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ANALYTICAL RESULTS AND QA/QC REVIEW SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

> PREPARED BY: CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

Groundwater samples were collected in support of the Operation and Maintenance Program at the 102nd Street Landfill (Site) in Niagara Falls, New York. The samples were collected in June 2007 and delivered to CompuChem in Cary, North Carolina, for analysis. Samples were analyzed for Site-Specific Parameter List (SSPL) volatile organic compounds (VOCs), SSPL semi-volatile organic compounds (SVOCs), SSPL pesticides, total mercury, and total arsenic. A sampling and analysis summary is presented in Table 1. The analytical results are summarized in Table 2 and the analytical methods used are summarized in Table 3. Copies of the Chain of Custody documents are included in Attachment A.

The final sample results and supporting quality assurance/quality control (QA/QC) results were reported by the laboratory in accordance with the requested deliverables. The QA/QC criteria by which these data were assessed are outlined in the analytical methods used and the following guidance documents:

- i) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", October 1999; and
- ii) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", February 1994.

All data were reviewed for the QA/QC information detailed in Section 2.0 by Paul McMahon of CRA, Inc. The names of the laboratory analysts were included in the report.

A graphical presentation of the concentration of chemical constituents versus time for wells PCM-03, PCM-04, and PCM-05 is located in Attachment B.

2.0 <u>QA/QC REVIEW</u>

Holding Times

The sample holding time criteria are specified in Table 3. All holding time criteria were met. Most samples were properly preserved and received at $4^{\circ}C$ ($\pm 2^{\circ}C$). One metals sample was received at the laboratory at an elevated pH. The laboratory preserved the bottle upon receipt. Since acid preservation should be completed at the time of collection, the associated sample results were qualified as estimated (see Table 4).

Surrogate Spike Recoveries -VOCs/SVOCs/Pesticides

All samples and blanks analyzed for VOCs, SVOCs, and pesticides were spiked with surrogate compounds prior to sample extraction and/or analysis. Most surrogate spike recoveries were acceptable per the "Guidelines", indicating good analytical efficiency. Low benzene hexachloride (BHC) surrogate recoveries were reported for three samples. All associated sample results were qualified as estimated (see Table 5).

Laboratory Method Blank Analyses

Method blanks were extracted and/or analyzed with the investigative samples for all parameters. All methods blanks were non-detect for the analytes of interest except some VOCs. Associated sample results with comparable concentrations were qualified as non-detect (See Table 6).

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

One sample was selected for MS/MSD analyses as specified in Table 1. The metals analyses were also performed in duplicate. Most recoveries and relative percent differences (RPDs) were acceptable, demonstrating good analytical accuracy and precision. One slightly low VOC MSD recovery and two high RPDs were reported. The associated sample results were non-detect and were judged acceptable based on the acceptable MS recovery. Low MS/MSD recoveries were reported for phenol, and the associated sample result was qualified as estimated (see Table 7).

Blank Spike (BS) Analyses

BS and/or laboratory control samples (LCSs) were analyzed for all parameters. Some analyses were performed in duplicate, with all RPDs demonstrating acceptable analytical precision. Most recoveries were acceptable, indicating good analytical accuracy. One low phenol recovery was reported, and the associated sample results were qualified as estimated (see Table 8).

Field Duplicate Analysis

One field duplicate sample was submitted "blind" to the laboratory for analyses as summarized in Table 1.

All field duplicate results showed acceptable reproducibility outside of estimated regions of detection, indicating good laboratory and sampling protocol precision.

<u>Trip Blanks</u>

Three trip blanks were collected for the program. The trip blanks were analyzed for VOCs, and some detections were noted. Associated results detected at levels similar to the blanks were qualified as non-detect (see Table 9).

Rinse Blank Analysis

One rinse blank was collected for the program as detailed in Table 1. All rinse blank results were non-detect except 2-chlorotoluene. Associated results detected at levels similar to the blank were qualified as non-detect (see Table 10).

3.0 <u>CONCLUSION</u>

Based on this QA/QC review, the data presented in Table 2 are acceptable with the noted qualifications.

ATTACHMENT A

CHAIN OF CUSTODY DOCUMENT(S)

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Mille	er Spri	ngs Remediation	CompuChem				102r	d SEMI	ANNU	AL											
Occid	lental Che	emical	501 Madison Avenue				Sam	pling						Paul	McMal	nan		Fax: (7	(16) 297-6	150 Phone: (716)297-2150
			Cary, NC 27513					919-379-40	89					Maili	ng Add	ress.		CRA 2	055 Niam	Folle Plud	Suite 2
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102ND	STREET		DC/TB/FK/JT				74	ing TS	lidea	in	/			NT F	acility			Fax (7)	16) 693-46	581 Phone: (7	16) 693-4616
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Mille	er Spri	ngs Remediation	CompuChem			102	nd SEMI	-ANNU	AL				1							
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	in the		Cary, NC 27513				919-37944	980		1			Mail	vicivian	an	Fa	x: (716) 2	97-61:	50 Phone: (7	16)297-2150
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						1	1//	130	1	T		1				Га	x (710) 05	93-408	Phone: (7	6) 693-4616
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18/07	10-12	PCBM-02-607			X		*	8	3	2	2	1							WITH ICE/	CE PACKS AND
18/07	8.00	PCM-12-607			X	1	*	8	3	2	2	1							KEPT AT 4	
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															1.1				SVOC 1 Ltr.	AG
									-						1.	1		1	ARSENIC 1	Ltr. P HNO3
												_						1	MERCUR	Y 1 Ltr. P
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CILITY LOC.	CATION:		SAMPLER(S) (PRINT NAME)			SIGN	ATIORE		1	1	-		Mailin	ng Add	ress:	CR	A 2055 Niag	ara Falls Blv	d. Suite 3
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19/07 h	0:40	PCM-07-607			x		TYPE *	NO. of	2	2						10 10 10 10 10 10 10 10 10 10 10 10 10 1			
/19/07 /0	2:05	PCM-01-607			x		*	8	3	2	2	1				-	-	ALL SAM	PLES STORED
/19/07 9	1.15	PCM-10-607			x		*	8	3	2	2	1				-	HCL	AND SHI	PPED IN COOLER(S)
/19/07 8	135	PCBM-03-607			x		*	8	2	2	2	1		-			-	WITH ICH	E/ICE PACKS AND
/19/07 7	730	RINSE-607			x		*	8	2	2	2	1		-		-	-	KEPT AT	4c
																		BNA 1 Ltr VOA 40M SVOC 1 L ARSENIC	. AG LL HCL I. AG
_	4									P.C								MERCU	RY 1 Ltr. P
			Prodra		n	G			9										
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ATTACHMENT B

GRAPHICAL PRESENTATION CHEMICAL CONCENTRATIONS VERSUS TIME





















SAMPLE COLLECTION AND ANALYSIS SUMMARY SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

				Analy	sis/I	Para	meters	5	
Sample ID	Location I.D. ⁽¹⁾	Collection Date	Collection Time	BHCs	VOCs	Metals	SVOCs	Depth to Water ⁽²⁾ (ft. BTOC)	Comment
PCM-02-607	PCM-02	06/14/07	10:05	х	Х	Х	Х	21.50	
PCM-03-607	PCM-03	06/14/07	11:50	Х	Х	Х	Х	12.38	
PCBM-01-607	PCBM-01	06/14/07	11:00	Х	Х	Х	Х	18.18	MS/MSD/Duplicate
TRP102-61407	-	06/14/07	-		Х			18.68	Trip Blank
PCM-04-607	PCM-04	06/18/07	8:25	Х	Х	Х	Х	-	
PCM-12-607	PCM-04	06/18/07	8:00	Х	Х	Х	Х	12.35	Duplicate of PCM-04-607
PCM-05-607	PCM-05	06/18/07	9:25	Х	Х	Х	Х	17.21	-
PCBM-02-607	PCBM-02	06/18/07	10:10	Х	Х	Х	Х	19.10	
TRP102-61807	-	06/18/07	-		Х			12.35	Trip Blank
PCM-07-607	PCM-07	06/19/07	10:40	Х	Х	Х	Х	-	-
PCM-01-607	PCM-01	06/19/07	10:05	Х	Х	Х	Х	-	
PCM-10-607	PCM-10	06/19/07	9:15	Х	Х	Х	Х	15.77	
PCBM-03-607	PCBM-03	06/19/07	8:35	Х	Х	Х	Х	14.78	
RINSE-607	-	06/19/07	7:30	Х	Х	Х	Х	13.17	Rinse Blank
TRP102-61907	-	06/19/07	-		Х			-	Trip Blank
									—

Notes:

- Wells PCM-06, PCM-08, and PCM-09 were dry.
 Niagara River water level for July 2007 was 563.67 feet.
 Not applicable.
- BHCs Benzene Hexachlorides.
- ft. BTOC Feet Below Top of Casing.
- MS Matrix Spike.
- MSD Matrix Spike Duplicate.
- SVOCs Semi-Volatile Organic Compounds.
- VOCs Volatile Organic Compounds.

ANALYTICAL RESULTS SUMMARY SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

San	nple Location:	PCBM-01	PCBM-02	PCBM-03	PCM-01	PCM-02	PCM-03	PCM-04	PCM-04	PCM-05	PCM-07	PCM-10
	Sample ID:	PCBM-01-607	PCBM-02-607	PCBM-03-607	PCM-01-607	PCM-02-607	PCM-03-607	PCM-04-607	PCM-12-607	PCM-05-607	PCM-07-607	<i>PCM-10-607</i>
	Sample Date:	6/14/2007	6/18/2007	6/19/2007	6/19/2007	6/14/2007	6/14/2007	6/18/2007	6/18/2007	6/18/2007	6/19/2007	6/19/2007
									Duplicate			
Parameters	Units											
Volatile Organic Com	ipounds											
1,2,3-Trichlorobenzen	e ug/L	.5 U	6.3 U	.5 U	.5 U	.5 U	250 U	310 U	310 U	.5 U	.5 U	.5 U
1,2,4-Trichlorobenzen	e ug/L	.5 U	6.3 U	.5 U	.5 U	.5 U	250 U	310 U	310 U	.5 U	.5 U	.5 U
1,2-Dichlorobenzene	ug/L	.5 U	6.3 U	.5 U	.5 U	.5 U	68 J	310 U	310 U	.5 U	.5 U	.5 U
1,4-Dichlorobenzene	ug/L	.5 U	6.3 U	.5 U	.5 U	0.27 J	300	330	320	.5 U	.5 U	.5 U
2-Chlorotoluene	ug/L	.5 U	6.3 U	.5 U	.5 U	.5 U	250 U	310 U	310 U	.5 U	.5 U	0.53 U
Benzene	ug/L	.5 U	6.3 U	.5 U	.5 U	0.14 J	70 J	110 J	100 J	4.9	.5 U	.5 U
Chlorobenzene	ug/L	.5 U	6.3 U	.5 U	.5 U	.5 U	3900	10000	11000	100	.5 U	.5 U
Semi-Volatile Organi	c Compounds											
1,2,4,5-Tetrachlorober	nzene ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	15	10 U				
2,5-Dichlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	20	14	15	10 U	10 U	10 U
4-Chlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	44	26	26	10 U	10 U	10 U
Phenol	ug/L	10 UJ	10 U	10 UJ	10 UJ	10 U	10 UJ	10 UJ				
Metals												
Arsenic	ug/L	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U				
Mercury	ug/L	.2 U	.2 U	.2 U	.2 U	.2 U	.2 UJ	0.10 J	.2 U	.2 U	.2 U	.2 U
Pesticides												
alpha-BHC	ug/L	0.042 J	.05 U	.05 U	.05 UJ	.05 UJ	.5 U	0.0081 J	.05 U	.05 U	0.013 J	0.014 J
beta-BHC	ug/L	0.013 J	.05 U	.05 U	.05 UJ	.05 UJ	0.08 J	0.14 J	0.16	.05 U	.05 U	0.022 J
delta-BHC	ug/L	0.02 J	.05 U	.05 U	.05 UJ	.05 UJ	0.75	.05 UJ	.05 U	.05 U	0.011 J	0.0089 J
gamma-BHC (Lindan	e) ug/L	0.029 J	.05 U	.05 U	.05 UJ	.05 UJ	.5 U	.05 UJ	.05 U	.05 U	.05 U	.05 U

Notes:

BHC Benzene Hexachloride.

J Estimated.

U Not detected.

ANAYTICAL METHOD SUMMARY SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

Analyses	Methodology ⁽¹⁾	Holding Time to Extraction (Days)	Holding Time to Analyses (Days)
VOCs	SW-846 8260B	-	14
SVOCs	SW-846 8270C	7	40
Pesticides	SW-846 8081A	7	40
Arsenic	SW-846 6010B	-	180
Mercury	SW-846 7470A	-	28

Notes:

(1)	Referenced from "Test Methods for Evaluating Solid Waste", USEPA OSW,
	3rd Edition, 1986 and subsequent revisions.
SVOCs	Semi-Volatile Organic Compounds.
VOCs	Volatile Organic Compounds.

QUALIFIED SAMPLE RESULTS DUE TO INADEQUATE PRESERVATION SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

Parameter	Sample ID	Analyte	pH Upon Receipt at Laboratory	Required pH	Sample Result	Units	Qualifier
Metals	PCM-03-607	Arsenic Mercury	4	>2 >2	10 U .2 U	ug/L ug/L	UJ UJ

Notes:

J Estimated.

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING SURROGATE RECOVERIES SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

	Surrogate	Control	Sample		Sample		
Surrogate	Recovery (percent)	Limits (percent)	ID	Analytes	Results	Units	Qualifier
Decachlorobiphenyl	25	43-144	PCM-01-607	alpha-BHC	.05 U	ug/L	UJ
				beta-BHC	.05 U	ug/L	UJ
				delta-BHC	.05 U	ug/L	UJ
				gamma-BHC (Lindane)	.05 U	ug/L	UJ
Decachlorobiphenyl	40	43-144	PCM-02-607	alpha-BHC	.05 U	ug/L	UJ
				beta-BHC	.05 U	ug/L	UJ
				delta-BHC	.05 U	ug/L	UJ
				gamma-BHC (Lindane)	.05 U	ug/L	UJ
Decachlorobiphenyl	34	43-144	PCM-04-607	alpha-BHC	0.0081 J	ug/L	J
				beta-BHC	0.14	ug/L	J
				delta-BHC	.05 U	ug/L	UJ
				gamma-BHC (Lindane)	.05 U	ug/L	UJ
	Surrogate Decachlorobiphenyl Decachlorobiphenyl	SurrogateSurrogate Recovery (percent)Decachlorobiphenyl25Decachlorobiphenyl40Decachlorobiphenyl34	SurrogateSurrogate Recovery (percent)Control Limits (percent)Decachlorobiphenyl2543-144Decachlorobiphenyl4043-144Decachlorobiphenyl3443-144	SurrogateSurrogate Recovery (percent)Control Limits (percent)Sample IDDecachlorobiphenyl2543-144PCM-01-607Decachlorobiphenyl4043-144PCM-02-607Decachlorobiphenyl3443-144PCM-04-607	SurrogateSurrogate Recovery (percent)Control Limits (percent)Sample IDAnalytesDecachlorobiphenyl2543-144PCM-01-607alpha-BHC beta-BHC delta-BHC gamma-BHC (Lindane)Decachlorobiphenyl4043-144PCM-02-607alpha-BHC beta-BHC delta-BHC gamma-BHC (Lindane)Decachlorobiphenyl3443-144PCM-04-607alpha-BHC beta-BHC delta-BHC gamma-BHC (Lindane)	SurrogateSurrogate Recovery (percent)Control Limits (percent)Sample IDAnalytesSample ResultsDecachlorobiphenyl2543-144PCM-01-607alpha-BHC beta-BHC (o5 U delta-BHC gamma-BHC (Lindane).05 U .05 U delta-BHC .05 UDecachlorobiphenyl4043-144PCM-02-607alpha-BHC beta-BHC (D5 U gamma-BHC (Lindane).05 U .05 U .05 U .05 UDecachlorobiphenyl4043-144PCM-04-607alpha-BHC beta-BHC .05 U .05 U .05 U .05 U .05 U.0081 J .05 U .05 U .05 U .05 U .05 U .05 U .05 UDecachlorobiphenyl3443-144PCM-04-607 .05 U .05 U .05 U .05 U .05 U .05 U .05 U.00081 J .05 U .05 U .05 U .05 U .05 U	SurrogateSurrogate Recovery (percent)Control Limits (percent)Sample IDAnalytesSample ResultsUnitsDecachlorobiphenyl2543-144PCM-01-607alpha-BHC beta-BHC (delta-BHC).05 U .05 U ug/L ug/L ug/Lug/L ug/L ug/LDecachlorobiphenyl2543-144PCM-02-607alpha-BHC beta-BHC (lindane).05 U .05 Uug/L ug/L ug/LDecachlorobiphenyl4043-144PCM-02-607alpha-BHC beta-BHC (lindane).05 U .05 Uug/L ug/L ug/L ug/L ug/L ug/L ug/L gamma-BHC (Lindane).05 U .05 Uug/L ug

Notes:

BHC Benzene Hexachloride.

J Estimated.

U Not detected.

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE METHOD BLANKS SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

Parameter	Analysis Date	Analyte	Blank Result ⁽¹⁾	Sample ID	Sample Result (ug/L)	Qualified Result (ug/L)
Volatiles	06/22/07	Chlorobenzene	0.60 J	PCBM-02-607	1.7 J	6.3 U
			0.12 J	PCM-01-607	0.10 J	.5 U
			0.12 J	PCM-02-607	0.31 J	.5 U
			0.12 J	PCM-07-607	0.13 J	.5 U
Volatiles	06/22/07	1,2,3-Trichlorobenzene	0.1 J	PCM-02-607	0.15 J	.5 U

Notes:

⁽¹⁾ Blank result corrected for sample dilution, where applicable.

J Estimated.

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERIES SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

			MS	MSD	Control Limits					
Parameter	Sample ID	Analyte	Recovery (percent)	Recovery (percent)	RPD (percent)	Recovery (percent)	RPD (percent)	Sample Result	Units	Qualifier
SVOCs	PCBM-01-607	Phenol	34	36	5	38-112	39	10 U	ug/L	UJ

Ν	otes:
ΙN	otes.

J Estimated.

MS Matrix Spike.

MSD Matrix Spike Duplicate.

RPD Relative Percent Difference.

SVOCs Semi-Volatile Organic Compounds.

U Not detected.

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING BLANK SPIKE RECOVERIES SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

		BS		Associated	Sample		
Parameter	Analyte	Recovery (percent)	Control Limits (percent)	Sample ID	Result (ug/L)	Qualifier	
SVOCs	Phenol	36	38-112	PCBM-03-607	10 U	UJ	
				PCM-01-607	10 U	UJ	
				PCM-07-607	10 U	UJ	
				PCM-10-607	10 U	UJ	

Notes:

BS Blank Spike.

SVOCs Semi-volatile organic compounds.

U Not detected.

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE TRIP BLANK SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

Parameter	Blank Date	Analyte	Blank Result	Associated Sample ID	Sample Result	Sample Qualifier	Units
Volatiles	06/14/07	1,2,4-Trichlorobenzene	0.13 J	PCM-02-607	0.12 J	0.5 U	ug/L

Notes:

J Estimated.

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE RINSE BLANKS SEMI-ANNUAL GROUNDWATER SAMPLING 102ND STREET LANDFILL NIAGARA FALLS, NEW YORK JUNE 2007

Parameter	Rinse Blank ID	Analyte	Blank Result	Associated Sample ID	Sample Result (µg/L)	Qualified Sample Result (µg/L)
Volatiles	Rinse-607	2-Chlorotoluene	0.18 J	PCBM-01-607	0.18 J	.5 U
				PCBM-03-607	0.28 J	.5 U
				PCM-01-607	0.48 J	.5 U
				PCM-02-607	0.18 J	.5 U
				PCM-05-607	0.26 J	.5 U
				PCM-07-607	0.24 J	.5 U
				PCM-10-607	0.53	0.53 U

Notes:

J Estimated.