMS1** Method: **SW6020A**

MBLK Sample ID: **MBLK-60263-60263** Units: **mg/L** Analysis Date: **07/03/14 04:17 AM**
Client ID: Run ID: **ICPMS1_140702A** SeqNo: **2834962** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	U	0.0050								
Arsenic	U	0.0050								
Barium	0.0002481	0.0050								J
Beryllium	U	0.0020								
Cadmium	U	0.0020								
Chromium	U	0.0050								
Cobalt	U	0.0050								
Copper	U	0.0050								
Lead	U	0.0050								
Manganese	0.001563	0.0050								J
Molybdenum	U	0.0050								
Nickel	0.0002729	0.0050								J
Selenium	U	0.0050								
Silver	U	0.0050								
Thallium	U	0.0050								
Vanadium	0.0002074	0.0050								J
Zinc	0.002985	0.010								J

LCS Sample ID: **LCS-60263-60263** Units: **mg/L** Analysis Date: **07/03/14 04:24 AM**
Client ID: Run ID: **ICPMS1_140702A** SeqNo: **2834965** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09652	0.0050	0.1	0	96.5	80-120	0			
Arsenic	0.09427	0.0050	0.1	0	94.3	80-120	0			
Barium	0.09493	0.0050	0.1	0	94.9	80-120	0			
Beryllium	0.09671	0.0020	0.1	0	96.7	80-120	0			
Cadmium	0.09592	0.0020	0.1	0	95.9	80-120	0			
Chromium	0.09402	0.0050	0.1	0	94	80-120	0			
Cobalt	0.09401	0.0050	0.1	0	94	80-120	0			
Copper	0.09302	0.0050	0.1	0	93	80-120	0			
Lead	0.09427	0.0050	0.1	0	94.3	80-120	0			
Manganese	0.09523	0.0050	0.1	0	95.2	80-120	0			
Molybdenum	0.09484	0.0050	0.1	0	94.8	80-120	0			
Nickel	0.09418	0.0050	0.1	0	94.2	80-120	0			
Selenium	0.09651	0.0050	0.1	0	96.5	80-120	0			
Silver	0.09098	0.0050	0.1	0	91	80-120	0			
Thallium	0.09116	0.0050	0.1	0	91.2	80-120	0			
Vanadium	0.09604	0.0050	0.1	0	96	80-120	0			
Zinc	0.09705	0.010	0.1	0	97	80-120	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60263** Instrument ID **ICPMS1** Method: **SW6020A**

MS Sample ID: **1407031-01AMS** Units: **mg/L** Analysis Date: **07/03/14 08:30 AM**
Client ID: Run ID: **ICPMS1_140702A** SeqNo: **2835050** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	1.005	0.050	1	0.0006734	100	75-125	0			
Arsenic	0.9992	0.050	1	0.004674	99.5	75-125	0			
Barium	1.14	0.050	1	0.1389	100	75-125	0			
Beryllium	0.9688	0.020	1	0.001147	96.8	75-125	0			
Cadmium	0.9769	0.020	1	0.0009645	97.6	75-125	0			
Chromium	0.9871	0.050	1	0.004361	98.3	75-125	0			
Cobalt	0.9735	0.050	1	0.001593	97.2	75-125	0			
Copper	0.9547	0.050	1	0.007924	94.7	75-125	0			
Lead	0.9816	0.050	1	0.004396	97.7	75-125	0			
Manganese	6.11	0.050	1	5.102	101	75-125	0			O
Molybdenum	0.999	0.050	1	0.001926	99.7	75-125	0			
Nickel	0.992	0.050	1	0.008685	98.3	75-125	0			
Selenium	0.9865	0.050	1	-0.005739	99.2	75-125	0			
Silver	0.9211	0.050	1	0.00003204	92.1	75-125	0			
Thallium	0.9504	0.050	1	-0.00003879	95	75-125	0			
Vanadium	1.026	0.050	1	0.003044	102	75-125	0			
Zinc	1.098	0.10	1	0.1162	98.2	75-125	0			

MSD Sample ID: **1407031-01AMSD** Units: **mg/L** Analysis Date: **07/03/14 08:39 AM**
Client ID: Run ID: **ICPMS1_140702A** SeqNo: **2835053** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.9704	0.050	1	0.0006734	97	75-125	1.005	3.5	20	
Arsenic	0.9872	0.050	1	0.004674	98.3	75-125	0.9992	1.21	20	
Barium	1.112	0.050	1	0.1389	97.3	75-125	1.14	2.49	20	
Beryllium	0.9434	0.020	1	0.001147	94.2	75-125	0.9688	2.66	20	
Cadmium	0.9582	0.020	1	0.0009645	95.7	75-125	0.9769	1.93	20	
Chromium	0.977	0.050	1	0.004361	97.3	75-125	0.9871	1.03	20	
Cobalt	0.9544	0.050	1	0.001593	95.3	75-125	0.9735	1.98	20	
Copper	0.9533	0.050	1	0.007924	94.5	75-125	0.9547	0.147	20	
Lead	0.9563	0.050	1	0.004396	95.2	75-125	0.9816	2.61	20	
Manganese	6.011	0.050	1	5.102	90.9	75-125	6.11	1.63	20	O
Molybdenum	0.9808	0.050	1	0.001926	97.9	75-125	0.999	1.84	20	
Nickel	0.9643	0.050	1	0.008685	95.6	75-125	0.992	2.83	20	
Selenium	0.9841	0.050	1	-0.005739	99	75-125	0.9865	0.244	20	
Silver	0.8995	0.050	1	0.00003204	89.9	75-125	0.9211	2.37	20	
Thallium	0.9272	0.050	1	-0.00003879	92.7	75-125	0.9504	2.47	20	
Vanadium	0.9995	0.050	1	0.003044	99.6	75-125	1.026	2.62	20	
Zinc	1.066	0.10	1	0.1162	95	75-125	1.098	2.96	20	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60263** Instrument ID **ICPMS1** Method: **SW6020A**

The following samples were analyzed in this batch:

14061557-01A	14061557-03A	14061557-05A
14061557-07A		

QC BATCH REPORT

Batch ID: **60241** Instrument ID **SVMS4** Method: **SW8270**

MBLK Sample ID: **SBLKW1-60241/42/43/44-60241** Units: **µg/L** Analysis Date: **07/02/14 06:39 PM**

Client ID: Run ID: **SVMS4_140702B** SeqNo: **2836236** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,4-Dichlorobenzene	U	5.0								
2,4,5-Trichlorophenol	U	5.0								
2,4,6-Trichlorophenol	U	5.0								
2,4-Dinitrotoluene	U	5.0								
Hexachloro-1,3-butadiene	U	5.0								
Hexachlorobenzene	U	5.0								
Hexachloroethane	U	5.0								
m-Cresol	U	5.0								
Nitrobenzene	U	5.0								
o-Cresol	U	5.0								
p-Cresol	U	5.0								
Pentachlorophenol	U	20								
Pyridine	U	20								
Surr: 2,4,6-Tribromophenol	*42.59*	0	*50*	0	*85.2*	*38-115*	0			
Surr: 2-Fluorobiphenyl	*36.04*	0	*50*	0	*72.1*	*32-100*	0			
Surr: 2-Fluorophenol	*20.88*	0	*50*	0	*41.8*	*22-59*	0			
Surr: 4-Terphenyl-d14	*52.1*	0	*50*	0	*104*	*23-112*	0			
Surr: Nitrobenzene-d5	*31.5*	0	*50*	0	*63*	*31-93*	0			
Surr: Phenol-d6	*12.77*	0	*50*	0	*25.5*	*13-36*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

QC BATCH REPORT

Batch ID: **60241** Instrument ID **SVMS4** Method: **SW8270**

LCS Sample ID: **SLCSW1-60241/42/43/44-60241** Units: **µg/L** Analysis Date: **07/02/14 07:05 PM**
Client ID: Run ID: **SVMS4_140702B** SeqNo: **2836237** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,4-Dichlorobenzene	11.23	5.0	20	0	56.2	30-110	0			
2,4,5-Trichlorophenol	14.05	5.0	20	0	70.2	50-110	0			
2,4,6-Trichlorophenol	15.39	5.0	20	0	77	50-115	0			
2,4-Dinitrotoluene	17.29	5.0	20	0	86.4	50-120	0			
Hexachloro-1,3-butadiene	13.96	5.0	20	0	69.8	25-105	0			
Hexachlorobenzene	17	5.0	20	0	85	50-110	0			
Hexachloroethane	8.03	5.0	20	0	40.2	30-95	0			
m-Cresol	10.37	5.0	20	0	51.8	30-110	0			
Nitrobenzene	14.86	5.0	20	0	74.3	45-110	0			
o-Cresol	11.36	5.0	20	0	56.8	40-110	0			
p-Cresol	10.37	5.0	20	0	51.8	30-110	0			
Pentachlorophenol	15.07	20	20	0	75.4	40-115	0			J
Pyridine	4.31	20	20	0	21.6	10-71	0			J
Surr: 2,4,6-Tribromophenol	*42.29*	0	*50*	0	*84.6*	*38-115*	0			
Surr: 2-Fluorobiphenyl	*34.88*	0	*50*	0	*69.8*	*32-100*	0			
Surr: 2-Fluorophenol	*19.59*	0	*50*	0	*39.2*	*22-59*	0			
Surr: 4-Terphenyl-d14	*47.79*	0	*50*	0	*95.6*	*23-112*	0			
Surr: Nitrobenzene-d5	*31.46*	0	*50*	0	*62.9*	*31-93*	0			
Surr: Phenol-d6	*12.42*	0	*50*	0	*24.8*	*13-36*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60241** Instrument ID **SVMS4** Method: **SW8270**

MS Sample ID: **14061442-02A MS** Units: **µg/L** Analysis Date: **07/02/14 07:30 PM**
Client ID: Run ID: **SVMS4_140702B** SeqNo: **2836238** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,4-Dichlorobenzene	271.4	100	400	0	67.8	30-110	0			
2,4,5-Trichlorophenol	318.2	100	400	0	79.6	50-110	0			
2,4,6-Trichlorophenol	332.6	100	400	0	83.2	50-115	0			
2,4-Dinitrotoluene	351.2	100	400	0	87.8	50-120	0			
Hexachloro-1,3-butadiene	319.4	100	400	0	79.8	25-105	0			
Hexachlorobenzene	334.4	100	400	0	83.6	50-110	0			
Hexachloroethane	219	100	400	0	54.8	30-95	0			
m-Cresol	234.4	100	400	0	58.6	30-110	0			
Nitrobenzene	306.8	100	400	0	76.7	45-110	0			
o-Cresol	249.6	100	400	0	62.4	40-110	0			
p-Cresol	234.4	100	400	0	58.6	30-110	0			
Pentachlorophenol	326.6	400	400	0	81.6	40-115	0			J
Pyridine	120.6	400	400	0	30.2	10-80	0			J
Surr: 2,4,6-Tribromophenol	*907.2*	0	*1000*	0	*90.7*	*38-115*	0			
Surr: 2-Fluorobiphenyl	*717.6*	0	*1000*	0	*71.8*	*32-100*	0			
Surr: 2-Fluorophenol	*419.2*	0	*1000*	0	*41.9*	*22-59*	0			
Surr: 4-Terphenyl-d14	*988.8*	0	*1000*	0	*98.9*	*23-112*	0			
Surr: Nitrobenzene-d5	*637.4*	0	*1000*	0	*63.7*	*31-93*	0			
Surr: Phenol-d6	*261.8*	0	*1000*	0	*26.2*	*13-36*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60241** Instrument ID **SVMS4** Method: **SW8270**

MSD Sample ID: **14061442-02A MSD** Units: **µg/L** Analysis Date: **07/02/14 07:56 PM**

Client ID: Run ID: **SVMS4_140702B** SeqNo: **2836239** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,4-Dichlorobenzene	251.4	100	400	0	62.8	30-110	271.4	7.65	30	
2,4,5-Trichlorophenol	314.8	100	400	0	78.7	50-110	318.2	1.07	30	
2,4,6-Trichlorophenol	321.2	100	400	0	80.3	50-115	332.6	3.49	30	
2,4-Dinitrotoluene	347	100	400	0	86.8	50-120	351.2	1.2	30	
Hexachloro-1,3-butadiene	299.6	100	400	0	74.9	25-105	319.4	6.4	30	
Hexachlorobenzene	323.6	100	400	0	80.9	50-110	334.4	3.28	30	
Hexachloroethane	198.8	100	400	0	49.7	30-95	219	9.67	30	
m-Cresol	228.4	100	400	0	57.1	30-110	234.4	2.59	30	
Nitrobenzene	288.4	100	400	0	72.1	45-110	306.8	6.18	30	
o-Cresol	248.6	100	400	0	62.2	40-110	249.6	0.401	30	
p-Cresol	228.4	100	400	0	57.1	30-110	234.4	2.59	30	
Pentachlorophenol	321	400	400	0	80.2	40-115	326.6	0	30	J
Pyridine	137.8	400	400	0	34.4	10-80	120.6	0	30	J
Surr: 2,4,6-Tribromophenol	*892.2*	0	*1000*	0	*89.2*	*38-115*	907.2	*1.67*	*0*	
Surr: 2-Fluorobiphenyl	*647.6*	0	*1000*	0	*64.8*	*32-100*	717.6	*10.3*	*0*	
Surr: 2-Fluorophenol	*412.4*	0	*1000*	0	*41.2*	*22-59*	419.2	*1.64*	*0*	
Surr: 4-Terphenyl-d14	*959.6*	0	*1000*	0	*96*	*23-112*	988.8	*3*	*0*	
Surr: Nitrobenzene-d5	*603*	0	*1000*	0	*60.3*	*31-93*	637.4	*5.55*	*0*	
Surr: Phenol-d6	*272.4*	0	*1000*	0	*27.2*	*13-36*	261.8	*3.97*	*0*	

The following samples were analyzed in this batch:

14061557-05A	14061557-07A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60244** Instrument ID **SVMS4** Method: **SW8270**

MBLK Sample ID: **SBLKW1-60241/42/43/44-60244** Units: **µg/L** Analysis Date: **07/02/14 06:39 PM**
Client ID: Run ID: **SVMS4_140703A** SeqNo: **2836405** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Pentachlorophenol	U	20								
Surr: 2,4,6-Tribromophenol	*42.59*	0	*50*	0	*85.2*	*38-115*	0			
Surr: 2-Fluorobiphenyl	*36.04*	0	*50*	0	*72.1*	*32-100*	0			
Surr: 2-Fluorophenol	*20.88*	0	*50*	0	*41.8*	*22-59*	0			
Surr: 4-Terphenyl-d14	*52.1*	0	*50*	0	*104*	*23-112*	0			
Surr: Nitrobenzene-d5	*31.5*	0	*50*	0	*63*	*31-93*	0			
Surr: Phenol-d6	*12.77*	0	*50*	0	*25.5*	*13-36*	0			

LCS Sample ID: **SLCSW1-60241/42/43/44-60244** Units: **µg/L** Analysis Date: **07/02/14 07:05 PM**
Client ID: Run ID: **SVMS4_140703A** SeqNo: **2836406** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Pentachlorophenol	15.07	20	20	0	75.4	40-115	0			J
Surr: 2,4,6-Tribromophenol	*42.29*	0	*50*	0	*84.6*	*38-115*	0			
Surr: 2-Fluorobiphenyl	*34.88*	0	*50*	0	*69.8*	*32-100*	0			
Surr: 2-Fluorophenol	*19.59*	0	*50*	0	*39.2*	*22-59*	0			
Surr: 4-Terphenyl-d14	*47.79*	0	*50*	0	*95.6*	*23-112*	0			
Surr: Nitrobenzene-d5	*31.46*	0	*50*	0	*62.9*	*31-93*	0			
Surr: Phenol-d6	*12.42*	0	*50*	0	*24.8*	*13-36*	0			

MS Sample ID: **14061442-02A MS** Units: **µg/L** Analysis Date: **07/02/14 07:30 PM**
Client ID: Run ID: **SVMS4_140703A** SeqNo: **2836407** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Pentachlorophenol	326.6	400	400	0	81.6	40-115	0			J
Surr: 2,4,6-Tribromophenol	*907.2*	0	*1000*	0	*90.7*	*38-115*	0			
Surr: 2-Fluorobiphenyl	*717.6*	0	*1000*	0	*71.8*	*32-100*	0			
Surr: 2-Fluorophenol	*419.2*	0	*1000*	0	*41.9*	*22-59*	0			
Surr: 4-Terphenyl-d14	*988.8*	0	*1000*	0	*98.9*	*23-112*	0			
Surr: Nitrobenzene-d5	*637.4*	0	*1000*	0	*63.7*	*31-93*	0			
Surr: Phenol-d6	*261.8*	0	*1000*	0	*26.2*	*13-36*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60244** Instrument ID **SVMS4** Method: **SW8270**

MSD Sample ID: **14061442-02A MSD** Units: **µg/L** Analysis Date: **07/02/14 07:56 PM**

Client ID: Run ID: **SVMS4_140703A** SeqNo: **2836408** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Pentachlorophenol	321	400	400	0	80.2	40-115	326.6	0	30	J
Surr: 2,4,6-Tribromophenol	*892.2*	0	*1000*	0	*89.2*	*38-115*	907.2	*1.67*	*40*	
Surr: 2-Fluorobiphenyl	*647.6*	0	*1000*	0	*64.8*	*32-100*	717.6	*10.3*	*40*	
Surr: 2-Fluorophenol	*412.4*	0	*1000*	0	*41.2*	*22-59*	419.2	*1.64*	*40*	
Surr: 4-Terphenyl-d14	*959.6*	0	*1000*	0	*96*	*23-112*	988.8	*3*	*40*	
Surr: Nitrobenzene-d5	*603*	0	*1000*	0	*60.3*	*31-93*	637.4	*5.55*	*40*	
Surr: Phenol-d6	*272.4*	0	*1000*	0	*27.2*	*13-36*	261.8	*3.97*	*40*	

The following samples were analyzed in this batch: 14061557-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **R143778A** Instrument ID **VMS5** Method: **SW8260**

MBLK Sample ID: **VBLKW1-140702-R143778A** Units: **µg/L** Analysis Date: **07/02/14 04:56 PM**
Client ID: Run ID: **VMS5_140702A** SeqNo: **2835706** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	U	1.0								
1,2-Dichloroethane	U	1.0								
2-Butanone	U	5.0								
Benzene	U	1.0								
Carbon tetrachloride	U	1.0								
Chlorobenzene	U	1.0								
Chloroform	U	1.0								
Tetrachloroethene	U	1.0								
Trichloroethene	U	1.0								
Vinyl chloride	U	1.0								
Surr: 1,2-Dichloroethane-d4	*19.59*	0	*20*	0	*98*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*19.3*	0	*20*	0	*96.5*	*80-110*	0			
Surr: Dibromofluoromethane	*19.25*	0	*20*	0	*96.2*	*85-115*	0			
Surr: Toluene-d8	*18.61*	0	*20*	0	*93*	*85-110*	0			

LCS Sample ID: **VLCSW1-140702-R143778A** Units: **µg/L** Analysis Date: **07/02/14 03:38 PM**
Client ID: Run ID: **VMS5_140702A** SeqNo: **2835705** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	20.15	1.0	20	0	101	70-145	0			
1,2-Dichloroethane	20.49	1.0	20	0	102	78-125	0			
2-Butanone	25.85	5.0	20	0	129	55-150	0			
Benzene	19.55	1.0	20	0	97.8	85-125	0			
Carbon tetrachloride	21.04	1.0	20	0	105	65-140	0			
Chlorobenzene	20.6	1.0	20	0	103	80-120	0			
Chloroform	19.41	1.0	20	0	97	80-130	0			
Tetrachloroethene	24.15	1.0	20	0	121	77-138	0			
Trichloroethene	23.57	1.0	20	0	118	84-130	0			
Vinyl chloride	15.13	1.0	20	0	75.6	50-136	0			
Surr: 1,2-Dichloroethane-d4	*19.56*	0	*20*	0	*97.8*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*20.13*	0	*20*	0	*101*	*80-110*	0			
Surr: Dibromofluoromethane	*19.65*	0	*20*	0	*98.2*	*85-115*	0			
Surr: Toluene-d8	*19.43*	0	*20*	0	*97.2*	*85-110*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **R143778A** Instrument ID **VMS5** Method: **SW8260**

MS Sample ID: **1407031-01A MS** Units: **µg/L** Analysis Date: **07/03/14 01:31 AM**
Client ID: Run ID: **VMS5_140702A** SeqNo: **2835710** Prep Date: DF: **20**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	349.8	20	400	0	87.4	70-145	0			
1,2-Dichloroethane	397.4	20	400	0	99.4	78-125	0			
2-Butanone	470.4	100	400	0	118	55-150	0			
Benzene	370.8	20	400	0	92.7	85-125	0			
Carbon tetrachloride	378.6	20	400	0	94.6	65-140	0			
Chlorobenzene	389.4	20	400	0	97.4	80-120	0			
Chloroform	752.4	20	400	0	188	80-130	0			S
Tetrachloroethene	433.8	20	400	0	108	77-138	0			
Trichloroethene	432.4	20	400	0	108	84-130	0			
Vinyl chloride	246.8	20	400	0	61.7	50-136	0			
Surr: 1,2-Dichloroethane-d4	*385.6*	0	*400*	0	*96.4*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*399.6*	0	*400*	0	*99.9*	*80-110*	0			
Surr: Dibromofluoromethane	*399.2*	0	*400*	0	*99.8*	*85-115*	0			
Surr: Toluene-d8	*369.8*	0	*400*	0	*92.4*	*85-110*	0			

MSD Sample ID: **1407031-01A MSD** Units: **µg/L** Analysis Date: **07/03/14 01:56 AM**
Client ID: Run ID: **VMS5_140702A** SeqNo: **2835711** Prep Date: DF: **20**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	332.6	20	400	0	83.2	70-145	349.8	5.04	30	
1,2-Dichloroethane	376.4	20	400	0	94.1	78-125	397.4	5.43	30	
2-Butanone	454	100	400	0	114	55-150	470.4	3.55	30	
Benzene	352.4	20	400	0	88.1	85-125	370.8	5.09	30	
Carbon tetrachloride	370.8	20	400	0	92.7	65-140	378.6	2.08	30	
Chlorobenzene	384.6	20	400	0	96.2	80-120	389.4	1.24	30	
Chloroform	703.6	20	400	0	176	80-130	752.4	6.7	30	S
Tetrachloroethene	445	20	400	0	111	77-138	433.8	2.55	30	
Trichloroethene	402	20	400	0	100	84-130	432.4	7.29	30	
Vinyl chloride	239.6	20	400	0	59.9	50-136	246.8	2.96	30	
Surr: 1,2-Dichloroethane-d4	*375.6*	0	*400*	0	*93.9*	*75-120*	385.6	*2.63*	*30*	
Surr: 4-Bromofluorobenzene	*399.4*	0	*400*	0	*99.8*	*80-110*	399.6	*0.0501*	*30*	
Surr: Dibromofluoromethane	*385*	0	*400*	0	*96.2*	*85-115*	399.2	*3.62*	*30*	
Surr: Toluene-d8	*379.2*	0	*400*	0	*94.8*	*85-110*	369.8	*2.51*	*30*	

The following samples were analyzed in this batch: 14061557-05A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **R143804A** Instrument ID **VMS9** Method: **SW8260**

MBLK Sample ID: **VBLKW2-140702-R143804A** Units: **µg/L** Analysis Date: **07/02/14 09:38 PM**
Client ID: Run ID: **VMS9_140702B** SeqNo: **2834876** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	U	1.0								
1,2-Dichloroethane	U	1.0								
2-Butanone	U	5.0								
Benzene	U	1.0								
Carbon tetrachloride	U	1.0								
Chlorobenzene	U	1.0								
Chloroform	U	1.0								
Tetrachloroethene	U	1.0								
Trichloroethene	U	1.0								
Vinyl chloride	U	1.0								
Surr: 1,2-Dichloroethane-d4	*21.24*	0	*20*	0	*106*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*17.25*	0	*20*	0	*86.2*	*80-110*	0			
Surr: Dibromofluoromethane	*21.62*	0	*20*	0	*108*	*85-115*	0			
Surr: Toluene-d8	*18.73*	0	*20*	0	*93.6*	*85-110*	0			

LCS Sample ID: **VLCSW3-140702-R143804A** Units: **µg/L** Analysis Date: **07/02/14 08:23 PM**
Client ID: Run ID: **VMS9_140702B** SeqNo: **2834873** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	22.85	1.0	20	0	114	70-145	0			
1,2-Dichloroethane	19.07	1.0	20	0	95.4	78-125	0			
2-Butanone	20.89	5.0	20	0	104	55-150	0			
Benzene	20.17	1.0	20	0	101	85-125	0			
Carbon tetrachloride	22.04	1.0	20	0	110	65-140	0			
Chlorobenzene	20.05	1.0	20	0	100	80-120	0			
Chloroform	19.68	1.0	20	0	98.4	80-130	0			
Tetrachloroethene	21.16	1.0	20	0	106	77-138	0			
Trichloroethene	20.79	1.0	20	0	104	84-130	0			
Vinyl chloride	16.13	1.0	20	0	80.6	50-136	0			
Surr: 1,2-Dichloroethane-d4	*19.82*	0	*20*	0	*99.1*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*20.78*	0	*20*	0	*104*	*80-110*	0			
Surr: Dibromofluoromethane	*20.28*	0	*20*	0	*101*	*85-115*	0			
Surr: Toluene-d8	*20.06*	0	*20*	0	*100*	*85-110*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **R143804A** Instrument ID **VMS9** Method: **SW8260**

MS Sample ID: **14061422-02A MS** Units: **µg/L** Analysis Date: **07/03/14 06:18 AM**
Client ID: Run ID: **VMS9_140702B** SeqNo: **2834900** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	21.48	1.0	20	0	107	70-145	0			
1,2-Dichloroethane	17.26	1.0	20	0	86.3	78-125	0			
2-Butanone	16.34	5.0	20	0	81.7	55-150	0			
Benzene	20.13	1.0	20	0.8	96.6	85-125	0			
Carbon tetrachloride	20.21	1.0	20	0	101	65-140	0			
Chlorobenzene	18.46	1.0	20	0	92.3	80-120	0			
Chloroform	18.66	1.0	20	0	93.3	80-130	0			
Tetrachloroethene	19.29	1.0	20	0	96.4	77-138	0			
Trichloroethene	19.27	1.0	20	0	96.4	84-130	0			
Vinyl chloride	15.43	1.0	20	0	77.2	50-136	0			
Surr: 1,2-Dichloroethane-d4	*18.69*	0	*20*	0	*93.4*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*20.28*	0	*20*	0	*101*	*80-110*	0			
Surr: Dibromofluoromethane	*19.8*	0	*20*	0	*99*	*85-115*	0			
Surr: Toluene-d8	*20.47*	0	*20*	0	*102*	*85-110*	0			

MSD Sample ID: **14061422-02A MSD** Units: **µg/L** Analysis Date: **07/03/14 06:43 AM**
Client ID: Run ID: **VMS9_140702B** SeqNo: **2834903** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1-Dichloroethene	20.31	1.0	20	0	102	70-145	21.48	5.6	30	
1,2-Dichloroethane	16.71	1.0	20	0	83.6	78-125	17.26	3.24	30	
2-Butanone	12.24	5.0	20	0	61.2	55-150	16.34	28.7	30	
Benzene	19.34	1.0	20	0.8	92.7	85-125	20.13	4	30	
Carbon tetrachloride	22.37	1.0	20	0	112	65-140	20.21	10.1	30	
Chlorobenzene	17.92	1.0	20	0	89.6	80-120	18.46	2.97	30	
Chloroform	17.77	1.0	20	0	88.8	80-130	18.66	4.89	30	
Tetrachloroethene	17.97	1.0	20	0	89.8	77-138	19.29	7.09	30	
Trichloroethene	18.63	1.0	20	0	93.2	84-130	19.27	3.38	30	
Vinyl chloride	14.49	1.0	20	0	72.4	50-136	15.43	6.28	30	
Surr: 1,2-Dichloroethane-d4	*18.32*	0	*20*	0	*91.6*	*75-120*	18.69	*2*	*30*	
Surr: 4-Bromofluorobenzene	*20.4*	0	*20*	0	*102*	*80-110*	20.28	*0.59*	*30*	
Surr: Dibromofluoromethane	*18.98*	0	*20*	0	*94.9*	*85-115*	19.8	*4.23*	*30*	
Surr: Toluene-d8	*20.5*	0	*20*	0	*102*	*85-110*	20.47	*0.146*	*30*	

The following samples were analyzed in this batch: 14061557-07A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **60262** Instrument ID **WETCHEM** Method: **SW9045D**

LCS Sample ID: **LCS-60262-60262** Units: **s.u.** Analysis Date: **07/02/14 04:19 PM**
Client ID: Run ID: **WETCHEM_140702J** SeqNo: **2833896** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	3.99	0	4	0	99.8	90-110	0			

DUP Sample ID: **14061537-03A DUP** Units: **s.u.** Analysis Date: **07/02/14 04:19 PM**
Client ID: Run ID: **WETCHEM_140702J** SeqNo: **2833902** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	8.03	0	0	0	0	0-0	8.05	0.249	20	

DUP Sample ID: **1407016-02B DUP** Units: **s.u.** Analysis Date: **07/02/14 04:19 PM**
Client ID: Run ID: **WETCHEM_140702J** SeqNo: **2833909** Prep Date: **07/02/14** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	8.47	0	0	0	0	0-0	8.48	0.118	20	

The following samples were analyzed in this batch: 14061557-06A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **R143662** Instrument ID **WETCHEM** Method: **A4500-H B-96**

LCS	Sample ID: **WLCSW1-140630-R143662**				Units: **s.u.**			Analysis Date: **06/30/14 01:45 PM**			
Client ID:		Run ID: **WETCHEM_140630N**			SeqNo: **2831370**			Prep Date:		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
pH (laboratory)	3.97	0	4	0	99.2	90-110	0				

LCS	Sample ID: **WLCSW1-140630-R143662**				Units: **s.u.**			Analysis Date: **06/30/14 01:45 PM**			
Client ID:		Run ID: **WETCHEM_140630N**			SeqNo: **2831376**			Prep Date:		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
pH (laboratory)	3.97	0	4	0	99.2	90-110	0				

DUP	Sample ID: **14061555-01A DUP**				Units: **s.u.**			Analysis Date: **06/30/14 01:45 PM**			
Client ID:		Run ID: **WETCHEM_140630N**			SeqNo: **2831372**			Prep Date:		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
pH (laboratory)	6.74	0	0	0	0	0-0	6.72	0.297	20		

The following samples were analyzed in this batch: 14061557-04A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **R143935** Instrument ID **MOIST** Method: **A2540 G**

MBLK Sample ID: **WBLKS-R143935** Units: **% of sample** Analysis Date: **07/03/14 08:59 AM**
Client ID: Run ID: **MOIST_140703A** SeqNo: **2837828** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	U	0.050								

LCS Sample ID: **LCS-R143935** Units: **% of sample** Analysis Date: **07/03/14 08:59 AM**
Client ID: Run ID: **MOIST_140703A** SeqNo: **2837827** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	100	0.050	100	0	100	99.5-100.5	0			

DUP Sample ID: **1407142-01A DUP** Units: **% of sample** Analysis Date: **07/03/14 08:59 AM**
Client ID: Run ID: **MOIST_140703A** SeqNo: **2837807** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	11.9	0.050	0	0	0	0-0	12.15	2.08	20	

DUP Sample ID: **1407211-05A DUP** Units: **% of sample** Analysis Date: **07/03/14 08:59 AM**
Client ID: Run ID: **MOIST_140703A** SeqNo: **2837818** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	10.1	0.050	0	0	0	0-0	9.85	2.51	20	

The following samples were analyzed in this batch: 14061557-06A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **R144042** Instrument ID **WETCHEM** Method: **D93**

LCS	Sample ID: **LCS-R144042-R144042**				Units: **°F**		Analysis Date: **07/08/14 08:45 AM**			
Client ID:		Run ID: **WETCHEM_140708J**			SeqNo: **2840323**		Prep Date:		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Flashpoint, P-M Closed-cup	82	0	81	0	101	97-103	0			

The following samples were analyzed in this batch: 14061557-04A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: Conestoga-Rovers & Associates
Work Order: 14061557
Project: Former GRMP (17360)

QC BATCH REPORT

Batch ID: **R144042a** Instrument ID **WETCHEM** Method: **D92**

LCS	Sample ID: **LCS-R144042-R144042a**				Units: **°F**		Analysis Date: **07/08/14 08:45 AM**			
Client ID:		Run ID: **WETCHEM_140708J**			SeqNo: **2840317**		Prep Date:		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Flashpoint, Open-cup	82	0	81	0	101	97-103	0			

The following samples were analyzed in this batch: 14061557-06A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

CHAIN OF CUSTODY RECORD

COC NO.: PL- 12384

PAGE 1 OF 1

CONESTOGA-ROVERS & ASSOCIATES
14496 Sheldon Road, Suite #200, Plymouth, Michigan 48170.
Phone: (734) 453-5123 Fax: (734) 453-5201

(See Reverse Side for Instructions)

Project No/ Phase/Task Code: 017360-T014-01414	Laboratory Name: ALS	Lab Location: Holland, MI	SSOW ID:
Project Name: Former GRMP	Lab Contact: Tom Beamish	Lab Quote No:	Cooler No:
Project Location: Wyoming, MI			Carrier: CRA
Chemistry Contact: Rawn Fleisher			Airbill No:
Sampler(s): Matt Ramsey			Date Shipped: 6/30/14

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Container Quantity & Preservation: Unpreserved	Hydrochloric Acid (HCl)	Nitric Acid (HNO_3)	Sulfuric Acid (H_2SO_4)	Sodium Hydroxide (NaOH)	Methanol/Water (Soil VOC)	EnCores 3x5-g, 1x25-g	Other:	Total Containers/Sample	Analysis Requested: Metals (TAL)	pentachlorophenol	TCLP Metals	TCLP VOCs	TCLP SVOCs	TCLP PCBs	TAL Pesticides	Corrosivity	MS/MSD Request	Comments/ Special Instructions:
1	WG-017360-063014-MR-001	6/30/14	1123	WG	G			1						1	X									
2	" -002		1227	"	"	2								2		X								
3	" -003		1311	"	"			1						1	X									
4	WW- " -004		1340	WW	C	5								5			X	X	X	X	X	X		
5	SO- " -005		1405	SO	C	4								4			X	X	X	X	X	X		
6																								
7																								
8																								
9																								
10																								
11																								
12																								
13																								
14																								
15																								

TAT Required in business days (use separate COCs for different TATs):
☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 1 Week ☒ 2 Week ☐ Other:

Total Number of Containers: 13

All Samples in Cooler must be on COC

Notes/ Special Requirements: 4°C

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
1. Matt	CRA	6/30/14	1520	1.	ALS	6/30/14	1520
2.				2.			
3.				3.			

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT—ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE—Fully Executed Copy (CRA) YELLOW—Receiving Laboratory Copy PINK—Shipper GOLDENROD—Sampling Crew

CRA Form: COC-10A (20110804)

ALS Group USA, Corp

Sample Receipt Checklist

Client Name: **CRA - PLYMOUTH** Date/Time Received: **30-Jun-14 15:20**

Work Order: **14061557** Received by: **DS**

Checklist completed by Diane Shaw (eSignature) 30-Jun-14 (Date) Reviewed by: Chad Whelton (eSignature) 01-Jul-14 (Date)

Matrices: Groundwater, Wastewater, Soil

Carrier name: Client

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	4.0 c		
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	6/30/2014 3:38:29 PM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

Revision: 1

Attachment C

Data Validation Memorandum

CONESTOGA-ROVERS & ASSOCIATES

14496 Sheldon Road, Suite #200
Plymouth, Michigan 48170
Telephone: (734) 453-5123 Fax: (734) 453-5201
www.CRAworld.com

MEMORANDUM

TO:	Jennifer Quigley	REF. NO.:	017360-T02Y14
FROM:	Ruth Mickle/tl/71/Det	DATE:	July 27, 2014

RE: Analytical Results and Reduced Validation
Sampling for replacement of Former Monitoring Wells 85-7 and 87-11
& Resampling of MW52-12 to Confirm the Detection of Pentachlorophenol
Racer Grand Rapids Stamping Site
Wyoming, Michigan
June 2014

1.0 Introduction

The following document details a reduced validation of analytical results for groundwater samples collected in support of the groundwater sampling at the Racer Grand Rapids Stamping Site during June 2014. Samples were submitted to ALS Environmental, located in Holland, Michigan (ALS-MI). A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Standard Conestoga-Rovers & Associates (CRA) report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody forms, finished report forms, method blank data, recovery data from surrogate spikes, laboratory control samples (LCS), matrix spikes (MS), and field QC samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and applicable guidance from the documents entitled:

i) "Former Grand Rapids Metal Plant Quality Assurance Project Plan (QAPP)", Revision 1, January 6, 2011

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", United States Environmental Protection Agency (USEPA) 540/R-99-008, October 1999

iii) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", USEPA 540/R-94-013, February 1994

Items ii) and iii) will subsequently be referred to as the "Guidelines" in this Memorandum.

2.0 Sample Holding Time and Preservation

The sample holding time criteria and sample preservation requirements for the analyses are summarized in Table 3. The sample chain of custody document and analytical report were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3.0 Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Table 4 presents the metals data qualified due to analyte concentrations in the method blank. All remaining method blank results were non-detect or the sample results were greater than five times the method blank results, indicating that laboratory contamination was not a factor.

4.0 Surrogate Spike Recoveries - Organic Analyses

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

The sample submitted for pentachlorophenol analysis was spiked with the appropriate number of surrogate compounds prior to sample extraction.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries met the above criteria.

5.0 Laboratory Control Sample Analyses

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. For this study, LCS were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Organic Analyses

The LCS contained all compounds of interest. All LCS were within the laboratory control limits, demonstrating acceptable analytical accuracy.

Inorganic Analyses

The LCS contained all analytes of interest. LCS recoveries were assessed per the "Guidelines". All LCS were within the laboratory control limits, demonstrating acceptable analytical accuracy.

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the extraction or digestion process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed.

MS/MSD analyses were performed as specified in Table 1.

Organic Analyses

The MS/MSD samples are spiked with all compounds of interest. Since the MS/MSD analyses were performed on non-project samples, the MS/MSD data were not used to assess the project sample results.

Inorganic Analyses

The MS/MSD samples were spiked with the analytes of interest, and the results were evaluated using the "Guidelines". The percent recoveries and RPD values were within the control limits, demonstrating acceptable analytical accuracy and precision.

7.0 Field QA/QC Samples

There were no field QA/QC samples associated with the sampling event.

8.0 Analyte Reporting

The laboratory reported detected results down to the laboratory's method detection limit (MDL) for each analyte. Positive analyte detections less than the RL but greater than the MDL were qualified as estimated (J) in Table 2 unless qualified otherwise in this memorandum. Non-detect results were presented as non-detect at the RL in Table 2.

9.0 Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable with the specific qualifications noted herein.

TABLE 1

SAMPLE COLLECTION AND ANALYSIS SUMMARY
SAMPLING OF REPLACEMENT OF FORMER MONITORING WELLS 85-7 AND 87-11
& RESAMPLING OF MW52-12 TO CONFIRM THE DETECTION OF PENTACHLOROPHENOL
RACER GRAND RAPIDS STAMPING SITE
WYOMING, MICHIGAN
JUNE 2014

					Parameters		
Sample Identification	*Location*	*Matrix*	*Collection Date (mm/dd/yyyy)*	*Collection Time (hr:min)*	*Pentachlorophenol*	*TAL Metals*	*Comments*
ALS-MI SDG No.: 14061557							
WG-017360-063014-MR-001	MW59-14	water	6/30/2014	11:23	--	X	MS/MSD
WG-017360-063014-MR-002	MW52-12	water	6/30/2014	12:27	X	--	
WG-017360-063014-MR-003	MW60-14	water	6/30/2014	13:11	--	X	

Notes:

TAL - Target Analyte List
ALS- MI - ALS Environmental - Holland, Michigan
SDG - Sample Delivery Group
MS/MSD - Matrix spike/Matrix spike duplicate

TABLE 2

ANALYTICAL RESULTS SUMMARY SAMPLING
SAMPLING OF REPLACEMENT OF FORMER MONITORING WELLS 85-7 AND 87-11
& RESAMPLING OF MW52-12 TO CONFIRM THE DETECTION OF PENTACHLOROPHENOL
RACER GRAND RAPIDS STAMPLING SITE
WYOMING, MICHIGAN
JUNE 2014

Sample Location:		*MW52-12*	*MW59-14*	*MW60-14*
Sample Identification:		*WG-017360-063014-MR-002*	*WG-017360-063014-MR-001*	*WG-017360-063014-MR-003*
Sample Date:		*6/30/2014*	*6/30/2014*	*6/30/2014*
	Units			
Metals				
Antimony	ug/L	--	5 U	0.051 J
Arsenic	ug/L	--	2.2 J	0.67 J
Barium	ug/L	--	110	50
Beryllium	ug/L	--	2 U	2 U
Cadmium	ug/L	--	0.12 J	2 U
Chromium	ug/L	--	5 U	0.71 J
Cobalt	ug/L	--	0.078 J	3.8 J
Copper	ug/L	--	0.66 J	1.8 J
Lead	ug/L	--	0.45 J	5 U
Manganese	ug/L	--	48	16
Mercury	ug/L	--	0.2 U	0.2 U
Molybdenum	ug/L	--	0.39 J	0.45 J
Nickel	ug/L	--	2.1 J	3.3 J
Selenium	ug/L	--	0.98 J	0.81 J
Silver	ug/L	--	5 U	5 U
Thallium	ug/L	--	5 U	5 U
Vanadium	ug/L	--	5 U	5 U
Zinc	ug/L	--	10 U	10 U
Semi-Volatile Organic Compounds (SVOCs)				
Pentachlorophenol	ug/L	1.0	--	--

Notes:
U - Not detected at the associated reporting limit.
J - Estimated concentration.

TABLE 3

ANALYTICAL METHODS AND HOLDING TIME CRITERIA
SAMPLING OF REPLACEMENT OF FORMER MONITORING WELLS 85-7 AND 87-11
& RESAMPLING OF MW52-12 TO CONFIRM THE DETECTION OF PENTACHLOROPHENOL
RACER GRAND RAPIDS STAMPING SITE
WYOMING, MICHIGAN
JUNE 2014

Parameter	*Method*	*Matrix*	*Preservation*	*Holding Time*	
				Collection to Extraction (Days)	*Collection or Extraction to Analysis (Days)*
Pentachlorophenol	SW-846 8270C	Water	Iced, 0-6° C	7	40
TAL Metals (except Mercury)	SW-846 6020A	Water	Iced, 0-6° C	-	180
Mercury	SW-846 7471A	Water	Iced, 0-6° C	-	28

Notes

SW-846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions.
TCL VOC - Target Compound List Volatile Organic Compounds
TAL - Target Analyte List

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE METHOD BLANKS
SAMPLING FOR REPLACEMENT OF FORMER MONITORING WELLS 85-7 AND 87-11
& RESAMPLING OF MW52-12 TO CONFIRM THE DETECTION OF PENTACHLOROPHENOL
RACER GRAND RAPIDS STAMPING SITE
WYOMING, MICHIGAN
JUNE 2014

Parameter	*Analyte*	*Analysis Date*	*Blank Result*	*Sample ID*	*Original Result*	*Qualified Result*	*Units*
TAL Metals	Vanadium	07/03/14	0.0002074J	WG-017360-063014-MR-001	0.00024 J	0.0050 U	mg/l
				WG-017360-063014-MR-003	0.00080 J	0.0050 U	mg/l
TAL Metals	Zinc	07/03/14	0.002985J	WG-017360-063014-MR-001	0.0052 J	0.010 U	mg/l
				WG-017360-063014-MR-003	0.0027 J	0.010 U	mg/l

Notes:

J - Estimated concentration.
U - Not detected at the associated reporting limit.
TAL - Target Analyte List