OBG

PART OF RAMBOLL

2019 ANNUAL REPORT – FINAL REPORT

Post-Closure Groundwater Monitoring Report
Coldwater Road Landfill
Flint, Michigan
MID 005 356 860

RACER TRUST

Detroit, Michigan

February 2020

OBG

Part of Ramboll

FEBRUARY 25, 2020 | CLIENT # 15388 | PROJECT # 72202

Post-Closure Groundwater Monitoring
Coldwater Road Landfill
MID 005 356 860

Flint, Michigan

Prepared for: RACER Trust
Detroit, Michigan

CLIFFORD S. YANTZ
SENIOR HYDROGEOLOGIST
O'BRIEN & GERE ENGINEERS, INC., PART OF RAMBOLL

February 25, 2020

Mr. Jacob Runge
Environmental Engineer
Materials Management Division
Michigan Department of Environment, Great Lakes, and Energy
P.O. Box 30241
Lansing, Michigan 48909-7741

RE: Post-Closure Groundwater Monitoring 2019 Annual Report
Coldwater Road Landfill, Flint, Michigan
MID 005 356 860

FILE: 15388 /72202/rep

Dear **Mr. Runge**:

On behalf of Revitalizing Auto Communities Environmental Response (RACER) Trust, O'Brien & Gere Engineers, Inc., part of Ramboll (OBG) is pleased to present the results of the annual groundwater sampling event conducted in November 2019 for the Coldwater Road Landfill site (**Figure 1**).

The groundwater samples were analyzed for total organic carbon (TOC, Method 415.1), total organic halogen (TOX, Method 9020A), specific conductivity (Method 120.1), and dissolved metals (chromium (Cr), copper (Cu), nickel (Ni), and zinc (Zn) Method 200.8).

The event also included field measurements for pH, specific conductivity, dissolved oxygen, oxidation reduction potential, temperature, and turbidity. Groundwater samples were collected using a Whale pump (B-18A and B-19Ar) or peristaltic pump, and the wells were purged "dry" and allowed to recharge, and the samples were collected as soon as sufficient water was present to obtain the necessary sample volume. This was done in accordance with OBG procedures and the site-specific Field Method Guide (**Appendix A**) because low-flow sampling techniques resulted in greater than 0.3 ft of drawdown in each of the shallow wells sampled during this event. Samples to be analyzed for dissolved metals were field filtered. Groundwater sampling logs are included in **Appendix B**.

Gauging and sampling were conducted on November 20, 2019. The results are presented in two separate tables: **Table 1** - Depth to Groundwater Levels in Monitoring Wells; **Table 2** - Post-Closure Monitoring - Historical Analytical Results (Physical Parameters, TOC, TOX, and Metals). Laboratory analytical reports are included in **Appendix C**.

A site location map (**Figure 1**) and monitoring well location (*i.e.*, site layout) map (**Figure 2**) are also included. A groundwater potentiometric surface map was completed for the shallow wells (**Figure 3**) and for the deeper drift aquifer (**Figure 4**).

The groundwater flow direction in the perched zone includes discontinuous perched saturated zones within an otherwise clayey matrix. **Figure 3** provides interpreted contours for the groundwater elevation data collected during the November 2019 annual sampling event. Based on these contours, the groundwater flow direction in the perched zone appears to be predominantly toward the northwest.

Groundwater in the drift aquifer flows in a southerly direction as shown on **Figure 4**. The drift aquifer static water elevations were consistent with historical data. Additional site monitoring wells (not part of the landfill monitoring program) were used to aid in the creation of the groundwater contours.

A review of the analytical data presented in the attached tables indicates analytical results similar to previous sampling events, a summary of the data is provided below:

- Chromium concentrations were not detected above the method detection limit of 5 µg/L; except in monitoring well B-19Ar (7 µg/L). The results were similar or less than historic results, which ranged from below the method detection limit to 37 µg/L at B-9 (8/31/1995).
- Copper concentrations were not detected above the method detection limit of 5 µg/L; except in monitoring well B-19Ar (6 µg/L). The results were similar or less than historic results, which ranged from below the method detection limit to 43 µg/L at B-9 (8/31/1995).
- Nickel concentrations were not detected above the method detection limit of 5 µg/L; except in monitoring wells B-9 (6 µg/L) and B-19Ar (12 µg/L). The results were similar or less than historic results, which ranged from below the method detection limit to 183 µg/L at B-9 (11/6/1997).
- Zinc concentrations ranged from 5 µg/L in monitoring wells B-7 and B-28 to 23 µg/L in monitoring well B-19Ar. The results were similar or less than historic results, which ranged from below the method detection limit to 150 µg/L at B-18A (6/21/1995).
- TOC concentrations ranged from 2.1 mg/L in monitoring well B-28 to 5.4 mg/L in monitoring well B-7. The results were similar or less than historic results, which ranged from below the method detection limit to 71 mg/L at B-9 (11/13/1996).
- TOX concentrations ranged from below the method detection limit of 40 µg/L in monitoring wells B-7, B-19Ar, and B-28 to 77 µg/L in monitoring well B-9. The results were similar or less than historic results, which ranged from below the method detection limit to 230 µg/L at B-7 (11/30/2016).
- pH concentrations ranged from 7.05 in monitoring well B-9 to 7.44 in monitoring well B-7. The results were within the range of the historic results, which ranged from 4.60 in monitoring well B-7 (11/5/1998) to 9.73 in monitoring well B-18A (12/8/2005).
- Specific conductivity ranged from 839 µs/cm in monitoring well B-28 to 2,620 µs/cm in monitoring well B-9. The results were comparable to the historic results, which ranged from 688 µs/cm in monitoring well B-19Ar (6/12/2018) to 3,290 µs/cm in monitoring well B-9 (11/20/2008).

A QA/QC review of the field and analytical data indicates that the data is useable for the intended purpose without deviations from quality assurance standards that would require rejection or further qualification of the data. Details of the data verification results for the groundwater monitoring data are included in **Appendix D**.

The relative percent difference (RPD) for the duplicate sample results for B-28 and Dup-2 (B-28) were within acceptable limits.

There were no exceedances of the Shewart control limits (SCL) during this sampling event. The Shewart control charts are included as **Appendix E**. There were spikes for chromium (7 µg/L), copper (6 µg/L), nickel (12 µg/L), and zinc (23 µg/L) in monitoring well B-19Ar, and a positive (increasing) trend for pH in B-7. The trend was calculated using regression analysis over the last four sampling events per the Post Closure Care Plan, January 2014.

The spikes and positive trend were not confirmed by the concentrations of metals, which were either not detected (for the four primary metals [Cr, Cu, Ni, and Zn] in particular) or stable, except in monitoring well B-19Ar.

The confirmation of two or more spikes for constituents in well B-19Ar required further evaluation of well B-19Ar and the data for the associated leak detection vault and sump closest to B-19Ar (*i.e.*, Vault A and Sump A) in accordance with Section 5.7.2 of the Post-Closure Care Plan (OBG, 2014). The analytical tables for Vault A data are contained in **Appendix F**. A sample was not collected from Sump A this event and was not included in the evaluation.

A summary of the further evaluation indicated:

- The spikes of chromium, copper, nickel, and zinc appear to be the result of metals (*i.e.*, sediment) entrainment due to the high turbidity (1,000+ NTUs, above range of meter) in the sample. The well was purged dry with a

whale pump, and then the sample was collected after the well recovered sufficiently to allow for sample collection (approximately 23 hours).

- The spikes (*i.e.*, current concentration exceeds the mean plus one standard deviation) could also be attributed to the concentrations in the well historically being non-detect, which would cause slight detections to become spikes. Chromium (7 µg/L), copper (6 µg/L), nickel (12 µg/L), and zinc (23 µg/L) concentrations were slightly higher than historical results that have generally been non-detects; however, metals have also been detected in the past, and the recent concentrations were below the all-time high for chromium (14 µg/L), copper (14 µg/L), nickel (26 µg/L), and zinc (39 µg/L) in B-19Ar.
- There does not appear to be a correlation between B-19Ar concentrations and concentrations in Vault A. In Vault A, chromium (below the method detection limit 5 µg/L), copper (below the method detection limit 5 µg/L), nickel (15 µg/L), and zinc (below the method detection limit 5 µg/L) were either not detected or stable.
- There does not appear to be a correlation between B-19Ar concentrations and concentration in adjacent monitoring wells B-18A and B-24r. In B-18A chromium (below the method detection limit 5 µg/L), copper (below the method detection limit 5 µg/L), nickel (below the method detection limit 5 µg/L), zinc (8 µg/L), were either not detected or stable. In B-24r chromium (below the method detection limit 5 µg/L), copper (below the method detection limit 5 µg/L), nickel (below the method detection limit 5 µg/L), zinc (7 µg/L), were either not detected or stable.
- pH decreased in Vault A, but increased in monitoring well B-19Ar during the most recent sampling event, but remain generally stable and were within historic ranges.
- Specific conductivity decreased in Vault A, but increased in monitoring well B-19Ar during the most recent sampling event, but remain generally stable and were with in historic ranges.

Therefore, the confirmed spikes in chromium, copper, nickel, and zinc in B-19Ar were not confirmed by or correlated with the concentrations of metals, pH, or specific conductivity in the closest associated leak detection vault and monitoring wells (B-18A and B-24r), and is not attributable to a release from the landfill.

Therefore, the spikes and negative trend do not suggest there was a release from the landfill and will continue to be evaluated during future sampling events. No other trends or spikes were observed during this monitoring event, and trends and spikes will continue to be monitored during future sampling events.

The next sampling event (annual event) is currently scheduled for June 2020. If you have any questions, please feel free to contact Clifford Yantz at (313) 333-0211.

Very truly yours,
O'BRIEN & GERE ENGINEERS, INC., Part of Ramboll

Clifford Scott Yantz

Clifford S. Yantz
Senior Hydrogeologist

ENCLOSURES:

Table 1 – Depth to Groundwater Levels
Table 2 – Historical Analytical Results
Figure 1 – Site Location Map
Figure 2 – Site Layout
Figure 3 – Shallow Groundwater Potentiometric Surface Map
Figure 4 – Drift Aquifer Groundwater Potentiometric Surface Map
Appendix A – Sampling Procedures
Appendix B – Groundwater Sampling Logs
Appendix C – Analytical Laboratory Results
Appendix D – Groundwater Sampling Program QA/QC Summary
Appendix E – Monitoring Well Control Charts
Appendix F – Vault A - Analytical Table

cc: David Favero – RACER Trust
Kevin Schneider – OBG

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

On Behalf of RACER Trust

_____

Clifford S. Yantz
Senior Hydrogeologist – O'Brien & Gere Engineers, Inc., Part of Ramboll
Agent for RACER Trust

Date: February 25, 2020

cc: file

TABLES

TABLE 1

RACER Trust - Coldwater Road Landfill Facility

Depth to Groundwater Levels in Monitoring Wells

November 20, 2019

Well	*Top of Casing Elev. (ft)**	*Depth to Water(ft)*	*Static Water Elev. (ft)*
Landfill Monitoring Wells			
B-7	813.63	16.57	797.06
B-9	807.45	3.00	804.45
B-18A	810.85	20.22	790.63
B-19A	812.66	5.68	806.98
B-19AR	811.80	37.85	773.95
B-20D	815.14	70.24	744.90
B-21D	821.07	80.50	740.57
B-22D	822.15	84.60	737.55
B-23DR	812.12	81.20	730.92
B-24R	816.04	12.24	803.80
B-27D	812.70	75.92	736.78
B-28	816.46	4.91	811.55
OBG MW-16D	807.43	58.22	749.21

Notes

Casing elevations were provided by Norwy & Hale Surveyors and are in feet relative to National Geodetic Vertical Datum

-- Depth to water not collected.

NA - Not available

NG - No ground water detected

Top of casing elevations were resurveyed in June 2017.

R - Indicates a replacement well location.

TABLE 2
RACER Trust - Coldwater Road Landfill Facility
Post-Closure Monitoring - Historical Analytical Results
Physical Parameters, TOC, TOX, Metals, Chloride, Cyanide, Phenols, and Sulfate

		Indicator Parameters					Dissolved Metals (µg/L)								Inorganics (mg/L)			
Well ID	Sample Date	TOC (mg/L)	TOX (µg/L)	pH	SpC	Temp	Cr	Cu	Ni	Zn	Fe	Mn	Na	Chloride	Cyanide	Phenols	Sulfate
			MDEQ Residential Drinking Water Criteria & RBSLs				*100 (A)*	*1,000 (E)*	*100 (A)*	*2,400*							
	6/21/1995	8.7	23	7.48	1509	13.8	<20	<20	<30	<20	--	--	--	--	--	--	--
	8/31/1995	--	--	--	--	--	<20	<20	<40	<20	--	--	--	--	--	--	--
	2/9/1996	14.0	120	--	--	--	<20	<20	<40	22	--	--	--	--	--	--	--
	6/19/1996	20.0	<100	6.91	1,508	13.2	<20	<20	<20	20	--	--	--	--	--	--	--
B-7	8/21/1996	55.0	26	7.59	1,567	17.1	<20	<20	<20	60	--	--	--	--	--	--	--
	11/13/1996	27.0	<5	7.95	1,960	7.2	<20	<20	<20	50	--	--	--	--	--	--	--
	5/6/1997	16.0	<100	7.20	780	11.0	<10	10	14	10	--	--	--	--	--	--	--
	11/6/1997	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/4/1998	6.0	<5	6.61	1,270	10.7	<10	<10	<5	20	--	--	--	--	--	--	--
	11/5/1998	4.0	<10	4.60	1,240	11.2	<10	<10	8	30	10	424	31,000	--	--	--	--
	12/23/1998	--	--	--	--	--		--	--	--	--	--	--	58	<0.005	<0.020	161
	4/26/1999	3.9	<100	7.50	1,413	14.2	<10	<10	10	<10	--	--	--	--	--	--	--
	11/5/1999	5.1	<100	6.50	1,230	14.2	<10	<10	8	30	260	313	41,800	64	<0.005	<0.020	301
	4/26/2000	4.8	<100	7.58	1,450	10.2	<10	<10	<5	<10	--	--	--	--	--	--	--
Duplicate	4/26/2000	5.9	<100	NS	NS	NS	<10	<10	6	10	--	--	--	--	--	--	--
	12/8/2000	4.2	<10	7.05	1,180	9.5	<10	<10	20	10	50	--	58,900	79	<0.005	<0.020	227
	5/16/2001	5.0	<100	7.30	1,330	13.0	<10	<10	7	<10	--	--	--	--	--	--	--
	10/18/2001	5.3	<100	7.19	1,210	12.5	<10	<10	5	<10	330	--	60,800	81	<0.005	NA	205
	5/16/2002	3.9	<100	7.19	1,850	11.9	<10	<10	<5	10	--	--	--	--	--	--	--
	11/7/2002	NR	NR	7.35	1,120	10.3	<5	<5	5	5	250	<5	65,500	NA	NA	NA	NA
	6/4/2003	3.3	<30	6.90	1,460	12.6	<5	<5	<5	<5	--	--	--	--	--	--	--
	11/13/2003	3.9	<30	6.90	1,590	9.6	<5	<5	<5	5	190	<5	--	85	<0.005	<0.010	279
	6/30/2004	4.3	43	7.13	1,353	16.0	<5	<5	9	7	--	--	--	--	--	--	--
	12/9/2004	4.0	<30	5.32	1,290	10.8	<5	<5	7	14	180	74	71,200	78	<0.005	<0.010	251
	6/8/2005	7.0	86	7.36	1,121	10.9	5	<5	9	13	170	31	81,900	80	<0.005	<0.010	254
	12/7/2005	7.5	<30	8.70	1,430	12.2	10	<4	6	20	150	50	85,300	--	--	--	--
	6/29/2006	4.3	<30	7.19	1,470	11.7	5	<4	9	18	190	150	76,900	73	<0.005	<0.010	270
	11/29/2006	4.4	<30	6.88	1,380	15.3	<5	<4	9	11	--	--	--	--	--	--	--
	6/7/2007	3.9	23.7	6.87	1,400	13.4	11	27	5	14	130	42	87,300	72	<0.005	<0.010	208
	11/14/2007	3.5	<30	6.85	1,350	13.4	14	6	16	20	--	--	--	--	--	--	--
	6/25/2008	3.8	72.9	6.90	1,410	20.7	<5	3	6	<5	350	10	94,800	68	<0.005	<0.010	222
	11/17/2008	4.6	20.5	6.80	1,258	5.5	<5	3	5	17	--	--	--	--	--	--	--
	6/24/2009	4.5	<30	6.90	1,184	20.0	<5	3	<5	14	67	36	84,500	40	<0.005	<0.010	154
	11/17/2009	8	25.3	7.31	1,090	10.3	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/17/2010	5	<30	7.04	1,290	16.3	<5	<4	<5	<5	<20	47	86,000	61	<0.005	<0.020	160
	11/8/2010	8	103	7.16	997	13.9	17	<4	<5	<5	--	--	--	--	--	--	--
	6/22/2011	4.3	25	7.25	910	13.7	10	<4	5	6	220	6	55,200	26	<0.005	<0.010	88
Replicate	6/22/2011	--	--	--	--	--	<5	--	--	--	--	--	--	--	--	--	--
	11/16/2011	5	28	7.04	974	12.8	<5	6	8	11	--	--	--	--	--	--	--
	6/27/2012	3.7	97	6.77	1,082	15.0	<5	<4	<5	<5	<20	58	64,900	40	<0.005	<0.02	134
	12/6/2012	7.9	<40	7.12	825	8.7	<5	4	<5	9	--	--	--	--	--	--	--
B-7	6/5/2013	4.5	6	7.24	921	14.0	<5	<4	<5	24	30	13	27,500	32	<0.005	<0.02	106
	11/4/2013	8.7	16	7.10	733	11.6	14	6	<5	<5	--	--	--	--	--	--	--
	6/25/2014	--	--	7.10	--	13.3	--	--	--	--	--	--	--	--	--	--	--
	11/18/2014	6.5	28	7.31	896	4.8	<5	6	6	6	--	--	--	--	--	--	--
	6/24/2015	4.2	<30	6.98	1,019	16.3	<5	<5	<5	<5	<20	69	58,900	36	<0.005	<0.02	122
	11/18/2015	3.7	16	7.06	1,231	14.7	<5	<5	7	7	--	--	--	--	--	--	--
	6/23/2016	3.9	77	7.14	852	15.1	<5	<5	<5	<5	30	41	41,700	22	<0.005	<0.02	82
	11/30/2016	5.3	230	7.21	880	13.3	<5	<5	<5	<5	--	--	--	--	--	--	--
	6/21/2017	3.9	12	6.78	1,092	11.0	<5	<5	<5	<5	40	37	51,700	41	<0.005	<0.02	155
	11/7/2017	6.5	39	6.94	841	10.8	<5	5	<5	<5	--	--	--	--	--	--	--
	6/12/2018	4.2	<60	6.95	932	11.0	<5	<5	<5	10	230	26	39,800	27	<0.005	<0.02	116
	11/7/2018	6.5	170	7.25	952	11.4	<5	<5	<5	<5	--	--	--	--	--	--	--
	5/30/2019	6.0	<150	7.35	737	10.7	<5	<5	<5	7	40	<5	32,400	20	<0.004	<0.02	110
	11/21/2019	**5.4**	**<40**	**7.44**	**910**	**12.5**	**<5**	**<5**	**<5**	**5**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

See notes on page 7.

TABLE 2
RACER Trust - Coldwater Road Landfill Facility
Post-Closure Monitoring - Historical Analytical Results
Physical Parameters, TOC, TOX, Metals, Chloride, Cyanide, Phenols, and Sulfate

		Indicator Parameters					Dissolved Metals (µg/L)							Inorganics (mg/L)			
Well ID	Sample Date	TOC (mg/L)	TOX (µg/L)	pH	SpC	Temp	Cr	Cu	Ni	Zn	Fe	Mn	Na	Chloride	Cyanide	Phenols	Sulfate
			MDEQ Residential Drinking Water Criteria & RBSLs				*100 (A)*	*1,000 (E)*	*100 (A)*	*2,400*							
	6/21/1995	3.5	34	7.68	2,400	14.6	<20	<20	<30	<20	--	--	--	--	--	--	--
	8/31/1995	3.9	<10	7.72	1,829	14.8	37	43	<40	<20	--	--	--	--	--	--	--
	2/9/1996	3.1	<10	7.34	2,860	8.0	<20	<20	<40	<20	--	--	--	--	--	--	--
	6/19/1996	2.1	<100	6.81	2,550	11.5	<20	<20	<20	<20	--	--	--	--	--	--	--
B-9	8/21/1996	2.3	<5	8.04	2,310	16.4	<20	<20	<20	70	--	--	--	--	--	--	--
	11/13/1996	71.0	<5	6.79	3,280	9.2	<20	<20	<20	40	--	--	--	--	--	--	--
	5/6/1997	3.0	<100	6.80	2,600	10.0	<10	<10	51	20	--	--	--	--	--	--	--
	11/6/1997	2.0	<100	6.50	2,800	11.0	<10	<10	183	40	650	741	--	141	<0.005	<0.020	1,178
	5/4/1998	3.0	<5	6.58	2,400	14.5	10	10	18	40	--	--	--	--	--	--	--
	11/5/1998	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	12/23/1998	--	--	--	--	--	--	--	--	--	--	--	--	NS	NS	NS	NS
	4/26/1999	4.0	<100	7.69	1,860	12.2	<10	<10	19	20	--	--	--	--	--	--	--
	11/5/1999	2.5	<100	6.75	2,340	15.4	<10	<10	20	30	610	1280	47,100	128	<0.005	<0.020	1,222
	4/26/2000	5.5	<100	7.56	2,780	9.5	<10	<10	12	30	--	--	--	--	--	--	--
	12/8/2000	5.0	<10	7.56	2,400	7.8	<10	<10	46	<10	50	--	69,500	142	<0.005	<0.020	1,246
	5/16/2001	4.8	<100	7.41	1,070	12.6	<10	<10	7	10	--	--	--	--	--	--	--
	10/17/2001	4.0	<100	7.54	2,130	10.8	<10	<10	8	20	940	--	66,000	122	<0.005	NA	1,150
	5/16/2002	1.9	<100	7.19	2,470	11.6	<10	<10	7	10	--	--	--	--	--	--	--
	11/7/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/4/2003	2.2	57	6.78	2,690	10.7	<5	<5	15	13	--	--	--	--	--	--	--
	11/13/2003	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/30/2004	3.8	NS	6.91	2,379	12.7	<5	8	19	28	--	--	--	--	--	--	--
	12/9/2004	3.0	<30	5.88	2,480	11.4	<5	<5	11	19	570	248	55,900	149	<0.005	<0.010	1,350
	6/8/2005	4.0	<30	7.09	2,116	10.3	6	6	12	17	480	701	58,300	128	<0.005	<0.010	1,160
	12/7/2005	5.0	<30	8.58	2,830	11.9	11	5	12	40	320	410	58,500	--	--	--	--
	6/29/2006	1.9	<30	6.82	2,820	12.4	6	6	13	19	390	330	63,600	125	<0.005	<0.010	1,150
	11/30/2006	2.7	36.7	7.15	2,830	12.5	<5	6	<5	14	--	--	--	--	--	--	--
	6/5/2007	2.1	<30	6.70	2,770	11.0	12	6	24	21	320	1,900	67,300	112	<0.005	<0.010	1,120
	11/16/2007	2.0	27.4	6.67	3,000	9.4	2	6	24	18	--	--	--	--	--	--	--
	7/2/2008	1.8	36.4	6.44	3,060	19.7	<5	4	13	19	780	812	64,200	133	<0.005	<0.010	1,280
	11/20/2008	2.2	15.9	6.35	3,290	8.1	<5	<1	13	<5	--	--	--	--	--	--	--
Duplicate	11/20/2008	2.0	127	6.35	3,280	8.1	<5	<1	13	<5	--	--	--	--	--	--	--
	6/25/2009	1.6	<30	6.67	2,700	19.8	<5	<1	<5	<5	59	173	65,300	107	<0.005	<0.010	1,120
	11/16/2009	3	84.1	6.71	3,030	12.7	<5	<4	16	8	--	--	--	--	--	--	--
	6/15/2010	3	27.5	6.69	3,030	13.0	<5	<4	7	6	460	475	70,700	117	<0.005	<0.020	1,230
	11/11/2010	3	37.5	6.37	2,910	12.9	19	4	7	15	--	--	--	--	--	--	--
	6/22/2011	1.9	<30	6.70	2,600	14.0	17	6	21	12	780	661	63,300	99	<0.005	<0.010	972
Replicate	6/22/2011	--	--	--	--	--	<5	--	--	--	--	--	--	--	--	--	--
	11/16/2011	2	50	7.18	3,060	12.9	<5	<4	7	<5	--	--	--	--	--	--	--
B-9	6/26/2012	2	21	6.53	2,770	14.0	<5	<4	8	<5	60	433	73,700	101	<0.005	<0.02	1,110
	12/5/2012	2.3	19	6.80	3,210	12.0	<5	8	17	23	--	--	--	--	--	--	--
	6/5/2013	2.1	15	7.07	2,660	12.5	<5	<4	6	25	40	173	66,400	106	<0.005	<0.02	1,150
	11/6/2013	2.2	NS	6.36	2,730	13.0	10	8	47	8	--	--	--	--	--	--	--
	6/25/2014	1.9	25	6.82	2,650	11.5	<5	<5	18	8	<20	159	27,100	108	<0.005	<0.02	1,070
	11/19/2014	2.1	29	6.77	2,670	8.12	<5	6	14	12	--	--	--	--	--	--	--
	6/24/2015	2.0	17	6.38	2,480	11.8	<5	<5	<5	<5	<20	89	62,400	87	<0.005	<0.02	1,040
	11/18/2015	2.0	<30	6.68	2,670	13.5	<5	<5	7	<5	--	--	--	--	--	--	--
	6/24/2016	1.9	150	6.68	2,190	12.9	<5	<5	10	<5	20	95	52,800	71	<0.005	<0.02	776
	11/29/2016	1.9	13	6.77	2,780	13.9	<5	<5	8	9	--	--	--	--	--	--	--
	6/20/2017	1.8	12	6.75	2,250	11.5	<5	<5	5	<5	17	172	54,600	74	<0.005	<0.02	770
	11/7/2017	2.1	<30	6.57	2,540	13.1	<5	<5	8	11	--	--	--	--	--	--	--
	6/12/2018	1.9	<60	5.78	2,420	11.6	<5	<5	6	8	20	89	55,500	85	<0.005	<0.02	931
	11/6/2018	4.9	<150	6.74	3,010	13.6	<5	<5	7	<5	--	--	--	--	--	--	--
	6/3/2019	4.3	<150	6.89	2,200	10.7	<5	<5	<5	7	70	12	52,200	69	<0.004	<0.02	838
	11/21/2019	**3.2**	**77**	**7.05**	**2,620**	**12.8**	**<5**	**<5**	**6**	**9**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

See notes on page 7.

TABLE 2
RACER Trust - Coldwater Road Landfill Facility
Post-Closure Monitoring - Historical Analytical Results
Physical Parameters, TOC, TOX, Metals, Chloride, Cyanide, Phenols, and Sulfate

		Indicator Parameters					Dissolved Metals (µg/L)							Inorganics (mg/L)			
Well ID	Sample Date	TOC (mg/L)	TOX (µg/L)	pH	SpC	Temp	Cr	Cu	Ni	Zn	Fe	Mn	Na	Chloride	Cyanide	Phenols	Sulfate
			MDEQ Residential Drinking Water Criteria & RBSLs				*100 (A)*	*1,000 (E)*	*100 (A)*	*2,400*							
	6/21/1995	2.7	<10	7.54	1,048	13.3	<20	<20	<30	150	--	--	--	--	--	--	--
	8/31/1995	3.0	<10	7.91	989	13.2	<20	<20	<40	<20	--	--	--	--	--	--	--
	2/9/1996	2.3	<10	7.42	1,021	9.3	<20	<20	<40	<20	--	--	--	--	--	--	--
	6/19/1996	1.4	<100	7.04	944	13.2	<20	<20	<20	<20	--	--	--	--	--	--	--
B-18A	8/21/1996	2.4	<5	7.49	1,041	12.8	<20	<20	<20	60	--	--	--	--	--	--	--
	11/13/1996	19.0	<5	7.22	1,331	6.4	<20	<20	<20	70	--	--	--	--	--	--	--
	5/6/1997	2.0	<100	6.50	900	10.0	<10	<10	13	10	--	--	--	--	--	--	--
	11/6/1997	4.0	<100	6.40	1,100	10.0	<10	<10	62	10	380	62	--	12	<0.005	<0.020	130
	5/4/1998	2.0	<5	6.72	862	11.8	<10	<10	<5	20	--	--	--	--	--	--	--
	11/5/1998	1.0	<10	6.00	1,090	11.8	<10	<10	<5	10	240	128	46,000	--	--	--	--
	12/23/1998	--	--	--	--	--	--	--	--	--	--	--	--	10	<0.005	<0.020	133
	4/26/1999	2.1	<100	8.10	921	14.0	<10	<10	<5	20	--	--	--	--	--	--	--
	11/5/1999	4.3	<100	7.10	832	14.0	<10	<10	<5	60	180	155	39,200	8	<0.005	<0.020	130
	4/26/2000	2.4	<100	7.50	980	10.4	<10	<10	<5	30	--	--	--	--	--	--	--
	12/8/2000	2.6	<10	6.96	990	9.9	<10	<10	15	<10	<10	--	34,500	7	<0.005	<0.020	126
Duplicate	12/8/2000	2.6	<10	--	--	--	<10	<10	13	<10	40	--	35,100	7	<0.005	<0.020	112
	5/16/2001	2.4	<100	7.91	1,160	12.9	<10	<10	<5	10	--	--	--	--	--	--	--
	10/17/2001	2.2	<100	7.09	1,020	12.2	<10	<10	<5	<10	350	--	35,400	7	<0.005	<0.020	132
	5/16/2002	1.5	<100	7.19	2,080	12.2	<10	<10	<5	10	--	--	--	--	--	--	--
	11/7/2002	1.9	<30	7.16	820	10.1	<5	<5	<5	<5	190	26	40,800	10	<0.005	<0.020	134
	6/4/2003	1.6	<30	6.92	790	13.1	<5	<5	<5	5	--	--	--	--	--	--	--
	11/13/2003	1	<30	7.68	1,180	7.1	<5	<5	<5	<5	160	<5	--	10	<0.005	<0.010	129
Duplicate	11/13/2003	--	--	--	--	--	--	--	--	--	--	--	--	11	<0.005	<0.010	130
	6/29/2004	1.2	<30	7.19	863	12.0	<5	<5	7	10	--	--	--	--	--	--	--
	12/9/2004	3	<30	6.19	960	10.5	<5	<5	9	12	900	363	37,900	14	<0.005	<0.010	127
	6/8/2005	2	<30	7.38	819	10.9	<5	<5	6	16	170	80	40,000	11	<0.005	<0.010	120
	12/8/2005	2.6	<30	9.73	1,120	10.1	11	<4	<5	10	390	170	47,000	--	--	--	--
	6/27/2006	1.2	<30	7.09	1,110	13.2	5	4	<5	46	170	50	48,200	13	<0.005	<0.010	125
	11/30/2006	1.4	119	7.18	1,100	11.5	5	<4	<5	9	--	--	--	--	--	--	--
	6/4/2007	1	19.9	7.01	1,070	13.2	9	3	3	14	110	22	51,800	15	<0.005	<0.010	114
	11/14/2007	<1	19	6.91	1,090	13.7	1	2	6	11	--	--	--	--	--	--	--
	6/25/2008	12	34.1	7.10	1,060	20.4	<5	2	<5	11	310	<5	54,800	15	<0.005	<0.010	110
	11/18/2008	<1	<30	6.58	1,088	2.9	<5	<1	<5	<5	--	--	--	--	--	--	--
	6/24/2009	<1	<30	7.25	1,060	26.2	<5	1	<5	15	<20	<5	53,100	16	<0.005	<0.010	111
	11/18/2009	2	<30	6.89	1,070	11.7	<5	<4	<5	45	--	--	--	--	--	--	--
	6/17/2010	1	<30	7.19	1,080	17.5	<5	<4	<5	8	<20	<5	45,500	15	<0.005	<0.020	109
	11/10/2010	2	28	6.91	1,065	9.5	12	<4	<5	<5	--	--	--	--	--	--	--
	6/21/2011	1.2	<30	7.16	1,031	18.8	10	<4	5	12	240	<5	46,100	17	<0.005	<0.010	103
Replicate	6/21/2011	--	--	--	--	--	<5	--	--	--	--	--	--	--	--	--	--
	11/15/2011	1	28	7.01	1,063	12.0	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/27/2012	1.2	<40	6.99	1,057	14.4	<5	<4	<5	<5	30	26	50,000	18	<0.005	<0.02	103
Duplicate	6/27/2012	1.2	<40	6.99	1,054	14.4	<5	<4	<5	5	40	27	46,500	18	<0.005	<0.02	101
	12/6/2012	1.5	<40	7.03	1,071	9.3	<5	<4	5	9	--	--	--	--	--	--	--
	6/5/2013	1.5	4.7	7.17	1,040	14.6	<5	<4	<5	31	20	12	43,900	19	<0.005	<0.02	110
B-18A	11/5/2013	1.4	<10	7.15	1,063	12.1	<5	<4	<5	11	--	--	--	--	--	--	--
	6/24/2014	1.5	<30	7.03	1,048	12.8	<5	<5	6	7	<20	20	20,500	18	<0.005	<0.02	107
	11/19/2014	1.4	16	7.10	1,073	6.27	<5	<4	5	7	--	--	--	--	--	--	--
Duplicate	11/19/2014	1.5	<60	7.10	1,072	6.27	<5	<4	5	7	--	--	--	--	--	--	--
	6/23/2015	1.3	<30	6.95	1,060	15.5	<5	<5	<5	<5	30	10	43,600	18	<0.005	<0.02	110
	11/18/2015	1.4	<30	7.03	1,065	12.2	<5	<5	<5	5	--	--	--	--	--	--	--
	6/23/2016	1.4	55	7.08	1,063	13.8	<5	<5	<5	<5	30	7	42,400	19	<0.005	<0.02	108
	11/30/2016	1.2	<30	7.10	1,059	11.4	<5	<5	<5	7	--	--	--	--	--	--	--
	6/20/2017	1.5	<30	6.97	1,075	12.7	<5	<5	<5	8	<20	27	36,300	18	<0.005	<0.02	118
	11/7/2017	1.2	<30	6.96	1,092	11.6	<5	<5	<5	<5	--	--	--	--	--	--	--
	6/12/2018	1.4	<60	6.90	1,074	12.4	<5	<5	<5	10	160	41	32,900	16	<0.005	<0.02	131
	11/7/2018	3.0	<150	6.85	1,106	11.7	<5	<5	<5	7	--	--	--	--	--	--	--
	6/3/2019	3.6	<150	7.36	1,050	11.2	<5	<5	<5	9	<20	15	34,900	18	<0.004	<0.02	127
Duplicate	6/3/2019	3.8	<150	7.36	1,056	11.2	<5	<5	<5	34	110	16	35,300	17	<0.004	<0.02	127
	11/20/2019	**2.2**	**65**	**7.30**	**1,055**	**11.2**	**<5**	**<5**	**<5**	**8**	--	--	--	--	--	--	--

See notes on page 7.

TABLE 2
RACER Trust - Coldwater Road Landfill Facility
Post-Closure Monitoring - Historical Analytical Results
Physical Parameters, TOC, TOX, Metals, Chloride, Cyanide, Phenols, and Sulfate

		Indicator Parameters					Dissolved Metals (µg/L)							Inorganics (mg/L)			
Well ID	Sample Date	TOC (mg/L)	TOX (µg/L)	pH	SpC	Temp	Cr	Cu	Ni	Zn	Fe	Mn	Na	Chloride	Cyanide	Phenols	Sulfate
			MDEQ Residential Drinking Water Criteria & RBSLs				*100 (A)*	*1,000 (E)*	*100 (A)*	*2,400*							
	6/21/1995	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	8/31/1995	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	2/9/1996	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	6/19/1996	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
B-19A	8/21/1996	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	11/13/1996	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	5/6/1997	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	11/6/1997	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	WD	WD	WD	WD
	5/4/1998	3.0	<5	6.84	1,480	10.1	<10	<10	<5	30	--	--	--	--	--	--	--
	11/5/1998	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	12/23/1998	--	--	--	--	--	--	--	--	--	--	--	--	NS	NS	NS	NS
	4/26/1999	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	11/5/1999	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/26/2000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	12/8/2000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/16/2001	4.0	<100	7.14	1,050	11.8	<10	<10	<5	<10	--	--	--	--	--	--	--
	10/17/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/16/2002	6.0	<100	7.19	1,740	10.6	<10	<10	<5	10	--	--	--	--	--	--	--
	11/7/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/4/2003	5.8	<30	6.92	1,350	12.9	<5	<5	<5	<5	--	--	--	--	--	--	--
	11/13/2003	3.4	<30	7.59	1,620	10.2	<5	<5	<5	<5	20	<5	--	148	<0.005	<0.010	229
	6/29/2004	3.9	<30	7.17	1,316	14.7	<5	<5	<5	8	--	--	--	--	--	--	--
	12/9/2004	5.0	33	6.24	1,340	9.9	<5	<5	<5	9	240	11	111,000	116	<0.005	<0.010	233
Duplicate	12/9/2004	5.0	<30	--	--	--	<5	<5	<5	7	170	<5	114,000	116	<0.005	<0.010	233
B-19AR	6/7/2005	3.0	<30	7.09	829	12.2	<5	<5	7	<5	1,320	228	15,700	52	<0.005	<0.010	130
Duplicate	12/8/2005	5.5	<30	--	1,390	--	10	<4	<5	20	160	<20	81,400	--	--	--	--
	12/8/2005	5.3	<30	7.13	1,390	12.3	10	<4	<5	<10	150	<20	74,800	--	--	--	--
Re-sample	2/14/2006	--	--	7.95	840	5.9	<5	--	--	--	--	--	--	--	--	--	--
	6/29/2006	2.7	<30	7.58	860	12.0	<5	<4	12	21	240	210	22,400	51	<0.005	<0.010	153
	11/30/2006	6.2	33.7	7.18	1,300	11.4	5	<4	<5	<5	--	--	--	--	--	--	--
	6/7/2007	2	<30	6.97	899	11.4	6	4	4	9	70	21	19,700	58	<0.005	<0.010	136
	11/13/2007	1.5	<30	7.27	1,070	12.1	3	7	26	11	--	--	--	--	--	--	--
	6/25/2008	2.4	38.8	7.13	1,060	17.4	<5	3	<5	16	380	9	18,500	58	<0.005	<0.010	148
	11/18/2008	1.3	<30	7.00	1,052	8.0	<5	1	<5	14	--	--	--	--	--	--	--
	6/24/2009	1.0	<30	7.74	911	17.3	<5	2	<5	<5	36	<5	21,200	60	<0.005	<0.010	147
	11/19/2009	2	<30	7.41	994	10.4	<5	<4	<5	7	--	--	--	--	--	--	--
	6/15/2010	2	<30	7.57	992	16.1	<5	<4	<5	<5	<20	<5	19,800	59	<0.005	<0.020	154
	11/10/2010	2	<30	6.91	1,128	8.7	12	<4	<5	<5	--	--	--	--	--	--	--
	6/22/2011	1.5	<30	7.35	902	17.2	5	<4	5	<5	240	<5	22,400	64	<0.005	<0.010	140
Replicate	6/22/2011	--	--	--	--	--	<5	--	--	--	--	--	--	--	--	--	--
	11/16/2011	2	26	7.06	1,091	8.4	<5	<4	<5	5	--	--	--	--	--	--	--
	6/27/2012	1.5	<40	7.78	1,005	13.3	<5	<4	<5	<5	<20	<5	23,200	62	<0.005	<0.02	145
	12/6/2012	1.8	<40	7.36	1,129	10.2	<5	<4	5	6	--	--	--	--	--	--	--
	6/5/2013	1.5	39	8.16	777	13.0	<5	<4	<5	25	40	<5	27,700	72	<0.005	<0.02	136
	11/6/2013	1.6	3.6	7.33	1,104	11.6	<5	<4	10	<5	--	--	--	--	--	--	--
B-19AR	6/23/2014	2.0	23	8.40	817	17.3	<5	<5	5	<5	<20	<5	11,900	74	<0.005	<0.02	136
	11/20/2014	2.1	190	7.37	1,038	6.16	<5	6	6	10	--	--	--	--	--	--	--
	6/23/2015	1.5	<30	6.77	1,165	20.2	<5	6	<5	26	30	50	28,700	72	<0.005	<0.02	132
	11/19/2015	1.4	17	6.90	1,170	10.6	<5	<5	7	7	--	--	--	--	--	--	--
	6/27/2016	1.5	71	8.13	712	18.8	<5	<5	<5	<5	40	<5	26,700	70	<0.005	<0.02	128
	11/30/2016	1.8	12	7.39	1,104	11.2	14	14	20	39	--	--	--	--	--	--	--
Re-sample	1/12/2017	--	--	7.34	--	11.1	<5	<5	6	11	--	--	--	--	--	--	--
	6/21/2017	2.0	30	7.29	1,064	12.1	<5	<5	<5	<5	<20	13	28,200	75	<0.005	<0.02	131
	11/7/2017	2.6	120	7.05	1,134	12.0	<5	<5	<5	<5	--	--	--	--	--	--	--
	6/12/2018	1.8	<60	8.63	688	12.5	<5	<5	<5	<5	30	<5	24,700	81	<0.005	<0.02	135
	11/7/2018	5.9	<150	7.35	1,176	11.1	6	5	11	15	--	--	--	--	--	--	--
	6/3/2019	6.5	<150	7.26	1,062	11.7	<5	<5	7	10	2,760	203	27,300	82	<0.004	<0.02	148
	11/21/2019	**2.4**	**<40**	**7.36**	**1,121**	**11.1**	**7**	**6**	**12**	**23**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

See notes on page 7.

TABLE 2
RACER Trust - Coldwater Road Landfill Facility
Post-Closure Monitoring - Historical Analytical Results
Physical Parameters, TOC, TOX, Metals, Chloride, Cyanide, Phenols, and Sulfate

		Indicator Parameters					Dissolved Metals (µg/L)							Inorganics (mg/L)			
Well ID	Sample Date	TOC (mg/L)	TOX (µg/L)	pH	SpC	Temp	Cr	Cu	Ni	Zn	Fe	Mn	Na	Chloride	Cyanide	Phenols	Sulfate
			MDEQ Residential Drinking Water Criteria & RBSLs				*100 (A)*	*1,000 (E)*	*100 (A)*	*2,400*							
	6/21/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	8/31/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/9/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	6/19/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-24	8/21/1996	5.6	<5	7.80	1,502	12.7	<20	<20	<20	90	--	--	--	--	--	--	--
	11/13/1996	20.0	<5	7.09	2,030	7.8	<20	<20	<20	50	--	--	--	--	--	--	--
	5/6/1997	5.0	<100	6.40	1,700	10.0	<10	<10	31	10	--	--	--	--	--	--	--
	11/6/1997	--	--	--	--	--	--	--	--	--	--	--	--	NS	NS	NS	NS
	5/4/1998	4.0	<5	6.52	1,410	11.6	<10	<10	8	20	--	--	--	--	--	--	--
	11/5/1998	4.0	23	5.50	1,595	10.4	<10	<10	9	20	60	120	27,700	--	--	--	--
	12/23/1998	--	--	--	--	--	--	--	--	--	--	--	--	163	<0.005	<0.020	205
	4/26/1999	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	11/5/1999	NS	NS	7.20	1,152	13.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	4/26/2000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	12/8/2000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/15/2001	NS	NS	6.40	1,450	12.9	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	10/17/2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/16/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	11/7/2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/3/2003	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	11/13/2003	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/30/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	--	--
	12/9/2004	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B-24R	6/7/2005	8.0	<30	7.27	857	10.6	8	<5	<5	<5	10,600	448	27,100	49	<0.005	<0.010	206
	12/8/2005	6.6	<30	5.16	1,120	11.9	11	<4	<5	10	3,180	210	28,700	--	--	--	--
	6/28/2006	4.7	<30	7.31	1,080	11.9	6	<4	<5	<5	3,760	210	27,700	48	<0.005	<0.010	182
	11/30/2006	4.8	30	7.31	1,100	11.7	6	<4	<5	<5	--	--	--	--	--	--	--
	6/4/2007	4.5	110	7.19	1,080	11.0	9	2	2	19	2,400	194	27,900	47	<0.005	<0.010	184
	11/13/2007	4.1	30.1	7.13	1,130	14.0	3	1	5	7	--	--	--	--	--	--	--
	6/26/2008	4.3	<30	6.99	1,130	19.0	<5	1	<5	8	3,490	175	39,600	46	<0.005	<0.010	189
	11/18/2008	3.8	<30	6.76	1,125	5.3	<5	<1	<5	<5	--	--	--	--	--	--	--
	6/24/2009	5.2	<30	6.62	1,120	17.4	<5	<1	<5	<5	4,000	155	38,400	48	<0.005	<0.010	201
	11/18/2009	5	86.4	7.08	1,140	12.9	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/16/2010	4	22.7	7.02	1,150	16.3	<5	<4	<5	<5	1,880	222	39,500	46	<0.005	<0.020	196
	11/9/2010	5	26.8	6.90	1,136	13.5	11	<4	<5	<5	--	--	--	--	--	--	--
	6/21/2011	3.7	<30	7.11	1,136	17.5	10	<4	6	<5	1,130	255	51,700	45	<0.005	<0.010	206
Duplicate	6/21/2011	3.7	<30	7.11	1,137	17.5	8	<4	6	<5	1,070	255	52,000	45	<0.005	<0.010	206
Replicate	6/21/2011	--	--	--	--	--	<5	--	--	--	--	--	--	--	--	--	--
Dup. Replicate	6/21/2011	--	--	--	--	--	<5	--	--	--	--	--	--	--	--	--	--
	11/16/2011	4	24	7.69	1,141	11.1	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/26/2012	3.5	16	6.80	1,219	13.7	<5	<4	<5	<5	1,200	242	72,000	45	<0.005	<0.02	219
B-24R	12/6/2012	4.2	48	6.98	1,204	10.2	<5	<4	<5	6	--	--	--	--	--	--	--
	6/3/2013	4	4.8	7.19	1,127	11.4	<5	<4	<5	<5	110	130	38,600	45	<0.005	<0.02	227
	11/5/2013	4	5.5	7.16	1,203	12.6	<5	<4	<5	<5	--	--	--	--	--	--	--
Duplicate	11/5/2013	4	<10	7.16	1,203	12.6	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/24/2014	3.7	16	7.10	1,202	13.9	<5	8	8	9	60	238	24,300	45	<0.005	<0.02	243
Duplicate	6/24/2014	3.7	16	7.10	1,201	13.9	<5	<5	7	<5	8	231	25,000	46	<0.005	<0.02	240
	11/19/2014	3.9	21	6.98	1,290	5.44	<5	<4	11	<5	--	--	--	--	--	--	--
	6/24/2015	3.5	<30	7.03	1,235	15.4	<5	<5	7	<5	<20	240	59,600	44	<0.005	<0.02	261
	11/18/2015	3.6	19	7.03	1,234	12.9	<5	<5	5	<5	--	--	--	--	--	--	--
Duplicate	11/18/2015	3.5	18	7.03	1,233	12.9	<5	<5	6	7	--	--	--	--	--	--	--
	6/23/2016	3.2	110	6.88	1,275	15.0	<5	<5	<5	<5	320	210	67,800	45	<0.005	<0.02	245
	11/29/2016	3.4	12	7.19	1,220	10.7	<5	<5	<5	<5	--	--	--	--	--	--	--
	6/20/2017	3.1	14	7.10	1,307	11.4	<5	<5	<5	<5	<20	74	74,400	48	<0.005	<0.02	246
	11/7/2017	3.4	<30	7.09	1,231	11.3	<5	<5	<5	<5	--	--	--	--	--	--	--
	6/12/2018	2.9	<60	7.07	1,280	11.4	<5	<5	<5	7	100	64	64,500	47	<0.005	<0.02	240
	11/7/2018	3.7	<150	7.22	1,269	11.0	<5	<5	<5	<5	--	--	--	--	--	--	--
	5/30/2019	4.7	<150	7.17	1,161	11.2	<5	<5	<5	13	540	108	70,100	46	<0.004	<0.02	249
	11/21/2019	**4.0**	**59**	**7.26**	**1,216**	**11.8**	**<5**	**<5**	**<5**	**7**	--	--	--	--	--	--	--

See notes on page 7.

TABLE 2
RACER Trust - Coldwater Road Landfill Facility
Post-Closure Monitoring - Historical Analytical Results
Physical Parameters, TOC, TOX, Metals, Chloride, Cyanide, Phenols, and Sulfate

		Indicator Parameters					Dissolved Metals (µg/L)							Inorganics (mg/L)			
Well ID	Sample Date	TOC (mg/L)	TOX (µg/L)	pH	SpC	Temp	Cr	Cu	Ni	Zn	Fe	Mn	Na	Chloride	Cyanide	Phenols	Sulfate
		MDEQ Residential Drinking Water Criteria & RBSLs					*100 (A)*	*1,000 (E)*	*100 (A)*	*2,400*							
	11/21/2005	--	--	6.21	994	12.3	--	--	--	<5	--	--	--	--	--	--	--
Duplicate	11/21/2005	--	--	6.21	--	12.3	--	--	--	7	--	--	--	--	--	--	--
	6/27/2006	3	<30	7.12	828	13.2	5	<4	<5	18	2,380	210	17,000	--	--	--	--
	12/1/2006	2.4	<30	7.48	812	12.3	<5	<4	<5	5	--	--	--	--	--	--	--
Duplicate	12/1/2006	3.3	<30	7.48	810	12.3	<5	<4	<5	<5	--	--	--	--	--	--	--
B-28	6/5/2007	2.1	<30	6.84	845	10.6	9	2	3	6	1,690	160	25,100	12	<0.005	<0.010	87
	11/15/2007	2.5	15	6.81	816	9.1	3	2	5	11	--	--	--	--	--	--	--
	6/27/2008	1.8	<30	6.87	840	17.6	<5	1	<5	5	370	84	16,300	10	<0.005	<0.010	88
	11/19/2008	1.1	<30	6.75	804	7.0	<5	<1	<5	<5	--	--	--	--	--	--	--
	6/24/2009	1.1	<30	6.96	822	19.5	<5	<1	<5	<5	204	132	14,600	10	<0.005	<0.010	84
	11/18/2009	2	<30	6.94	814	11.6	<5	<4	<5	20	--	--	--	--	--	--	--
	6/16/2010	2	<30	7.02	841	17.6	<5	<4	<5	<5	790	173	19,100	12	<0.005	<0.020	78
	11/10/2010	3	<30	7.05	813	13.3	18	<4	<5	<5	--	--	--	--	--	--	--
	6/21/2011	1.5	<30	7.23	837	14.1	9	<4	5	<5	1,380	130	23,400	12	<0.005	<0.010	80
Replicate	6/21/2011	--	--	--	--	--	<5	--	--	--	--	--	--	--	--	--	--
	11/15/2011	2	160	7.17	823	12.5	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/26/2012	2	<40	6.45	849	13.0	<5	<4	<5	<5	1,960	84	29,800	12	<0.005	<0.02	80
Duplicate	12/6/2012	1.6	<40	7.25	823	11.4	<5	<4	<5	<5	--	--	--	--	--	--	--
	12/6/2012	1.7	<40	7.25	823	11.4	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/3/2013	1.5	10	6.88	834	13.1	<5	<4	5	<5	1,310	111	26,000	12	<0.005	<0.02	87
	11/5/2013	1.6	<10	7.26	842	12.9	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/24/2014	1.5	<30	7.03	852	12.2	<5	9	<5	<5	1,490	53	15,400	12	<0.005	<0.02	89
Replicate	7/28/2014	--	--	--	--	--	--	<5	--	--	--	--	--	--	--	--	--
	11/19/2014	1.6	<60	7.05	844	7.48	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/22/2015	1.5	<30	7.04	860	13.4	<5	<5	<5	<5	3,330	53	37,100	11	<0.005	<0.02	92
	11/18/2015	1.6	<30	7.13	849	13.8	<5	<5	<5	6	--	--	--	--	--	--	--
B-28	6/24/2016	1.6	49	7.18	866	15.0	<5	<5	<5	<5	4,960	53	45,800	11	<0.005	<0.02	92
	11/29/2016	1.5	<30	7.27	853	12.6	<5	<5	<5	<5	--	--	--	--	--	--	--
Duplicate	11/29/2016	1.5	16	7.27	860	12.6	<5	<5	<5	<5	--	--	--	--	--	--	--
	6/20/2017	1.6	18	7.05	863	11.4	<5	<5	<5	<5	80	35	30,000	13	<0.005	<0.02	106
	11/7/2017	1.6	<30	7.11	859	12.5	<5	<5	<5	<5	--	--	--	--	--	--	--
Duplicate	11/7/2017	1.5	<30	7.11	867	12.5	<5	<5	<5	<5	--	--	--	--	--	--	--
	6/12/2018	1.6	<60	7.09	839	12.2	<5	<5	<5	<5	60	27	14,600	12	<0.005	<0.02	100
	11/7/2018	1.5	<150	7.37	880	11.8	<5	<5	<5	<5	--	--	--	--	--	--	--
Duplicate	11/7/2018	1.6	<150	7.37	880	11.8	<5	<5	<5	<5	--	--	--	--	--	--	--
	5/29/2019	3.4	<150	7.39	803	11.0	<5	<5	<5	<5	50	84	16,200	13	<0.004	<0.02	118
	11/21/2019	2.1	42	7.34	833	12.2	<5	<5	<5	<5	--	--	--	--	--	--	--
Duplicate	**11/21/2019**	**2.1**	**<40**	**7.34**	**839**	**12.2**	**<5**	**<5**	**<5**	**5**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

See notes on page 7.

TABLE 2
RACER Trust - Coldwater Road Landfill Facility
Post-Closure Monitoring - Historical Analytical Results
Physical Parameters, TOC, TOX, Metals, Chloride, Cyanide, Phenols, and Sulfate

		Indicator Parameters					Dissolved Metals (µg/L)							Inorganics (mg/L)			
Well ID	Sample Date	TOC (mg/L)	TOX (µg/L)	pH	SpC	Temp	Cr	Cu	Ni	Zn	Fe	Mn	Na	Chloride	Cyanide	Phenols	Sulfate
		MDEQ Residential Drinking Water Criteria & RBSLs					*100 (A)*	*1,000 (E)*	*100 (A)*	*2,400*							
Equipment Blank	12/10/2004	<1	<30	--	--	--	<5	<5	<5	11	<20	13	810	<2	<0.005	<0.010	<2
	6/8/2005	<1	<30	--	--	--	<5	<5	<5	<5	<20	<5	120	<5	<0.005	<0.010	<5
	12/8/2005	<1	<30	--	5	--	<5	<4	<5	<10	<100	<20	<1000	--	--	--	--
	6/28/2006	<1	<30	--	12	--	<5	<4	<5	<5	<100	<20	<1000	<1	<0.005	<0.010	<1
	12/1/2006	<1	<30	--	26	--	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/8/2007	<1	26	--	13	--	<5	1	1	13	<20	11	340	<2	<0.005	<0.010	<2
	11/15/2007	<1	<30	--	4	--	<5	1	1	9	--	--	--	--	--	--	--
	6/26/2008	<1	<30	--	3	--	<5	1	<5	<5	100	7	420	<2	<0.005	<0.010	<2
	11/19/2008	<1	<30	--	6	--	<5	1	<5	<5	--	--	--	--	--	--	--
	6/25/2009	<1	<30	--	24	--	<5	<1	<5	<5	110	<5	200	<2	<0.005	<0.010	<2
	11/19/2009	0.7	<30	--	5	--	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/17/2010	0.4	<30	--	4	--	<5	<4	<5	<5	<20	<5	<200	<2	<0.005	<0.020	<2
	11/11/2010	1	<30	--	1.2	--	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/22/2011	0.88	<30	--	3	--	<5	<4	<5	<5	<20	<5	460	<2	<0.005	<0.010	<2
	11/16/2011	<1	4.9	--	1,330	--	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/27/2012	<1	<20	--	3	--	<5	<4	<5	13	50	<5	6350	<2	<0.005	<0.02	<2
	12/6/2012	<1	<40	--	17.0	--	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/6/2013	<1	<10	--	1,370	--	<5	<4	<5	<5	<20	<5	<500	<2	<0.005	<0.02	<2
	11/6/2013	<1	<10	--	2,350	--	<5	<4	<5	<5	--	--	--	--	--	--	--
	6/24/2014	<1	<30	--	1,930	--	<5	<5	<5	<5	<20	<5	<1000	<2.5	<0.005	<0.02	<2.5
	6/24/2015	<1	<30	--	4.09	--	<5	<5	<5	<5	<20	<5	140	<2	<0.005	<0.02	<2
	6/24/2016	<1	6.2	--	2,220	--	<5	<5	<5	<5	<20	<5	<500	<2.5	<0.005	<0.02	<2
	6/22/2017	<1	<30	--	5,780	--	<5	<5	<5	<5	<20	<5	<200	<5	<0.005	<0.02	<5
	11/7/2017	<1	<30	--	7.07	--	<5	<5	<5	<5	--	--	--	--	--	--	--
	6/14/2018	1.2	<60	--	28.8	--	<5	<5	<5	<5	<20	<5	<250	<2.5	<0.005	<0.02	<2.5
	11/7/2018	39.3	<150	--	5.40	--	<5	<5	<5	<5	--	--	--	--	--	--	--
	6/3/2019	<1	<150	--	2.63	--	<5	<5	<5	<5	<20	<5	530	<2.5	<0.004	<0.02	<2.5
	11/21/2019	**<1**	**<40**	**--**	**4.90**	**--**	**<5**	**<5**	**<5**	**<5**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

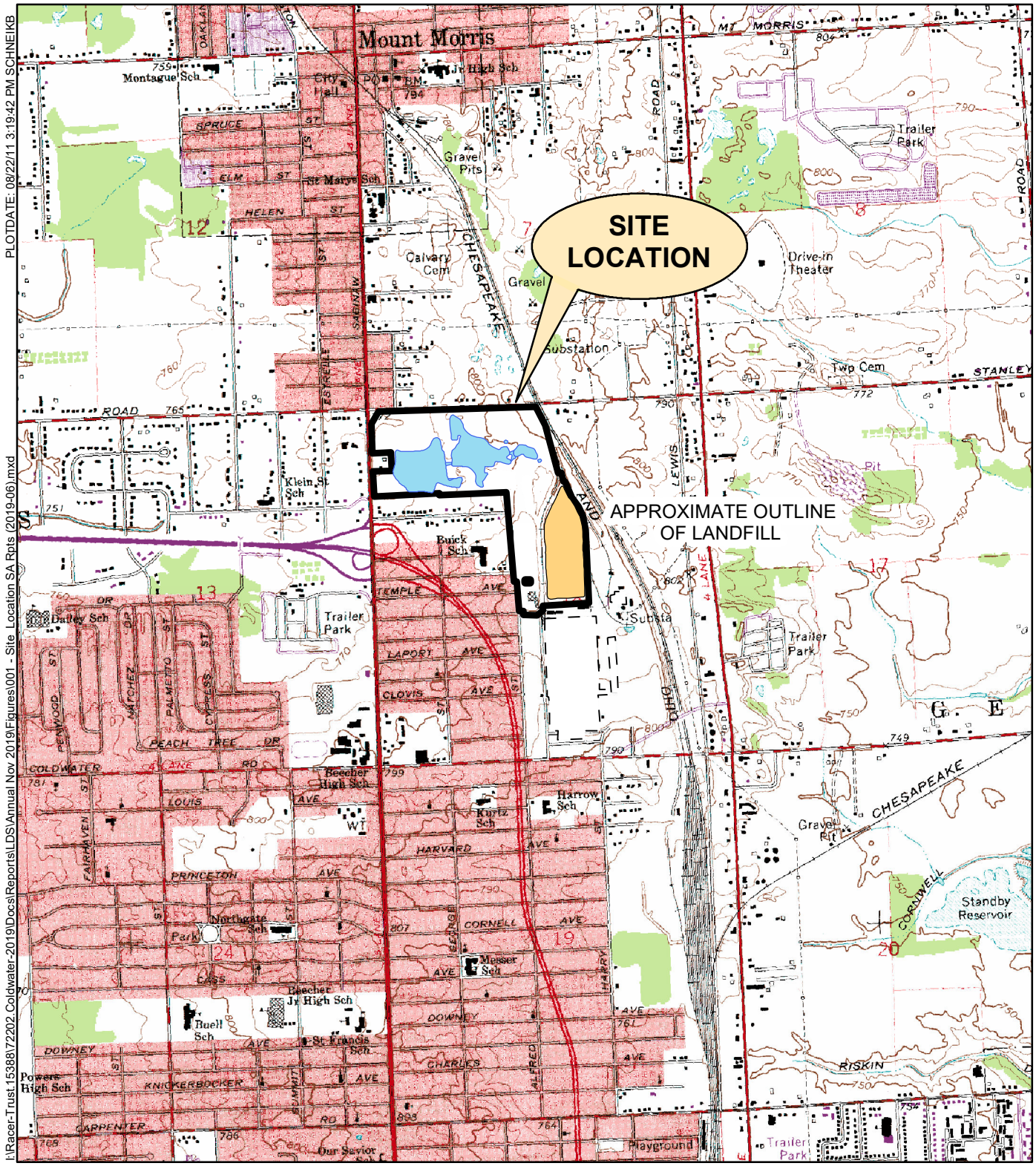
Notes
1) < = Not detected.
2) NS = Not sampled, insufficient liquid encountered.
3) NR = No Result, insufficient sample volume.
4) T = Temperature in degrees Celsius.
5) -- = Not analyzed.
6) Dup = Duplicate sample.

Exceeds MDEQ Residential Drinking Water Criteria

7) A = Criterion is the state of Michigan drinking water standard established pursuant to Section 5 of 1976 PA 399, MCL 325.1005.
8) E = Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA)

FIGURES

FIGURE 1



I:\Racer-Trust.15388\72202.Coldwater-2019\Docs\Reports\LDS\Annual Nov 2019\Figures\001 - Site_Location SA Rpts (2019-06).mxd

PLOTDATE: 08/22/11 3:19:42 PM SCHNEIKB

RACER TRUST
COLDWATER ROAD LANDFILL FACILITY
FLINT, MICHIGAN

SITE LOCATION MAP

0 1
Miles

N

15388/72202/001
JANUARY 2020

O'BRIEN & GERE ENGINEERS, INC.

N

LEGEND

- MONITORING WELL
- LEACHATE COLLECTION SUMP
- ACCESS PORT FOR LEAK DETECTION VAULT
- PROPERTY BOUNDARY
- FORMER BUILDING

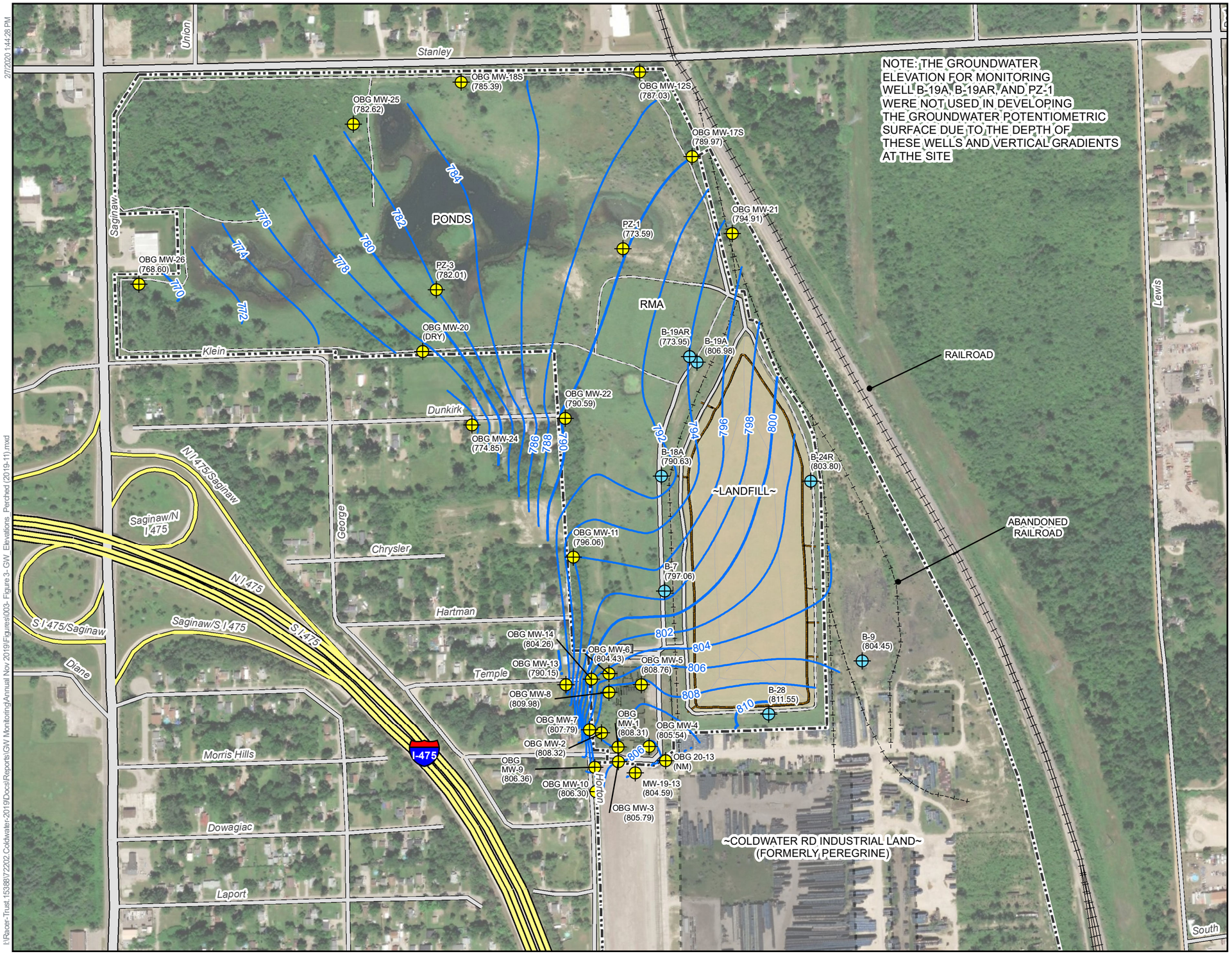
RACER TRUST
COLDWATER ROAD
FLINT, MICHIGAN

SITE LAYOUT

0 150 300 600
Feet

FILE_NO._72202
DATE: JANUARY 2020

O'BRIEN & GERE ENGINEERS, INC.



N

LEGEND

- MONITORING WELL / PIEZOMETER
- ADDITIONAL SITE MONITORING WELL
- GROUNDWATER CONTOUR (NOVEMBER 20, 2019)
- (800.93) GROUNDWATER ELEVATION
- PROPERTY BOUNDARY
- FORMER BUILDING

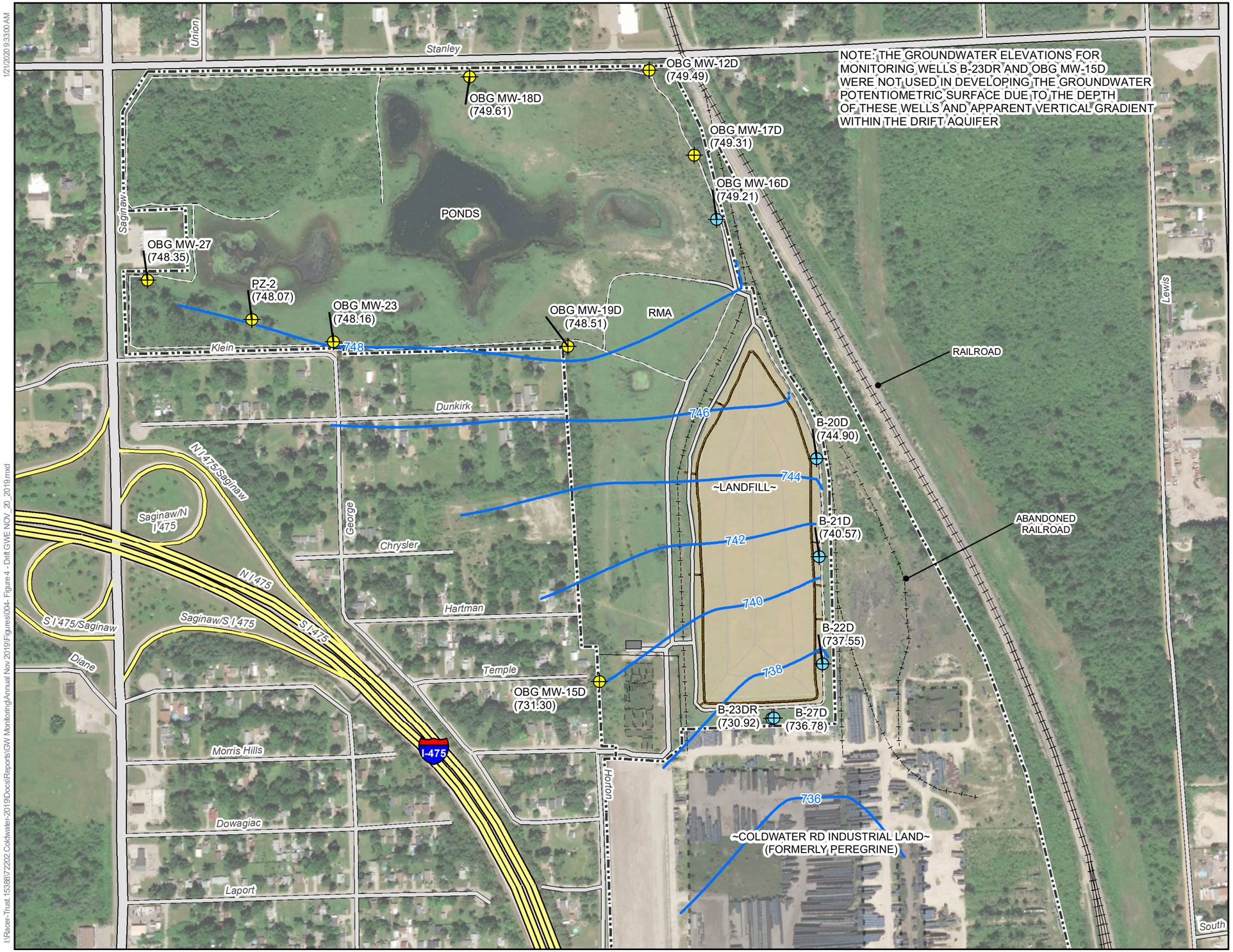
RACER TRUST
COLDWATER ROAD
FLINT, MICHIGAN

SHALLOW GROUNDWATER ELEVATION MAP
NOVEMBER 20, 2019

0 200 400 800
Feet

FILE_NO._72202
DATE: JANUARY 2020

O'BRIEN & GERE ENGINEERS, INC.



N

LEGEND

- MONITORING WELL / PIEZOMETER
- ADDITIONAL SITE MONITORING WELL
- GROUNDWATER CONTOUR (NOVEMBER 20, 2019)
- (800.93) GROUNDWATER ELEVATION
- PROPERTY BOUNDARY
- FORMER BUILDING

RACER TRUST
COLDWATER ROAD
FLINT, MICHIGAN

DRIFT AQUIFER
GROUNDWATER
ELEVATION MAP
NOVEMBER 20, 2019

0 200 400 800
Feet

FILE_NO._72202
DATE: JANUARY 2020

O'BRIEN & GERE ENGINEERS, INC.

APPENDIX A

Sampling Procedures

TABLE OF CONTENTS

1 INTRODUCTION

This procedure is for the collection of groundwater samples for laboratory analysis.

The objective of most groundwater quality monitoring programs is to obtain samples that are representative of existing groundwater conditions, or samples that retain the physical and chemical properties of the groundwater within an aquifer.

One of the most important aspects of groundwater sampling is acquiring samples that are free of suspended silt, sediment, or other fine grained particulates. Fine grain materials may often have a variety of chemical components sorbed to the particle or have the ability to sorb chemicals from the aqueous phase to the particle, which will bias the subsequent analytical results.

Constituents known to have an affinity for fine-grained particulates are: polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs), and inorganics. Monitoring programs where these constituents are suspected or known to be prevalent must employ sampling methods that minimize particulate presence.

The "Low Stress/Low Flow" purging and sampling method will be utilized to purge the well to allow representative water from the formation to replace the standing water within the sampling zone of the well. Experience has shown that the low stress/low flow technique typically achieves representative groundwater samples with minimal particulate interference.

Lastly, in extreme cases "ultra-low flow" techniques have been employed at select sites where low stress/low flow methods were used, yet particulate-sensitive constituents continue to bias the analytical results, or excessive drawdown is produced using standard low stress/low flow methods due to the presence of low permeability materials within a well's screened zone. Ultra-low flow techniques are conducted at purging rates below 100 ml per minute, and should only be utilized after low stress/low flow methods have been attempted (see Section 2.2 for further discussion on the purging of wells prior to sample collection).

2 PROCEDURAL GUIDELINES

The following describes techniques for groundwater sampling: Low Stress/Low Flow Methods.

Low stress/low flow methods will be employed when it is critical to collect groundwater samples truly representative of the groundwater present, and to minimize the impact of sediment/colloid presence.

2.1 PREPARATORY REQUIREMENTS

Prior to groundwater sampling, an inspection will be performed on each well. The inspection will include:

- Inspecting the concrete pad for cracks
- Inspecting the protective steel cover
- Inspecting the integrity of the PVC well casing (to the extent possible)
- Inspecting the well caps
- Inspecting the well identification markings to confirm they are legible (if illegible, re-mark)
- Inspecting the locks to assess whether they are in good working condition.

Results of the well inspection will be documented on the Groundwater Sampling Log for each well. If the inspection indicates repairs are required, these will be performed prior to the next sampling event. Corrective actions implemented to repair well(s) will also be documented on the Groundwater Sampling Log and/or the field notebook for the facility.

Groundwater purging and sampling data will be recorded on the Groundwater Sampling Log.

2.2 WELL PURGING AND STABILIZATION MONITORING (LOW STRESS/LOW FLOW METHOD)

The procedure for sampling the monitoring wells is as follows:

1) Sampling equipment will first be decontaminated prior to each use by the following protocol:
   - Scrub equipment thoroughly in a low-sudsing detergent solution (*e.g.*, Alconox). Pump low-sudsing detergent solution through submersible pump for approximately 5 minutes, if utilized
   - Rinse equipment thoroughly with distilled water, and pump distilled water through submersible pump, if utilized
   - Wrap equipment in plastic for handling and/or storage until next use
   - Decontamination of disposable tubing, if used, will not be necessary
2) Calibrate field instrument and document calibration activity. Calibration shall be performed in accordance with manufacturer's recommendations, and noted on the Groundwater Sampling Log
3) An electric water level probe will be used to measure the depth from the top of the casing to the top of water to the nearest 0.01-ft. The measurement will be recorded in a dedicated field notebook and Groundwater Sampling Log
4) Measure the depth from the top of casing to the bottom of the well for the initial sampling event
5) Slowly lower the pump and/or tubing into the well positioning the pump intake at the mid-point of the well screen taking care to minimize disturbing the well
6) During the purging of the well, monitor and record the field indicator parameters (pH, temperature, conductivity, oxidation-reduction (redox) reaction potential (ORP), dissolved oxygen (DO), and turbidity)

approximately every 5 minutes. Stabilization is considered achieved when the final groundwater flow rate is achieved, and three consecutive readings for each parameter are within the following limits:

pH	±0.1 pH units for three consecutive readings;
temperature	±3 percent for three consecutive readings;
conductivity	±3 percent for three consecutive readings;
ORP	±10 millivolts (mV) for three consecutive readings;
DO	±10 percent for three consecutive readings; and
Turbidity	±10 percent for three consecutive readings or a final value of less than 5 nephelometric turbidity units (NTU).

7) Verify that drawdowns of 0.3 ft or less are maintained and make adjustments as necessary. Record drawdown measurements and note adjustments in pumping rates as necessary on the Groundwater Sampling Log. If drawdowns of 0.3 ft or less cannot be maintained utilize ultra-low flow purge techniques. However, if ultra-low flow purging still results in excessive drawdown, the well will be purged "dry" and allowed to recharge, and the sample will be collected as soon as sufficient water is present to obtain the necessary sample volume

8) Obtain a sample for chemical analyses immediately upon stabilization of field parameter measurements. Field filter the sample for dissolved metals using a 0.45-micron filter prior to preserving with acid. Samples are to be collected in the order of volatility as follows: TOC/TOX (or VOCs) and dissolved metals.

If after 2 hours of purging the indicator parameters have not stabilized, as recommended in the USEPA guidance, the purging will be discontinued and the sample will be collected with an explanation of attempts to achieve stabilization.

Either a decontaminated submersible pump or peristaltic pump (for shallow wells only) may be utilized to purge each well. If a submersible pump is utilized in the purging process, then it will be decontaminated prior to and after sampling each well. Sampling equipment must be protected from the ground surface by a clean plastic sheet laid around the work area. Water from purging will not be containerized.

2.3 SAMPLE PRESERVATION

Sample bottles will be labeled with sample identification, collection date and time, filtration/preservative status. Sample bottles will be filled and capped securely and immediately preserved (if required) and stored at 4 degrees Celsius in a cooler.

The cooler and samples will be prepared for shipment or transport by the following procedure:

1) Prepare cooler(s) for shipment.
   - Tape drain(s) of cooler shut
   - Place mailing label with laboratory address on top of cooler(s).
2) Arrange sample containers in a manner to prevent potential sample container breakage.
3) Confirm the bottle labels are completed correctly. Place clear tape over bottle labels to prevent moisture accumulation from causing the label to peel off.
4) Seal sample containers within plastic zip-lock bags to prevent packing material from contacting samples.
5) Place packing material at the bottom of the cooler to act as a cushion for the sample containers.
6) Fill remaining spaces with packing material.

7) Confirm containers are firmly packed in cooler.

8) If ice is required to preserve the samples, cubes should be repackaged in double zip-lock bags, and placed on top of the packing material.

9) Sign COC form (or obtain signature) and indicate the time and date it was relinquished to Federal Express or other carrier, as appropriate.

10) Separate copies of COC forms. Seal proper copies within a large zip-lock bag and tape to inside lid of cooler. Retain copies of forms in-house.

11) Close lid and latch.

12) Tape cooler shut on both ends, making several complete revolutions with strapping tape.

13) Relinquish to Federal Express or other courier service. Retain airbill receipt for project records (Note: Samples will be shipped for "NEXT DAY" delivery).

If samples are delivered directly to the laboratory, or the laboratories in-house courier, by the sampling team, the packaging/shipping requirements may be omitted. COC procedures; however, must be strictly maintained.

2.4 SAMPLE MANAGEMENT AND CHAIN-OF-CUSTODY

COC procedures document the history of sample containers and samples from the time of preparation of sample containers through sample collection, shipment, and analysis. A sample is considered in custody if:

- The sample is in the sampler's physical possession
- The sample is secured by the sampler to prevent tampering
- The sample is secured by the sampler employee in an area that is restricted to authorized personnel.

To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, a COC record will be completed for each sample at each sampling location. Each time the samples are transferred, signatures of the person relinquishing and receiving the samples, as well as the date and time, will be documented.

Parallel field notebook/Groundwater Sampling Log and COC records will be maintained. Recorded information will include:

- Sampling Location
- Time and Date
- Sampling Method
- Method of Preservation.

Additionally, the field notebook will also include information on weather conditions, depth to water, total depth of the well, field parameter and instrument calibration records and other useful or pertinent information. The notebook will be kept at the facility or with their designated contractor.

2.5 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) MEASURES

Field QA/QC procedures will consist of collecting one equipment blank (if reusable equipment is used) and one duplicate sample (one additional sample from one of the wells) for each sampling event. The duplicate sample will be assigned a separate sample identification and submitted to the laboratory "blind".

The procedure for collecting an equipment blank will be to pass distilled water through the decontaminated sampling device into a laboratory-supplied sample bottles. An equipment blank sample will not be required if disposable sampling equipment is used.

3 REFERENCES

USEPA Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures (EPA/540/S -95/504).

USEPA (Region 1) Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells (EQASOP-GW 001), January 19, 2010.

USEPA RCRA Groundwater Monitoring: Draft Technical Guidance (EPA/530-R-93-001).

MDEQ RRD Operational Memorandum No. 2: Sampling and Analysis.

APPENDIX B

Groundwater Sampling Logs

O'Brien & Gere Engineers, Inc. **Standard Groundwater Sampling Log**

Date	11/20/2019-11/21/2019		
Site Name	RACER Coldwater Rd	Weather	Light Rain, 40's (°F)
Location	Flint, MI	Well #	B-7
Project No.	72202	Evacuation Method	Whale Pump-Peristaltic
Personnel	KBS	Sampling Method	Purged Dry

Well Information:

Depth of Well *	29.11	ft.
Depth to Water *	16.57 - 11/21 was 26.05	ft.
Length of Water Column	12.54	ft.
Volume of Water in Well	2.04	gal.(s)
3X Volume of Water in Well	6.13	gal.(s)

Water Volume /ft. for:	
X	2" Diameter Well = 0.163 X LWC
	4" Diameter Well = 0.653 X LWC
	6" Diameter Well = 1.469 X LWC

Volume removed before sampling: 4 gal.(s)
Did well go dry? yes

* Measurements taken from: X Well Casing; Protective Casing; (Other, Specify)

Instrument Calibration:

	Calibrated within range
pH	Yes
ORP	Yes
Conductivity	Yes
DO	Yes

Water parameters:

	Drawdown measured (0.3 feet or less)	Temperature Celsius (±3 percent)	Conductivity mS/cm (±3 percent)	Dissolved Oxygen mg/L (±10 percent)	pH (±0.1 pH units)	ORP mV (±10 millivolts)	Turbidity NTUs (±10 percent)
initial		12.0	0.86	6.79	7.60	159.5	
5 min	24.57	12.6	0.84	7.30	7.57	157.9	55.90
10 min	26.95	12.5	0.88	5.67	7.44	158.1	50.7
15 min	27.74	DRY					
20 min	11/21/2019	No readings collected					51.1
25 min							
30 min							
35 min							
40 min							
45 min							
50 min							
55 min							
60 min							
65 min							
70 min							
75 min							
80 min							
85 min							
90 min							

Water Sample:
Time Collected 11/21/2019 13:06

Physical Appearance at Start		Physical Appearance at Sampling	
Color	light brown	Color	light brown
Odor	none	Odor	none
Turbidity (> 100 NTU)	55.90	Turbidity (> 100 NTU)	51.10
Sheen/Free Product	none	Sheen/Free Product	none

Samples collected:

Analyses	# Bottles	Bottle size/type	Preservative	Field Filtered
TOC	2	40 ml glass voa	H_2SO_4	
TOX	1	250 ml amber	H_2SO_4	
Dissolved Metals	1	125 ml plastic	HNO_3	yes
Specific Conductivity	1	250 ml plastic	None	

Notes:

O'Brien & Gere Engineers, Inc. **Standard Groundwater Sampling Log**

Date	11/20/2019-11/21/2019		
Site Name	RACER Coldwater Rd	Weather	Partly Cloudy/Light Rain, 40's (°F
Location	Flint, MI	Well #	B-9
Project No.	72202	Evacuation Method	Whale Pump-Peristaltic
Personnel	KBS	Sampling Method	Purge Dry

Well Information:

Depth of Well *	25.21	ft.
Depth to Water *	3.00 - 11/21 was 5.23	ft.
Length of Water Column	22.21	ft.
Volume of Water in Well	3.62	gal.(s)
3X Volume of Water in Well	10.86	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling: 4.1 gal.(s)
Did well go dry? yes

* Measurements taken from: X Well Casing; Protective Casing; (Other, Specify)

Instrument Calibration:

	Calibrated within range
pH	Yes
ORP	Yes
Conductivity	Yes
DO	Yes

Water parameters:

	Drawdown measured (0.3 feet or less)	Temperature Celsius (±3 percent)	Conductivity mS/cm (±3 percent)	Dissolved Oxygen mg/L (±10 percent)	pH (±0.1 pH units)	ORP mV (±10 millivolts)	Turbidity NTUs (±10 percent)
initial	7.08	13.2	2.76	8.84	6.92	115.6	308
5 min	13.50	13.1	2.48	4.59	7.07	109.3	112
10 min		12.8	2.52	4.11	7.05	106.8	91
15 min	23.00	DRY					
20 min							
25 min	11/21/2019						
30 min	6.91	11.5	2.67	4.00		63.2	84.6
35 min	7.09	11.3	2.01	3.12		39.5	46.8
40 min							
45 min							
50 min							
55 min							
60 min							
65 min							
70 min							
75 min							
80 min							
85 min							
90 min							

Water Sample:
Time Collected 11/21/2019 11:12

Physical Appearance at Start		Physical Appearance at Sampling	
Color	light brown	Color	cloudy
Odor	None	Odor	None
Turbidity (> 100 NTU)	308	Turbidity (> 100 NTU)	46.8
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Analyses	# Bottles	Bottle size/type	Preservative	Field Filtered
TOC	2	40 ml glass voa	H_2SO_4	
TOX	1	250 ml amber	H_2SO_4	
Dissolved Metals	1	125 ml plastic	HNO_3	yes
Specific Conductivity	1	250 ml plastic	None	

Notes:
Issue with pH probe on second day of sampling. No pH readings collected

O'Brien & Gere Engineers, Inc. **Standard Groundwater Sampling Log**

Date	11/20/2019		
Site Name	RACER Coldwater Rd	Weather	Light Rain, 40's (°F)
Location	Flint, MI	Well #	B-18A
Project No.	72202	Evacuation Method	Whale Pump
Personnel	KBS	Sampling Method	3 well volumes

Well Information:

Depth of Well *	43.50	ft.
Depth to Water *	20.22	ft.
Length of Water Column	23.28	ft.
Volume of Water in Well	3.79	gal.(s)
3X Volume of Water in Well	11.38	gal.(s)

Water Volume /ft. for:
- X 2" Diameter Well = 0.163 X LWC
- 4" Diameter Well = 0.653 X LWC
- 6" Diameter Well = 1.469 X LWC

Volume removed before sampling: 12 gal.(s)
Did well go dry? no

* Measurements taken from: X Well Casing; Protective Casing; (Other, Specify)

Instrument Calibration:

	Calibrated within range
pH	Yes
ORP	Yes
Conductivity	Yes
DO	Yes

Water parameters:

	Drawdown measured (0.3 feet or less)	Temperature Celsius (±3 percent)	Conductivity mS/cm (±3 percent)	Dissolved Oxygen mg/L (±10 percent)	pH (±0.1 pH units)	ORP mV (±10 millivolts)	Turbidity NTUs (±10 percent)
initial		10.7	1.04	5.52	7.47	147.1	53.5
5 min		11.0	1.06	2.28	7.26	147.4	8.34
10 min		11.2	1.06	1.83	7.22	148.3	18.0
15 min		11.4	1.06	1.42	7.23	144.1	43.7
20 min		11.4	1.06	1.14	7.23	134.2	43.8
25 min							
30 min	41.15	11.1	1.08	0.41	7.21	26.4	29.70
35 min	41.95	11.2	1.07	0.55	7.23	35.2	18.4
40 min	41.95	11.2	1.08	3.46	7.30	59.3	
45 min							
50 min							
55 min							
60 min							
65 min							
70 min							
75 min							
80 min							
85 min							
90 min							

Water Sample:
Time Collected 13:03

Physical Appearance at Start		Physical Appearance at Sampling	
Color	slightly cloudy	Color	Clear
Odor	None	Odor	None
Turbidity (> 100 NTU)	53.4	Turbidity (> 100 NTU)	18.4
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Analyses	# Bottles	Bottle size/type	Preservative	Field Filtered
TOC	2	40 ml glass voa	H_2SO_4	
TOX	1	250 ml amber	H_2SO_4	
Dissolved Metals	1	125 ml plastic	HNO_3	yes
Specific Conductivity	1	250 ml plastic	None	

Notes:

O'Brien & Gere Engineers, Inc. **Standard Groundwater Sampling Log**

Date	11/20/2019-11/21/2019		
Site Name	RACER Coldwater Rd	Weather	Light Rain, 40's (°F)
Location	Flint, MI	Well #	B-19Ar
Project No.	72202	Evacuation Method	Whale Pump
Personnel	KBS	Sampling Method	Purge Dry

Well Information:

Depth of Well *	46.20	ft.
Depth to Water *	37.85 - 11/21 was 37.65	ft.
Length of Water Column	8.35	ft.
Volume of Water in Well	1.36	gal.(s)
3X Volume of Water in Well	4.08	gal.(s)

Water Volume /ft. for:	
X	2" Diameter Well = 0.163 X LWC
	4" Diameter Well = 0.653 X LWC
	6" Diameter Well = 1.469 X LWC

Volume removed before sampling 1.8 gal.(s)
Did well go dry? yes

* Measurements taken from [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

	Calibrated within range
pH	Yes
ORP	Yes
Conductivity	Yes
DO	Yes

Water parameters:

	Drawdown measured (0.3 feet or less)	Temperature Celsius (±3 percent)	Conductivity mS/cm (±3 percent)	Dissolved Oxygen mg/L (±10 percent)	pH (±0.1 pH units)	ORP mV (±10 millivolts)	Turbidity NTUs (±10 percent)
initial		initial 10.6	initial 1.09	initial 2.60	initial 7.70	initial 113.7	initial 1000+
5 min	41.61	11.1	1.09	0.73	7.36	104.3	1000+
10 min	43.44	DRY					
15 min							
20 min	11/21/2019	No readings collected					
25 min							
30 min							
35 min							
40 min							
45 min							
50 min							
55 min							
60 min							
65 min							
70 min							
75 min							
80 min							
85 min							
90 min							

Water Sample:
Time Collected 11/21/2019 13:30

Physical Appearance at Start		Physical Appearance at Sampling	
Color	light brown	Color	light brown
Odor	None	Odor	None
Turbidity (> 100 NTU)	1000+	Turbidity (> 100 NTU)	1000+
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Analyses	# Bottles	Bottle size/type	Preservative	Field Filtered
TOC	2	40 ml glass voa	H_2SO_4	
TOX	1	250 ml amber	H_2SO_4	
Dissolved Metals	1	125 ml plastic	HNO_3	yes
Specific Conductivity	1	250 ml plastic	None	

Notes:

O'Brien & Gere Engineers, Inc. **Standard Groundwater Sampling Log**

Date	11/20/2019-11/21/2019		
Site Name	RACER Coldwater Rd	Weather	Partly Cloudy/Light Rain, 40's (°F)
Location	Flint, MI	Well #	B-24r
Project No.	72202	Evacuation Method	Whale Pump-Peristaltic
Personnel	KBS	Sampling Method	purge dry

Well Information:

Depth of Well *	30.40	ft.
Depth to Water *	12.24 - 11/21 was 11.80	ft.
Length of Water Column	18.16	ft.
Volume of Water in Well	2.96	gal.(s)
3X Volume of Water in Well	8.88	gal.(s)

Water Volume /ft. for:	
X	2" Diameter Well = 0.163 X LWC
	4" Diameter Well = 0.653 X LWC
	6" Diameter Well = 1.469 X LWC

Volume removed before sampling 7.8 gal.(s)
Did well go dry? yes

* Measurements taken from [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

	Calibrated within range
pH	Yes
ORP	Yes
Conductivity	Yes
DO	Yes

Water parameters:

	Drawdown measured (0.3 feet or less)	Temperature Celsius (±3 percent)	Conductivity mS/cm (±3 percent)	Dissolved Oxygen mg/L (±10 percent)	pH (±0.1 pH units)	ORP mV (±10 millivolts)	Turbidity NTUs (±10 percent)
initial	14.74	11.5	1.21	2.11	7.47	110.3	460
5 min	20.65	12.4	1.21	0.62	7.29	105.1	700
10 min	22.75	12.5	1.22	1.27	7.29	101.3	267
15 min	25.54	12.1	1.22	0.37	7.26	48.9	107
20 min		11.8	1.20	0.30	7.26	26.2	
25 min	28.89	DRY					
30 min	11/21/2019						
35 min	12.29	8.4	1.22	7.28		-55.4	99
40 min	13.05	9.5	1.25	8.51		-12.4	63.8
45 min							
50 min							
55 min							
60 min							
65 min							
70 min							
75 min							
80 min							
85 min							
90 min							

Water Sample:
Time Collected 11/21/2019 12:40

Physical Appearance at Start		Physical Appearance at Sampling	
Color	light brown	Color	cloudy
Odor	none	Odor	none
Turbidity (> 100 NTU)	460	Turbidity (> 100 NTU)	63.80
Sheen/Free Product	none	Sheen/Free Product	none

Samples collected:

Analyses	# Bottles	Bottle size/type	Preservative	Field Filtered
TOC	2	40 ml glass voa	H_2SO_4	
TOX	1	250 ml amber	H_2SO_4	
Dissolved Metals	1	125 ml plastic	HNO_3	yes
Specific Conductivity	1	250 ml plastic	None	

Notes:
Issue with pH probe on second day of sampling. No pH readings collected

O'Brien & Gere Engineers, Inc. **Standard Groundwater Sampling Log**

Date	11/20/2019-11/21/2019		
Site Name	RACER Coldwater Rd	Weather	Partly Cloudy/Light Rain, 40's (°F)
Location	Flint, MI	Well #	B-28
Project No.	72202	Evacuation Method	Whale Pump-Peristaltic
Personnel	KBS	Sampling Method	purge dry

Well Information:

Depth of Well *	32.92	ft.
Depth to Water *	4.91 - 11/21 was 4.69	ft.
Length of Water Column	28.01	ft.
Volume of Water in Well	4.57	gal.(s)
3X Volume of Water in Well	13.70	gal.(s)

Water Volume /ft. for:	
X	2" Diameter Well = 0.163 X LWC
	4" Diameter Well = 0.653 X LWC
	6" Diameter Well = 1.469 X LWC

Volume removed before sampling 13.1 gal.(s)
Did well go dry? yes

* Measurements taken from [X] Well Casing [ ] Protective Casing [ ] (Other, Specify)

Instrument Calibration:

	Calibrated within range
pH	Yes
ORP	Yes
Conductivity	Yes
DO	Yes

Water parameters:

	Drawdown measured (0.3 feet or less)	Temperature Celsius (±3 percent)	Conductivity mS/cm (±3 percent)	Dissolved Oxygen mg/L (±10 percent)	pH (±0.1 pH units)	ORP mV (±10 millivolts)	Turbidity NTUs (±10 percent)
initial	5.8	11.5	0.86	7.00	7.77	53.8	86.90
5 min	13.03	12.4	0.85	1.79	7.45	-30.3	59.30
10 min	19.72	12.3	0.85	4.19	7.51	-10.5	32.6
15 min		12.3	0.85	3.29	7.46	-14.9	21.7
20 min		12.4	0.87	1.33	7.38	-31.3	35.8
25 min		12.3	0.87	0.50	7.35	-49.2	67.7
30 min	25.56	12.2	0.87	0.68	7.36	-57.4	51.10
35 min	25.95	12.2	0.85	0.92	7.36	-55.0	25.9
40 min	28.61	12.5	0.87	2.27	7.39	-47.8	55.5
45 min	30.80	12.2	0.82	0.36	7.34	-37.1	96.9
50 min	31.03	DRY					
55 min							
60 min		10.2	0.97	4.44		-21.6	92.3
65 min	5.96	10.1	0.92	3.77		-15.2	39.7
70 min							
75 min							
80 min							
85 min							
90 min							

Water Sample:
Time Collected 11/21/2019 12:00

Physical Appearance at Start		Physical Appearance at Sampling	
Color	cloudy	Color	cloudy
Odor	None	Odor	None
Turbidity (> 100 NTU)	86.90	Turbidity (> 100 NTU)	39.70
Sheen/Free Product	None	Sheen/Free Product	None

Samples collected:

Analyses	# Bottles	Bottle size/type	Preservative	Field Filtered
TOC	2	40 ml glass voa	H_2SO_4	
TOX	1	250 ml amber	H_2SO_4	
Dissolved Metals	1	125 ml plastic	HNO_3	yes
Specific Conductivity	1	250 ml plastic	None	

Notes: DUP-2 Collected
Issue with pH probe on second day of sampling. No pH readings collected

APPENDIX C

Analytical Results

Analytical Laboratory Report

Supplemental Report

Report ID: S09608.01(02)
Generated on 12/30/2019
Replaces report S09608.01(01) generated on 12/23/2019

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 313-333-0211 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Laverty (johnlaverty@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S09608.01-S09608.08
Project: RACER Coldwater Rd
Collected Date(s): 11/20/2019 - 11/21/2019
Submitted Date/Time: 11/21/2019 15:50
Sampled by: Kevin Schneider
P.O. #: 11900504

Table of Contents

Maya Murshak
Technical Director

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

All analyses completed

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched

Method Summary

Method	Version
E120.1	EPA Method 120.1 Revision 1982
E200.8	EPA Method 200.8 Revision 5.4
SM5310C	Standard Method 5310C 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007

Sample Summary (8 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S09608.01	B-18A	Groundwater	11/20/19 13:03
S09608.02	B-9	Groundwater	11/21/19 11:12
S09608.03	B-28	Groundwater	11/21/19 12:00
S09608.04	B-24r	Groundwater	11/21/19 12:40
S09608.05	B-7	Groundwater	11/21/19 13:06
S09608.06	B-19Ar	Groundwater	11/21/19 13:30
S09608.07	DUP-2	Groundwater	11/21/19 00:01
S09608.08	Equipment Blank-1	Water	11/21/19 14:20

Lab Sample ID: S09608.01
Sample Tag: B-18A
Collected Date/Time: 11/20/2019 13:03
Matrix: Groundwater
COC Reference: 116019

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR
1	250ml Amber	H2SO4	Yes	3.9	IR
1	250ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	11/22/19 14:00	CCM	

Inorganics

Method: E120.1, Run Date: 12/02/19 12:26, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Conductivity	1,055	1		umhos/cm	1		

Method: SM5310C, Run Date: 11/26/19 19:33, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	2.2	1		mg/L	1		

Metals

Method: E200.8, Run Date: 11/22/19 16:07, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium, Dissolved	Not detected	0.005		mg/L	5	7440-47-3	
Copper, Dissolved	Not detected	0.005		mg/L	5	7440-50-8	
Nickel, Dissolved	Not detected	0.005		mg/L	5	7440-02-0	
Zinc, Dissolved	0.008	0.005		mg/L	5	7440-66-6	

Other / Misc.

Method: , Run Date: 12/30/19 10:00, Analyst: MMC

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Misc. Special Project*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S09608.02
Sample Tag: B-9
Collected Date/Time: 11/21/2019 11:12
Matrix: Groundwater
COC Reference: 116019

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR
1	250ml Amber	H2SO4	Yes	3.9	IR
1	250ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	11/22/19 14:00	CCM	

Inorganics

Method: E120.1, Run Date: 12/02/19 12:28, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Conductivity	2,620	1		umhos/cm	1		

Method: SM5310C, Run Date: 11/26/19 19:55, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	3.2	1		mg/L	1		

Metals

Method: E200.8, Run Date: 11/22/19 16:09, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium, Dissolved	Not detected	0.005		mg/L	5	7440-47-3	
Copper, Dissolved	Not detected	0.005		mg/L	5	7440-50-8	
Nickel, Dissolved	0.006	0.005		mg/L	5	7440-02-0	
Zinc, Dissolved	0.009	0.005		mg/L	5	7440-66-6	

Other / Misc.

Method: , Run Date: 12/30/19 10:00, Analyst: MMC

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Misc. Special Project*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S09608.03
Sample Tag: B-28
Collected Date/Time: 11/21/2019 12:00
Matrix: Groundwater
COC Reference: 116019

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR
1	250ml Amber	H2SO4	Yes	3.9	IR
1	250ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	11/22/19 14:00	CCM	

Inorganics

Method: E120.1, Run Date: 12/02/19 12:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Conductivity	833	1		umhos/cm	1		

Method: SM5310C, Run Date: 11/26/19 20:17, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	2.1	1		mg/L	1		

Metals

Method: E200.8, Run Date: 11/22/19 16:11, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium, Dissolved	Not detected	0.005		mg/L	5	7440-47-3	
Copper, Dissolved	Not detected	0.005		mg/L	5	7440-50-8	
Nickel, Dissolved	Not detected	0.005		mg/L	5	7440-02-0	
Zinc, Dissolved	Not detected	0.005		mg/L	5	7440-66-6	

Other / Misc.

Method: , Run Date: 12/30/19 10:00, Analyst: MMC

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Misc. Special Project*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S09608.04
Sample Tag: B-24r
Collected Date/Time: 11/21/2019 12:40
Matrix: Groundwater
COC Reference: 116019

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR
1	250ml Amber	H2SO4	Yes	3.9	IR
1	250ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	11/22/19 14:00	CCM	

Inorganics

Method: E120.1, Run Date: 12/02/19 12:32, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Conductivity	1,216	1		umhos/cm	1		

Method: SM5310C, Run Date: 11/26/19 20:39, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	4.0	1		mg/L	1		

Metals

Method: E200.8, Run Date: 11/22/19 16:13, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium, Dissolved	Not detected	0.005		mg/L	5	7440-47-3	
Copper, Dissolved	Not detected	0.005		mg/L	5	7440-50-8	
Nickel, Dissolved	Not detected	0.005		mg/L	5	7440-02-0	
Zinc, Dissolved	0.007	0.005		mg/L	5	7440-66-6	

Other / Misc.

Method: , Run Date: 12/30/19 10:00, Analyst: MMC

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Misc. Special Project*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S09608.05
Sample Tag: B-7
Collected Date/Time: 11/21/2019 13:06
Matrix: Groundwater
COC Reference: 116019

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR
1	250ml Amber	H2SO4	Yes	3.9	IR
1	250ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	11/22/19 14:00	CCM	

Inorganics

Method: E120.1, Run Date: 12/02/19 12:34, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Conductivity	910	1		umhos/cm	1		

Method: SM5310C, Run Date: 11/26/19 21:01, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	5.4	1		mg/L	1		

Metals

Method: E200.8, Run Date: 11/22/19 16:15, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium, Dissolved	Not detected	0.005		mg/L	5	7440-47-3	
Copper, Dissolved	Not detected	0.005		mg/L	5	7440-50-8	
Nickel, Dissolved	Not detected	0.005		mg/L	5	7440-02-0	
Zinc, Dissolved	0.005	0.005		mg/L	5	7440-66-6	

Other / Misc.

Method: , Run Date: 12/30/19 10:00, Analyst: MMC

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Misc. Special Project*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S09608.06
Sample Tag: B-19Ar
Collected Date/Time: 11/21/2019 13:30
Matrix: Groundwater
COC Reference: 116019

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR
1	250ml Amber	H2SO4	Yes	3.9	IR
1	250ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	11/22/19 14:00	CCM	

Inorganics

Method: E120.1, Run Date: 12/02/19 12:36, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Conductivity	1,121	1		umhos/cm	1		

Method: SM5310C, Run Date: 11/26/19 21:24, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	2.4	1		mg/L	1		

Metals

Method: E200.8, Run Date: 11/22/19 16:17, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium, Dissolved	0.007	0.005		mg/L	5	7440-47-3	
Copper, Dissolved	0.006	0.005		mg/L	5	7440-50-8	
Nickel, Dissolved	0.012	0.005		mg/L	5	7440-02-0	
Zinc, Dissolved	0.023	0.005		mg/L	5	7440-66-6	

Other / Misc.

Method: , Run Date: 12/30/19 10:00, Analyst: MMC

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Misc. Special Project*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S09608.07
Sample Tag: DUP-2
Collected Date/Time: 11/21/2019 00:01
Matrix: Groundwater
COC Reference: 116019

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR
1	250ml Amber	H2SO4	Yes	3.9	IR
1	250ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	11/22/19 14:00	CCM	

Inorganics

Method: E120.1, Run Date: 12/02/19 12:38, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Conductivity	839	1		umhos/cm	1		

Method: SM5310C, Run Date: 11/26/19 21:46, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	2.1	1		mg/L	1		

Metals

Method: E200.8, Run Date: 11/22/19 16:19, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium, Dissolved	Not detected	0.005		mg/L	5	7440-47-3	
Copper, Dissolved	Not detected	0.005		mg/L	5	7440-50-8	
Nickel, Dissolved	Not detected	0.005		mg/L	5	7440-02-0	
Zinc, Dissolved	0.005	0.005		mg/L	5	7440-66-6	

Other / Misc.

Method: , Run Date: 12/30/19 10:00, Analyst: MMC

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Misc. Special Project*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Lab Sample ID: S09608.08
Sample Tag: Equipment Blank-1
Collected Date/Time: 11/21/2019 14:20
Matrix: Water
COC Reference: 116019

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.9	IR
2	40ml Glass	H2SO4	Yes	3.9	IR
1	125ml Amber	H2SO4	Yes	3.9	IR
1	250ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	11/22/19 14:00	CCM	

Inorganics

Method: E120.1, Run Date: 12/02/19 12:40, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Conductivity	4.90	1		umhos/cm	1		

Method: SM5310C, Run Date: 11/26/19 22:08, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
TOC	Not detected	1		mg/L	1		

Metals

Method: E200.8, Run Date: 11/22/19 16:05, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chromium, Dissolved	Not detected	0.005		mg/L	2	7440-47-3	
Copper, Dissolved	Not detected	0.005		mg/L	2	7440-50-8	
Nickel, Dissolved	Not detected	0.005		mg/L	2	7440-02-0	
Zinc, Dissolved	Not detected	0.005		mg/L	2	7440-66-6	

Other / Misc.

Method: , Run Date: 12/30/19 10:00, Analyst: MMC

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Misc. Special Project*	Completed				1		O

O-Analysis performed by outside laboratory. See attached report.

Merit Laboratories Login Checklist

Lab Set ID: S09608
Client: OBG02 (O'Brien & Gere Engineers, Inc.)
Project: RACER Coldwater Rd
Submitted: 11/21/2019 15:50 Login User: SRS

Attention: Clifford Yantz
Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 313-333-0211 FAX:
Email: Clifford.Yantz@obg.com

Selection				Description	Note
Sample Receiving					
01.	[X] Yes	[ ] No	[ ] N/A	Samples are received at 4C +/- 2C Thermometer #	IR 4.6
02.	[X] Yes	[ ] No	[ ] N/A	Received on ice/ cooling process begun	
03.	[ ] Yes	[X] No	[ ] N/A	Samples shipped	
04.	[ ] Yes	[X] No	[ ] N/A	Samples left in 24 hr. drop box	
05.	[ ] Yes	[ ] No	[X] N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody					
06.	[X] Yes	[ ] No	[ ] N/A	COC adequately filled out	
07.	[X] Yes	[ ] No	[ ] N/A	COC signed and relinquished to the lab	
08.	[X] Yes	[ ] No	[ ] N/A	Sample tag on bottles match COC	
09.	[X] Yes	[ ] No	[ ] N/A	Subcontracting needed? Subcontacted to:	Test America
Preservation					
10.	[X] Yes	[ ] No	[ ] N/A	Do sample have correct chemical preservation	
11.	[X] Yes	[ ] No	[ ] N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	[ ] Yes	[X] No	[ ] N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions					
13.	[X] Yes	[ ] No	[ ] N/A	All bottles intact	
14.	[X] Yes	[ ] No	[ ] N/A	Appropriate analytical bottles are used	
15.	[X] Yes	[ ] No	[ ] N/A	Merit bottles used	
16.	[X] Yes	[ ] No	[ ] N/A	Sufficient sample volume received	
17.	[ ] Yes	[X] No	[ ] N/A	Samples require laboratory filtration	
18.	[X] Yes	[ ] No	[ ] N/A	Samples submitted within holding time	
19.	[ ] Yes	[X] No	[ ] N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S09608 Initials: SRS

Client: OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd

Submitted: 11/21/2019 15:50 Login User:

Attention: Clifford Yantz
Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 313-333-0211 FAX:
Email: Clifford.Yantz@obg.com

Lab ID	125 ml Plastic HNO_3	250 ml Plastic HNO_3	1 L Plastic HNO_3	250 ml Plastic H_2SO_4	125 ml Amber H_2SO_4	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber $PbCO_3$ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S09608.01	X								X					
S09608.02	X								X					
S09608.03	X								X					
S09608.04	X								X					
S09608.05	X								X					
S09608.06	X								X					
S09608.07	X								X					
S09608.08	X								X					
S09608.08					X				X					

Prepared by Merit Laboratories

Merit Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

116019

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: Clifford Yantz
COMPANY: O'Brien & Gere part of Ramboll
ADDRESS: 2260 East Saginaw
CITY: East Lansing STATE: MI ZIP CODE: 48823
PHONE NO.: 313-333-0211 FAX NO.: P.O. NO.:
E-MAIL ADDRESS: clifford.yantz@obg.com QUOTE NO.:

INVOICE TO

CONTACT NAME: X SAME
COMPANY:
ADDRESS:
CITY: STATE: ZIP CODE:
PHONE NO.: E-MAIL ADDRESS:

PROJECT NO./NAME: RACER Coldwater Rd
SAMPLER(S) - PLEASE PRINT/SIGN NAME: Chris Schneider

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications: ☐ OHIO VAP ☐ Drinking Water ☐ DoD ☐ NPDES
Project Locations: ☐ Detroit ☐ New York ☐ Other
Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	Dissolved metals	TDC	specific conductivity	TOX	Special Instructions
096005.01	11/20/19	1303	B-18A	GW	5	1		1	3				X	X	X	X	Dissolved metals
.02	11/21/19	1112	B-9										X	X	X	X	were field filtered
.03		1200	B-28										X	X	X	X	
.04		1240	B-24r										X	X	X	X	Metals Are:
.05		1306	B-7										X	X	X	X	Cu, Cr, Ni, Zn
.06		1330	B-19Ar										X	X	X	X	
.07		—	DUP-2										X	X	X	X	
.08		1420	Equipment Blank-1	Q	5	1		1	3				X	X	X	X	

RELINQUISHED BY: SIGNATURE/ORGANIZATION	OBG ☒ Sampler	DATE 11/21/19	TIME 1425
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE 11/21/19	TIME 1425
RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE 11/21/19	TIME 1515
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE 11/21/19	TIME 1550

RELINQUISHED BY: SIGNATURE/ORGANIZATION — DATE — TIME
RECEIVED BY: SIGNATURE/ORGANIZATION — DATE — TIME

SEAL NO. — SEAL INTACT YES ☐ NO ☐ — INITIALS
SEAL NO. — SEAL INTACT YES ☐ NO ☐ — INITIALS

NOTES: 4.6 TEMP. ON ARRIVAL

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Michigan
10448 Citation Drive
Suite 200
Brighton, MI 48116
Tel: (810)229-2763

Laboratory Job ID: 190-21664-1
Client Project/Site: S09608/TOX

For:
Merit Laboratories
2680 E Lansing Drive
East Lansing, Michigan 48823

Attn: John Laverty

Sue Schafer

Authorized for release by:
12/27/2019 5:11:16 PM

Sue Schafer, Project Manager II
(810)229-2763
sue.schafer@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Sample Summary

Client: Merit Laboratories
Project/Site: S09608/TOX

Job ID: 190-21664-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
190-21664-1	S09608.01	Ground Water	11/20/19 13:03	11/25/19 09:40	
190-21664-2	S09608.02	Ground Water	11/21/19 11:12	11/25/19 09:40	
190-21664-3	S09608.03	Ground Water	11/21/19 12:00	11/25/19 09:40	
190-21664-4	S09608.04	Ground Water	11/21/19 12:40	11/25/19 09:40	
190-21664-5	S09608.05	Ground Water	11/21/19 13:06	11/25/19 09:40	
190-21664-6	S09608.06	Ground Water	11/21/19 13:30	11/25/19 09:40	
190-21664-7	S09608.07	Ground Water	11/21/19 00:01	11/25/19 09:40	
190-21664-8	S09608.08	Water	11/21/19 14:20	11/25/19 09:40	

Job ID: 190-21664-1

Laboratory: Eurofins TestAmerica, Michigan

Narrative

Job Narrative
190-21664-1

Comments
No additional comments.

Receipt
The samples were received on 11/25/2019 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.8º C.

General Chemistry
Method 9020B: Breakthrough exceeded 10% for the following sample:(500-173819-F-2-E). Re-analysis was performed with concurring results. The data have been reported.

Method 9020B: Sample replicate results are outside 20% RPD requirement. Reanalysis was not performed due to sample replicate will be analyzed out of hold. The data has been reported

(500-173819-F-2-E)

Method 9020B: The native sample, matrix spike, and matrix spike duplicate (MS/MSD) associated with preparation batch 680-601031 and analytical batch 680-601162 were performed at the same dilution. Due to the additional level of analyte present in the spiked samples, the concentration of Halogens,Total Organic in the MS/MSD was above the instrument calibration range. The data have been reported and qualified.

Method 9020B: Breakthrough exceeded 10% for the following sample:S09608.01 (190-21664-1). Re-analysis was performed with concurring results. The data have been reported.

Method 9020B: Sample duplicate results are outside 20% RPD requirement. Reanalysis was not performed due to sample replicate will be analyzed out of hold.The data has been reported.

S09608.01 (190-21664-1)

Method 9020B: Breakthrough exceeded 10% for the following samples:S09608.02 (190-21664-2), S09608.03 (190-21664-3), S09608.04 (190-21664-4) and (500-174231-D-1-A). Re-analysis was performed with concurring results. The data have been reported.

Method 9020B: Reanalysis of the following samples were performed outside of the analytical holding time due to failure of quality control parameters in the initial analysis. S09608.02 (190-21664-2), S09608.03 (190-21664-3) and S09608.04 (190-21664-4)

Method 9020B: Sample duplicate results are outside 20% RPD requirement. Reanalysis was not performed due to sample replicate will be analyzed out of hold. The data has been reported.

S09608.04 (190-21664-4)

Method 9020B: Breakthrough exceeded 10% for the following samples:S09608.05 (190-21664-5), S09608.06 (190-21664-6), S09608.07 (190-21664-7) and S09608.08 (190-21664-8). Re-analysis was performed with concurring results. The data have been reported.

Method 9020B: Reanalysis of the following samples were performed outside of the analytical holding time due to failure of quality control parameters in the initial analysis. S09608.05 (190-21664-5), S09608.06 (190-21664-6), S09608.07 (190-21664-7) and S09608.08 (190-21664-8)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample Results

Client: Merit Laboratories
Project/Site: S09608/TOX

Job ID: 190-21664-1

Client Sample ID: S09608.01
Lab Sample ID: 190-21664-1
Date Collected: 11/20/19 13:03
Matrix: Ground Water
Date Received: 11/25/19 09:40

General Chemistry

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	65		40		ug/L		12/18/19 05:00	12/18/19 10:04	1
TOX Result 1	76		40		ug/L		12/18/19 05:00	12/18/19 10:04	1
TOX Result 2	54		40		ug/L		12/18/19 05:00	12/18/19 10:04	1
TOX Dup	65		40		ug/L		12/18/19 05:00	12/18/19 10:04	1

Client Sample ID: S09608.02
Lab Sample ID: 190-21664-2
Date Collected: 11/21/19 11:12
Matrix: Ground Water
Date Received: 11/25/19 09:40

General Chemistry

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	77	H	40		ug/L		12/22/19 07:08	12/22/19 14:58	1
TOX Result 1	82	H	40		ug/L		12/22/19 07:08	12/22/19 14:58	1
TOX Result 2	72	H	40		ug/L		12/22/19 07:08	12/22/19 14:58	1
TOX Dup	77	H	40		ug/L		12/22/19 07:08	12/22/19 14:58	1

Client Sample ID: S09608.03
Lab Sample ID: 190-21664-3
Date Collected: 11/21/19 12:00
Matrix: Ground Water
Date Received: 11/25/19 09:40

General Chemistry

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	42	H	40		ug/L		12/22/19 07:08	12/22/19 15:36	1
TOX Result 1	40	H	40		ug/L		12/22/19 07:08	12/22/19 15:36	1
TOX Result 2	45	H	40		ug/L		12/22/19 07:08	12/22/19 15:36	1
TOX Dup	42	H	40		ug/L		12/22/19 07:08	12/22/19 15:36	1

Client Sample ID: S09608.04
Lab Sample ID: 190-21664-4
Date Collected: 11/21/19 12:40
Matrix: Ground Water
Date Received: 11/25/19 09:40

General Chemistry

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	59	H	40		ug/L		12/22/19 07:08	12/22/19 16:16	1
TOX Result 1	69	H	40		ug/L		12/22/19 07:08	12/22/19 16:16	1
TOX Result 2	49	H	40		ug/L		12/22/19 07:08	12/22/19 16:16	1
TOX Dup	59	H	40		ug/L		12/22/19 07:08	12/22/19 16:16	1

Client Sample ID: S09608.05
Lab Sample ID: 190-21664-5
Date Collected: 11/21/19 13:06
Matrix: Ground Water
Date Received: 11/25/19 09:40

General Chemistry

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	<40	H	40		ug/L		12/23/19 05:00	12/23/19 11:05	1
TOX Result 1	<40	H	40		ug/L		12/23/19 05:00	12/23/19 11:05	1
TOX Result 2	<40	H	40		ug/L		12/23/19 05:00	12/23/19 11:05	1
TOX Dup	<40	H	40		ug/L		12/23/19 05:00	12/23/19 11:05	1

Client Sample ID: S09608.06

Lab Sample ID: 190-21664-6

Date Collected: 11/21/19 13:30

Matrix: Ground Water

Date Received: 11/25/19 09:40

General Chemistry

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	<40	H	40		ug/L		12/23/19 05:00	12/23/19 12:30	1
TOX Result 1	<40	H	40		ug/L		12/23/19 05:00	12/23/19 12:30	1
TOX Result 2	<40	H	40		ug/L		12/23/19 05:00	12/23/19 12:30	1
TOX Dup	<40	H	40		ug/L		12/23/19 05:00	12/23/19 12:30	1

Client Sample ID: S09608.07

Lab Sample ID: 190-21664-7

Date Collected: 11/21/19 00:01

Matrix: Ground Water

Date Received: 11/25/19 09:40

General Chemistry

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	<40	H	40		ug/L		12/23/19 05:00	12/23/19 13:09	1
TOX Result 1	<40	H	40		ug/L		12/23/19 05:00	12/23/19 13:09	1
TOX Result 2	<40	H	40		ug/L		12/23/19 05:00	12/23/19 13:09	1
TOX Dup	<40	H	40		ug/L		12/23/19 05:00	12/23/19 13:09	1

Client Sample ID: S09608.08

Lab Sample ID: 190-21664-8

Date Collected: 11/21/19 14:20

Matrix: Water

Date Received: 11/25/19 09:40

General Chemistry

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	<40	H	40		ug/L		12/23/19 05:00	12/23/19 13:48	1
TOX Result 1	<40	H	40		ug/L		12/23/19 05:00	12/23/19 13:48	1
TOX Result 2	<40	H	40		ug/L		12/23/19 05:00	12/23/19 13:48	1
TOX Dup	<40	H	40		ug/L		12/23/19 05:00	12/23/19 13:48	1

Method: 9020B - Organic Halides, Total (TOX)

Lab Sample ID: MB 680-601031/1-A
Matrix: Water
Analysis Batch: 601162

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 601031

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	<40	^	40		ug/L		12/17/19 05:00	12/17/19 08:07	1
TOX Result 1	<40		40		ug/L		12/17/19 05:00	12/17/19 08:07	1
TOX Result 2	<40		40		ug/L		12/17/19 05:00	12/17/19 08:07	1
TOX Dup	<40	^	40		ug/L		12/17/19 05:00	12/17/19 08:07	1

Lab Sample ID: LCS 680-601031/2-A
Matrix: Water
Analysis Batch: 601162

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 601031

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
TOX Result 1			400	419		ug/L		105	60 - 140		
TOX Result 2			400	419		ug/L		105	60 - 140		
TOX Dup			400	419	^	ug/L		105	60 - 140		

Lab Sample ID: MB 680-601229/1-A
Matrix: Water
Analysis Batch: 601371

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 601229

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	<40		40		ug/L		12/18/19 05:00	12/18/19 07:19	1
TOX Result 1	<40		40		ug/L		12/18/19 05:00	12/18/19 07:19	1
TOX Result 2	<40		40		ug/L		12/18/19 05:00	12/18/19 07:19	1
TOX Dup	<40		40		ug/L		12/18/19 05:00	12/18/19 07:19	1

Lab Sample ID: LCS 680-601229/2-A
Matrix: Water
Analysis Batch: 601371

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 601229

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
TOX Result 1			400	471		ug/L		118	60 - 140		
TOX Result 2			400	471		ug/L		118	60 - 140		
TOX Dup			400	471		ug/L		118	60 - 140		

Lab Sample ID: LCSD 680-601229/52-A
Matrix: Water
Analysis Batch: 601371

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 601229

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
TOX Result 1			400	460		ug/L		115	60 - 140	2	40
TOX Result 2			400	460		ug/L		115	60 - 140	2	40
TOX Dup			400	460		ug/L		115	60 - 140	2	40

Lab Sample ID: 190-21664-1 MS
Matrix: Ground Water
Analysis Batch: 601371

Client Sample ID: S09608.01
Prep Type: Total/NA
Prep Batch: 601229

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
TOX Result 1	76		400	464		ug/L		97	60 - 140		
TOX Result 2	54		400	464		ug/L		103	60 - 140		
TOX Dup	65		400	464		ug/L		100	60 - 140		

Method: 9020B - Organic Halides, Total (TOX)

Lab Sample ID: 190-21664-1 MSD
Matrix: Ground Water
Analysis Batch: 601371

Client Sample ID: S09608.01
Prep Type: Total/NA
Prep Batch: 601229

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
TOX Result 1	76		400	468		ug/L		98	60 - 140	1	40
TOX Result 2	54		400	468		ug/L		104	60 - 140	1	40
TOX Dup	65		400	468		ug/L		101	60 - 140	1	40

Lab Sample ID: MB 680-601717/1-A
Matrix: Water
Analysis Batch: 601742

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 601717

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	<40		40		ug/L		12/22/19 07:08	12/22/19 08:15	1
TOX Result 1	<40		40		ug/L		12/22/19 07:08	12/22/19 08:15	1
TOX Result 2	<40		40		ug/L		12/22/19 07:08	12/22/19 08:15	1
TOX Dup	<40		40		ug/L		12/22/19 07:08	12/22/19 08:15	1

Lab Sample ID: LCS 680-601717/2-A
Matrix: Water
Analysis Batch: 601742

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 601717

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
TOX Result 1	400	398		ug/L		100	60 - 140
TOX Result 2	400	398		ug/L		100	60 - 140
TOX Dup	400	398		ug/L		100	60 - 140

Lab Sample ID: MB 680-601900/1-A
Matrix: Water
Analysis Batch: 601909

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 601900

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Halogens, Total Organic	<40		40		ug/L		12/23/19 05:00	12/23/19 09:27	1
TOX Result 1	<40		40		ug/L		12/23/19 05:00	12/23/19 09:27	1
TOX Result 2	<40		40		ug/L		12/23/19 05:00	12/23/19 09:27	1
TOX Dup	<40		40		ug/L		12/23/19 05:00	12/23/19 09:27	1

Lab Sample ID: LCS 680-601900/2-A
Matrix: Water
Analysis Batch: 601909

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 601900

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
TOX Result 1	400	398		ug/L		100	60 - 140
TOX Result 2	400	398		ug/L		100	60 - 140
TOX Dup	400	398		ug/L		100	60 - 140

Lab Sample ID: 190-21664-5 MS
Matrix: Ground Water
Analysis Batch: 601909

Client Sample ID: S09608.05
Prep Type: Total/NA
Prep Batch: 601900

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
TOX Result 1	<40	H	400	433		ug/L		100	60 - 140
TOX Result 2	<40	H	400	433		ug/L		102	60 - 140
TOX Dup	<40	H	400	433		ug/L		101	60 - 140

Client: Merit Laboratories
Project/Site: S09608/TOX

Job ID: 190-21664-1

Method: 9020B - Organic Halides, Total (TOX)

Lab Sample ID: 190-21664-5 MSD
Matrix: Ground Water
Analysis Batch: 601909

Client Sample ID: S09608.05
Prep Type: Total/NA
Prep Batch: 601900

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
TOX Result 1	<40	H	400	460		ug/L		106	60 - 140	6	40
TOX Result 2	<40	H	400	460		ug/L		109	60 - 140	6	40
TOX Dup	<40	H	400	460		ug/L		108	60 - 140	6	40

Definitions/Glossary

Client: Merit Laboratories
Project/Site: S09608/TOX

Job ID: 190-21664-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
H	Sample was prepped or analyzed beyond the specified holding time

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

General Chemistry

Prep Batch: 601031

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-601031/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-601031/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	

Analysis Batch: 601162

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-601031/1-A	Method Blank	Total/NA	Water	9020B	601031
LCS 680-601031/2-A	Lab Control Sample	Total/NA	Water	9020B	601031

Prep Batch: 601229

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-21664-1	S09608.01	Total/NA	Ground Water	Carbon Trap	
190-21664-2	S09608.02	Total/NA	Ground Water	Carbon Trap	
190-21664-3	S09608.03	Total/NA	Ground Water	Carbon Trap	
190-21664-4	S09608.04	Total/NA	Ground Water	Carbon Trap	
190-21664-5	S09608.05	Total/NA	Ground Water	Carbon Trap	
190-21664-6	S09608.06	Total/NA	Ground Water	Carbon Trap	
190-21664-7	S09608.07	Total/NA	Ground Water	Carbon Trap	
190-21664-8	S09608.08	Total/NA	Water	Carbon Trap	
MB 680-601229/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-601229/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	
LCSD 680-601229/52-A	Lab Control Sample Dup	Total/NA	Water	Carbon Trap	
190-21664-1 MS	S09608.01	Total/NA	Ground Water	Carbon Trap	
190-21664-1 MSD	S09608.01	Total/NA	Ground Water	Carbon Trap	

Analysis Batch: 601371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-21664-1	S09608.01	Total/NA	Ground Water	9020B	601229
190-21664-2	S09608.02	Total/NA	Ground Water	9020B	601229
190-21664-3	S09608.03	Total/NA	Ground Water	9020B	601229
190-21664-4	S09608.04	Total/NA	Ground Water	9020B	601229
190-21664-5	S09608.05	Total/NA	Ground Water	9020B	601229
190-21664-6	S09608.06	Total/NA	Ground Water	9020B	601229
190-21664-7	S09608.07	Total/NA	Ground Water	9020B	601229
190-21664-8	S09608.08	Total/NA	Water	9020B	601229
MB 680-601229/1-A	Method Blank	Total/NA	Water	9020B	601229
LCS 680-601229/2-A	Lab Control Sample	Total/NA	Water	9020B	601229
LCSD 680-601229/52-A	Lab Control Sample Dup	Total/NA	Water	9020B	601229
190-21664-1 MS	S09608.01	Total/NA	Ground Water	9020B	601229
190-21664-1 MSD	S09608.01	Total/NA	Ground Water	9020B	601229

Prep Batch: 601717

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-21664-2	S09608.02	Total/NA	Ground Water	Carbon Trap	
190-21664-3	S09608.03	Total/NA	Ground Water	Carbon Trap	
190-21664-4	S09608.04	Total/NA	Ground Water	Carbon Trap	
MB 680-601717/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-601717/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	

Analysis Batch: 601742

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-21664-2	S09608.02	Total/NA	Ground Water	9020B	601717

General Chemistry (Continued)

Analysis Batch: 601742 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-21664-3	S09608.03	Total/NA	Ground Water	9020B	601717
190-21664-4	S09608.04	Total/NA	Ground Water	9020B	601717
MB 680-601717/1-A	Method Blank	Total/NA	Water	9020B	601717
LCS 680-601717/2-A	Lab Control Sample	Total/NA	Water	9020B	601717

Prep Batch: 601900

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-21664-5	S09608.05	Total/NA	Ground Water	Carbon Trap	
190-21664-6	S09608.06	Total/NA	Ground Water	Carbon Trap	
190-21664-7	S09608.07	Total/NA	Ground Water	Carbon Trap	
190-21664-8	S09608.08	Total/NA	Water	Carbon Trap	
MB 680-601900/1-A	Method Blank	Total/NA	Water	Carbon Trap	
LCS 680-601900/2-A	Lab Control Sample	Total/NA	Water	Carbon Trap	
190-21664-5 MS	S09608.05	Total/NA	Ground Water	Carbon Trap	
190-21664-5 MSD	S09608.05	Total/NA	Ground Water	Carbon Trap	

Analysis Batch: 601909

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
190-21664-5	S09608.05	Total/NA	Ground Water	9020B	601900
190-21664-6	S09608.06	Total/NA	Ground Water	9020B	601900
190-21664-7	S09608.07	Total/NA	Ground Water	9020B	601900
190-21664-8	S09608.08	Total/NA	Water	9020B	601900
MB 680-601900/1-A	Method Blank	Total/NA	Water	9020B	601900
LCS 680-601900/2-A	Lab Control Sample	Total/NA	Water	9020B	601900
190-21664-5 MS	S09608.05	Total/NA	Ground Water	9020B	601900
190-21664-5 MSD	S09608.05	Total/NA	Ground Water	9020B	601900

Lab Chronicle

Client: Merit Laboratories
Project/Site: S09608/TOX

Job ID: 190-21664-1

Client Sample ID: S09608.01
Date Collected: 11/20/19 13:03
Date Received: 11/25/19 09:40

Lab Sample ID: 190-21664-1
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Carbon Trap			601229	12/18/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601371	12/18/19 10:04	CLJ	TAL SAV

Client Sample ID: S09608.02
Date Collected: 11/21/19 11:12
Date Received: 11/25/19 09:40

Lab Sample ID: 190-21664-2
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Carbon Trap			601229	12/18/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601371	12/18/19 22:49	CLJ	TAL SAV
Total/NA	Prep	Carbon Trap			601717	12/22/19 07:08	CLJ	TAL SAV
Total/NA	Analysis	9020B		1	601742	12/22/19 14:58	CLJ	TAL SAV

Client Sample ID: S09608.03
Date Collected: 11/21/19 12:00
Date Received: 11/25/19 09:40

Lab Sample ID: 190-21664-3
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Carbon Trap			601229	12/18/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601371	12/18/19 23:29	CLJ	TAL SAV
Total/NA	Prep	Carbon Trap			601717	12/22/19 07:08	CLJ	TAL SAV
Total/NA	Analysis	9020B		1	601742	12/22/19 15:36	CLJ	TAL SAV

Client Sample ID: S09608.04
Date Collected: 11/21/19 12:40
Date Received: 11/25/19 09:40

Lab Sample ID: 190-21664-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Carbon Trap			601229	12/18/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601371	12/19/19 01:04	CLJ	TAL SAV
Total/NA	Prep	Carbon Trap			601717	12/22/19 07:08	CLJ	TAL SAV
Total/NA	Analysis	9020B		1	601742	12/22/19 16:16	CLJ	TAL SAV

Client Sample ID: S09608.05
Date Collected: 11/21/19 13:06
Date Received: 11/25/19 09:40

Lab Sample ID: 190-21664-5
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Carbon Trap			601229	12/18/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601371	12/19/19 01:55	CLJ	TAL SAV
Total/NA	Prep	Carbon Trap			601900	12/23/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601909	12/23/19 11:05	CLJ	TAL SAV

Lab Chronicle

Client: Merit Laboratories
Project/Site: S09608/TOX

Job ID: 190-21664-1

Client Sample ID: S09608.06
Date Collected: 11/21/19 13:30
Date Received: 11/25/19 09:40

Lab Sample ID: 190-21664-6
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Carbon Trap			601229	12/18/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601371	12/19/19 02:42	CLJ	TAL SAV
Total/NA	Prep	Carbon Trap			601900	12/23/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601909	12/23/19 12:30	CLJ	TAL SAV

Client Sample ID: S09608.07
Date Collected: 11/21/19 00:01
Date Received: 11/25/19 09:40

Lab Sample ID: 190-21664-7
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Carbon Trap			601229	12/18/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601371	12/19/19 03:31	CLJ	TAL SAV
Total/NA	Prep	Carbon Trap			601900	12/23/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601909	12/23/19 13:09	CLJ	TAL SAV

Client Sample ID: S09608.08
Date Collected: 11/21/19 14:20
Date Received: 11/25/19 09:40

Lab Sample ID: 190-21664-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Carbon Trap			601229	12/18/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601371	12/19/19 04:09	CLJ	TAL SAV
Total/NA	Prep	Carbon Trap			601900	12/23/19 05:00	DR	TAL SAV
Total/NA	Analysis	9020B		1	601909	12/23/19 13:48	CLJ	TAL SAV

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Analyst References:

Lab: TAL SAV

Batch Type: Prep

CLJ = Cynthia Johnson

DR = Dominique Richardson

Batch Type: Analysis

CLJ = Cynthia Johnson

Accreditation/Certification Summary

Client: Merit Laboratories
Project/Site: S09608/TOX

Job ID: 190-21664-1

Laboratory: Eurofins TestAmerica, Michigan

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Michigan	State	0057	05-05-20

Laboratory: Eurofins TestAmerica, Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-20
Alaska	State	GA00006	06-30-20
Alaska (UST)	State	17-016	09-30-20
ANAB	Dept. of Defense ELAP	L2463	09-22-22
ANAB	ISO/IEC 17025	L2463.01	09-22-22
Arizona	State	AZ0808	12-14-20
Arkansas DEQ	State	19-015-0	02-01-20
California	State	2939	06-30-20
Connecticut	State	PH-0161	03-31-21
Florida	NELAP	E87052	06-30-20
GA Dept. of Agriculture	State Program	N/A	06-12-20
Georgia	State	E87052	06-30-20
Georgia (DW)	State	803	06-30-20
Guam	State	19-007R	04-17-20
Hawaii	State	<cert No.>	06-30-20
Illinois	NELAP	004547	01-19-20
Indiana	State	C-GA-02	06-30-20
Iowa	State	353	06-30-21
Kansas	NELAP	E-10322	10-15-20
Kentucky (DW)	State	KY90084	12-31-19
Kentucky (UST)	State	<cert No.>	06-30-20
Louisiana	NELAP	02011	06-30-20
Maine	State	GA00006	09-26-20
Maryland	State	250	12-31-20
Massachusetts	State	M-GA006	06-30-20
Michigan	State	9925	06-30-20
Mississippi	State	<cert No.>	06-30-20
Nebraska	State	NE-OS-7-04	06-30-20
New Hampshire	NELAP	2096	05-29-20
New Jersey	NELAP	GA769	06-30-20
New Mexico	State	GA00006	06-30-20
New York	NELAP	10842	04-01-20
North Carolina (DW)	State	13701	07-31-20
Oklahoma	State	9984	08-31-20
Pennsylvania	NELAP	68-00474	06-30-20
Puerto Rico	State	GA00006	01-01-21
South Carolina	State	98001	06-30-20
Tennessee	State	02961	06-30-20
Texas	NELAP	T1047004185-19-14	11-30-20
Texas	TCEQ Water Supply	T104704185	06-30-20
US Fish & Wildlife	US Federal Programs	LE058448-0	07-31-20
USDA	US Federal Programs	P330-18-00313	10-29-21
Virginia	NELAP	10509	06-14-20

Accreditation/Certification Summary

Client: Merit Laboratories
Project/Site: S09608/TOX

Job ID: 190-21664-1

Laboratory: Eurofins TestAmerica, Savannah (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Washington	State	C805	06-10-20
West Virginia (DW)	State	9950C	12-31-19
West Virginia DEP	State	094	07-31-20
Wisconsin	State	999819810	08-31-20
Wyoming	State	8TMS-L	06-30-20 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Merit Laboratories
Project/Site: S09608/TOX

Job ID: 190-21664-1

Method	Method Description	Protocol	Laboratory
9020B	Organic Halides, Total (TOX)	SW846	TAL SAV
Carbon Trap	Carbon Trap Preparation	EPA-17	TAL SAV

Protocol References:

EPA-17 = "Method 1650, Revision A, Adsorbable Organic Halides By Adsorption And Colormetric Titration," EPA, February 1992

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Merit Laboratories, Inc.
2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # _____ OF _____

CHAIN OF CUSTODY RECORD

REPORT TO

CONTACT NAME: John Laverty
COMPANY: Merit Laboratories
ADDRESS: 2680 East Lansing Drive
CITY: East Lansing STATE: MI ZIP CODE: 48823
PHONE NO.: 517-332-0167 FAX NO.: 517-332-4034 P.O. NO.:
E-MAIL ADDRESS: johnlaverty@meritlabs.com QUOTE NO.:

INVOICE TO

CONTACT NAME: Julie Teague ☒ SAME
COMPANY: Merit Laboratories
ADDRESS: 2680 East Lansing Drive
CITY: East Lansing STATE: MI ZIP CODE: 48823
PHONE NO.: 517-332-0167 E-MAIL ADDRESS: juliet@meritlabs.com

PROJECT NO./NAME: S09608 SAMPLER(S) - PLEASE PRINT/SIGN NAME

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER _____

DELIVERABLES REQUIRED ☒ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER _____

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications
☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES

Project Locations
☐ Detroit ☐ New York
☐ Other _____

Special Instructions

MERIT LAB NO. (FOR LAB USE ONLY)	YEAR DATE	YEAR TIME	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives: NONE	HCl	HNO_3	H_2SO_4	NaOH	MeOH	OTHER	TOX
	11/20/19	1303	S09608.01	GW	1				x				✓
	11/21/19	1112	S09608.02	GW	1				x				✓
	11/21/19	1200	S09608.03	GW	1				x				✓
	11/21/19	1240	S09608.04	GW	1				x				✓
	11/21/19	1306	S09608.05	GW	1				x				✓
	11/21/19	1330	S09608.06	GW	1				x				✓
	11/21/19	0001	S09608.07	GW	1				x				✓
	11/21/19	1420	S09608.08	W	1				x				✓

190-21664 Chain of Custody

Subcontracted to
Test America

RELINQUISHED BY: SIGNATURE/ORGANIZATION	☐ Sampler	DATE 11-25-19	TIME 9:30
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE 11-25-19	TIME 9:30
RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE 11/25/19	TIME 9:40
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE 11/25/19	TIME 9:40

RELINQUISHED BY: SIGNATURE/ORGANIZATION — DATE — TIME
RECEIVED BY: SIGNATURE/ORGANIZATION — DATE — TIME

SEAL NO. — SEAL INTACT YES ☐ NO ☐ — INITIALS
SEAL NO. — SEAL INTACT YES ☐ NO ☐ — INITIALS

NOTES: TEMP. ON ARRIVAL _____

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

12/27/2019

eurofins

Environment Testing
TestAmerica

Cooler/Sample Receipt

(AFTER HOURS receipt: complete gray areas. Place cooler in walk-in, place this form in Receiving in-box. Date/Time rec'd _____ Initials _____)

❑ SDS or Known Hazard Information Supplied by Client

❑ Discrepancies
❑ Short Hold
❑ Rush ❑24hr ❑2day ❑3day ❑5day ❑other _____

Client ID Merit Labs
Work Order # 190-21664

Receipt evaluation performed by - Initials Amy Date 11/25/19 Time 10 39

Method of Shipment:
☒ Walk-In Client ❑ TestAmerica Field/Courier
❑ Other Client/3rd Party Courier _____
❑ Fed Ex Tracking # _____
❑ UPS Tracking # _____
❑ Other _____

Shipping Container Type:
☒ Cooler ❑ Box
❑ None ❑ Other _____

Packing Materials:
❑ Plastic Bags ❑ Foam
❑ Bubble Wrap ❑ Paper
❑ Packing Peanuts ☒ None
❑ Other _____

Custody Seals Intact:
❑ Yes ❑ No
☒ N/A (not used or required)

Cooling Materials:
☒ Ice (solid) ❑ Ice (Melted)
❑ Blue Ice ❑ None
❑ Other _____

Bacteriological Samples	Temp (°C) Corrected	Frozen	Received within 2 hours	Sample Flagged
		yes no	yes no	yes no

❑ Check if Additional Sheets Required

Receipt Temperatures

C.F.

Thermometer ID	Observed (°C)	Corrected (°C)	Temp Blank	Sample Temp	Received on same day sampled?	Acceptable?*	Cooler ID	Note Affected Samples if temperature not acceptable
140252483			❑	❑	❑Yes ❑No	❑Yes ❑No		
140252496			❑	❑	❑Yes ❑No	❑Yes ❑No		
IR	CP313207	3.7	3.8	❑	☒	❑Yes ☒No	☒Yes ❑No	

* Receipt temperatures are considered acceptable if the samples are received on the same day they were collected & show signs that the cooling process has started. Temperature acceptance for most tests is ≤6.0°C, but not frozen.

Receipt Questions**	Y	N	n/a	"No" answers require additional comment
COC present & TA receipt signature, date, & time properly documented?	✓			
Containers & labels in good condition? (unbroken, not leaking, appropriately filled, labels legible & attached)	✓			
Appropriate containers used & adequate volume provided?	✓			Preserved Bottles Checked with pH Strips* (Yes) (No) (Tox Bottles)
Number of sample containers match COC?	✓			
Samples received within hold time?	✓			
Samples submitted for GRO and Volatiles analyses (8260, 624, 524) received without headspace?			✓	
Was a Trip Blank received with VOA samples?			✓	
Were the samples free of any questionable physical conformities? For example, field duplicates or multiple bottles of the same sample do not significantly vary in appearance (color, proportion of solids, etc.)	✓			
Were the COC, bottle labels, and all other items free of all other discrepancies or issues that would need to be addressed with the Project Manager and/or Client?	✓			Sample 509608.08 appears to be Water / not Waste

** May not be applicable if samples are not for compliance testing

* Excludes FOG, Volatiles, TOC Vials (Eg Blanks)

pH strip lot # : 144385

Client Contact Record

Contact via: ❑ Phone ❑ Email ❑ Other _____ Person Contacted: _____ Date/Time: _____

❑ Discrepancy allowance agreement is on record in the client project file

Discussion/Resolution

Any additional documentation and clarification from client must be noted in the narrative and/or scanned into the COC directory

Reviewed by PM Signature 11/25/19 Date

WI Page 1 of 1

WI No DT-SCA-WI-00[illegible]
effective 08/11/12

12/27/2019

Eurofins TestAmerica, Canton
4101 Shuffel Street NW
North Canton, OH 44720
Phone: 330-497-9396 Fax: 330-497-0772

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Schafer, Sue	Carrier Tracking No(s):	COC No: 240-114385.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: sue.schafer@testamericainc.com	State of Origin: Michigan	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 190-21664-1
Address: 5102 LaRoche Avenue,	Due Date Requested: 12/6/2019			
City: Savannah	TAT Requested (days):			
State, Zip: GA, 31404				
Phone: 912-354-7858(Tel) 912-352-0165(Fax)	PO #:			
Email:	WO #:			
Project Name: S09608/TOX	Project #: 19001249			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9020B/Carbon_Trap	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
S09608.01 (190-21664-1)	11/20/19	13:03 Eastern		Water			X	1	
S09608.02 (190-21664-2)	11/21/19	11:12 Eastern		Water			X	1	
S09608.03 (190-21664-3)	11/21/19	12:00 Eastern		Water			X	1	
S09608.04 (190-21664-4)	11/21/19	12:40 Eastern		Water			X	1	
S09608.05 (190-21664-5)	11/21/19	13:06 Eastern		Water			X	1	
S09608.06 (190-21664-6)	11/21/19	13:30 Eastern		Water			X	1	
S09608.07 (190-21664-7)	11/21/19	00:01 Eastern		Water			X	1	
S09608.08 (190-21664-8)	11/21/19	14:20 Eastern		Water			X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		11-26-19 1500	240		11-27-19 1010	TA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.9/4.0

Ver: 01/16/2019

APPENDIX D

Groundwater Sampling Program QA/QC Summary

APPENDIX D
QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Data verification was independently performed by O'Brien & Gere, Part of Ramboll (OBG) to assess the groundwater monitoring data quality for samples collected during the 2019 annual groundwater sampling event conducted in November 2019. Data verification was utilized to confirm the quality of the field and laboratory (Merit Laboratories, Inc. (Merit) of East Lansing, Michigan) data. The data verification included review of: (1) laboratory documentation, (2) chain-of-custody (COC) documentation, (3) target analyte results, (4) laboratory data qualifiers, if any, (5) laboratory reporting (quantitation) limits, (6) laboratory blank analysis, and (7) quality control samples, including duplicate samples.

The results of the data verification indicated the following:

- Laboratory documentation was complete.
- Chain-of-custody (COC) documentation was complete.
- Target analyte results were reported in accordance with the project requirements.
- Reanalysis of the following samples were performed outside of the analytical holding time due to failure of quality control parameters in the initial analysis in monitoring wells B-7, B-9, B-19Ar, B-24r, B-28, DUP-2 (B-28), Equipment Blank-1.
- Laboratory blank analysis matrix spike / matrix spike duplicate (MS/MSD) associated with preparation batch 680-601031 and analytical batch 680-601162 were performed at the same dilution. Due to the additional level of analyte present in the spiked samples, the concentration of TOX in the MS/MSD was above the instrument calibration range. The data have been reported and qualified.
- Laboratory quantitation (or reporting) limits (RLs) were within the project required limits for undiluted samples.
- Breakthroughs exceeding 10% for TOX samples were reported in samples B-7, B-9, B-18A, B-19Ar, B-24r, B-28, DUP-2 (B-28), and Equipment Blank-1. Re-analysis was performed with concurring results. Sample duplicate results were outside the 20% relative percent difference. Reanalysis was not performed due to sample replicate being analyzed out of hold time. The data was reported but should be considered an estimated (J) value due to the QC excursion.
- The relative percent difference (RPD) for the duplicate sample results for B-28 and Dup-2 (B-28) were within acceptable limits.

Furthermore, the instrument utilized for measurement of field parameters calibrated within range (deviation from standard of less than 3 percent) for pH, oxidation reduction potential (ORP), specific conductivity (conductivity), and dissolved oxygen (DO); therefore, operated within manufacturers specifications during sample collection. There was an issue with the pH probe on the second day of sampling and no readings were collected.

The data verification indicates that the overall usability of the groundwater monitoring data is acceptable for the intended use without further qualification or rejection of the data with the exception of the qualification of the results for TOX in B-7, B-9, B-18A, B-19Ar, B-24r, B-28, DUP-2 (B-28), and Equipment Blank-1 as estimated (J) values due to the QC excursion.

APPENDIX E

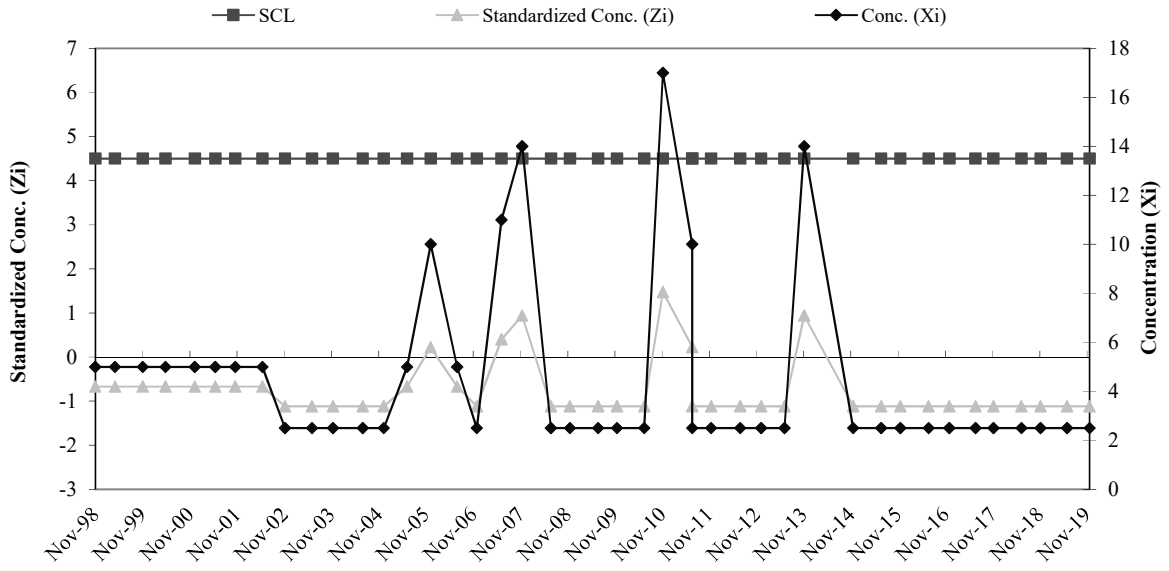
Monitoring Well Control Charts

COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-7 Cr

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	10		
2	Aug-95	10		
3	Feb-96	10		
4	Jun-96	10	**8.75**	**5.60**
5	Aug-96	10		
6	Nov-96	10		
7	May-97	5		
8	May-98	5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-98	4.5	5	-0.67	36	Nov-11	4.5	2.5	-1.12
10	Apr-99	4.5	5	-0.67	37	Jun-12	4.5	2.5	-1.12
11	Nov-99	4.5	5	-0.67	38	Dec-12	4.5	2.5	-1.12
12	Apr-00	4.5	5	-0.67	39	Jun-13	4.5	2.5	-1.12
13	Dec-00	4.5	5	-0.67	40	Nov-13	4.5	14	0.94
14	May-01	4.5	5	-0.67	41	Nov-14	4.5	2.5	-1.12
15	Oct-01	4.5	5	-0.67	42	Jun-15	4.5	2.5	-1.12
16	May-02	4.5	5	-0.67	43	Nov-15	4.5	2.5	-1.12
17	Nov-02	4.5	2.5	-1.12	44	Jun-16	4.5	2.5	-1.12
18	Jun-03	4.5	2.5	-1.12	45	Nov-16	4.5	2.5	-1.12
19	Nov-03	4.5	2.5	-1.12	46	Jun-17	4.5	2.5	-1.12
20	Jun-04	4.5	2.5	-1.12	47	Nov-17	4.5	2.5	-1.12
21	Dec-04	4.5	2.5	-1.12	48	Jun-18	4.5	2.5	-1.12
22	Jun-05	4.5	5	-0.67	49	Nov-18	4.5	2.5	-1.12
23	Dec-05	4.5	10	0.22	50	May-19	4.5	2.5	-1.12
24	Jun-06	4.5	5	-0.67	51	Nov-19	4.5	2.5	-1.12
25	Nov-06	4.5	2.5	-1.12					
26	Jun-07	4.5	11	0.40					
27	Nov-07	4.5	14	0.94					
28	Jun-08	4.5	2.5	-1.12					
29	Nov-08	4.5	2.5	-1.12					
30	Jun-09	4.5	2.5	-1.12					
31	Nov-09	4.5	2.5	-1.12					
32	Jun-10	4.5	2.5	-1.12					
33	Nov-10	4.5	17	1.47					
34	Jun-11	4.5	10	0.22					
35	Jun-11	4.5	2.5	-1.12					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

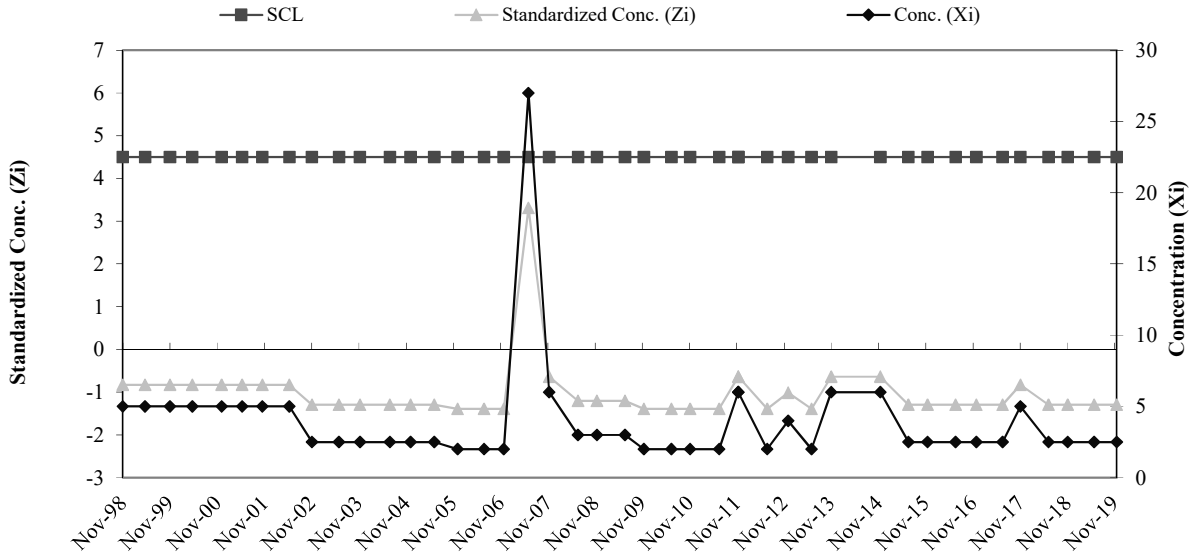


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-7 Cu

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	10		
2	Aug-95	10		
3	Feb-96	10		
4	Jun-96	10	**9.40**	**5.32**
5	Aug-96	10		
6	Nov-96	10		
7	May-97	10		
8	May-98	5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-98	4.5	5	-0.83	35	Nov-11	4.5	6	-0.64
10	Apr-99	4.5	5	-0.83	36	Jun-12	4.5	2	-1.39
11	Nov-99	4.5	5	-0.83	37	Dec-12	4.5	4	-1.02
12	Apr-00	4.5	5	-0.83	38	Jun-13	4.5	2	-1.39
13	Dec-00	4.5	5	-0.83	39	Nov-13	4.5	6	-0.64
14	May-01	4.5	5	-0.83	40	Nov-14	4.5	6	-0.64
15	Oct-01	4.5	5	-0.83	41	Jun-15	4.5	2.5	-1.30
16	May-02	4.5	5	-0.83	42	Nov-15	4.5	2.5	-1.30
17	Nov-02	4.5	2.5	-1.30	43	Jun-16	4.5	2.5	-1.30
18	Jun-03	4.5	2.5	-1.30	44	Nov-16	4.5	2.5	-1.30
19	Nov-03	4.5	2.5	-1.30	45	Jun-17	4.5	2.5	-1.30
20	Jun-04	4.5	2.5	-1.30	46	Nov-17	4.5	5	-0.83
21	Dec-04	4.5	2.5	-1.30	47	Jun-18	4.5	2.5	-1.30
22	Jun-05	4.5	2.5	-1.30	48	Nov-18	4.5	2.5	-1.30
23	Dec-05	4.5	2	-1.39	49	May-19	4.5	2.5	-1.30
24	Jun-06	4.5	2	-1.39	50	Nov-19	4.5	2.5	-1.30
25	Nov-06	4.5	2	-1.39					
26	Jun-07	4.5	27	3.31					
27	Nov-07	4.5	6	-0.64					
28	Jun-08	4.5	3	-1.20					
29	Nov-08	4.5	3	-1.20					
30	Jun-09	4.5	3	-1.20					
31	Nov-09	4.5	2	-1.39					
32	Jun-10	4.5	2	-1.39					
33	Nov-10	4.5	2	-1.39					
34	Jun-11	4.5	2	-1.39					
35	Nov-11	4.5	6	-0.64					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

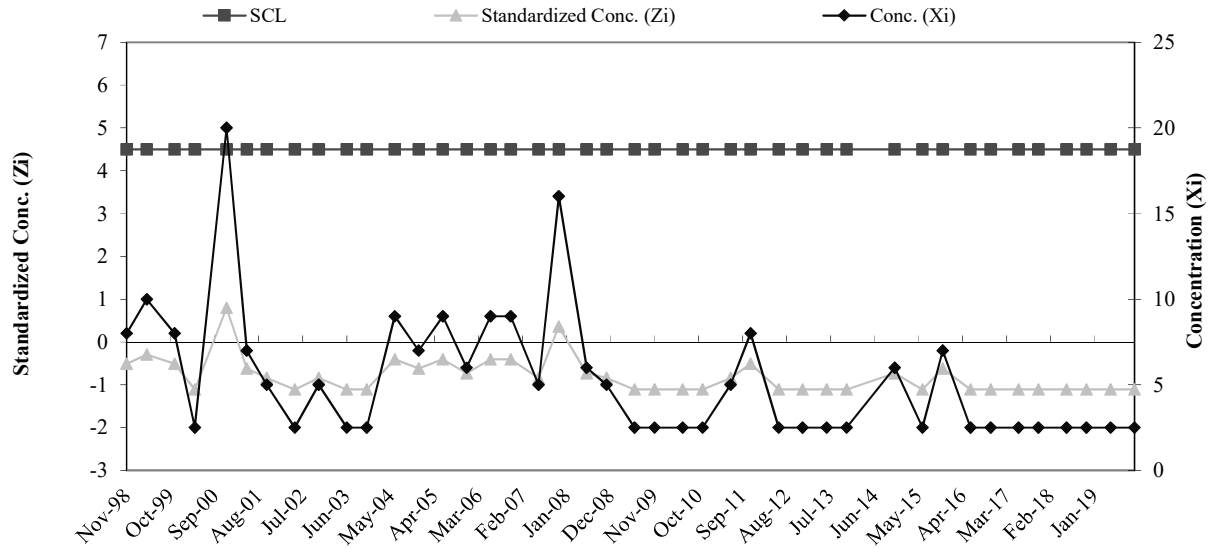


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-7 Ni

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	15		
2	Aug-95	20		
3	Feb-96	20		
4	Jun-96	10	**12.70**	**9.19**
5	Aug-96	10		
6	Nov-96	20		
7	May-97	14		
8	May-98	2.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-98	4.5	8	-0.51	35	Nov-11	4.5	8	-0.51
10	Apr-99	4.5	10	-0.29	36	Jun-12	4.5	2.5	-1.11
11	Nov-99	4.5	8	-0.51	37	Dec-12	4.5	2.5	-1.11
12	Apr-00	4.5	2.5	-1.11	38	Jun-13	4.5	2.5	-1.11
13	Dec-00	4.5	20	0.79	39	Nov-13	4.5	2.5	-1.11
14	May-01	4.5	7	-0.62	40	Nov-14	4.5	6	-0.73
15	Oct-01	4.5	5	-0.84	41	Jun-15	4.5	2.5	-1.11
16	May-02	4.5	2.5	-1.11	42	Nov-15	4.5	7	-0.62
17	Nov-02	4.5	5	-0.84	43	Jun-16	4.5	2.5	-1.11
18	Jun-03	4.5	2.5	-1.11	44	Nov-16	4.5	2.5	-1.11
19	Nov-03	4.5	2.5	-1.11	45	Jun-17	4.5	2.5	-1.11
20	Jun-04	4.5	9	-0.40	46	Nov-17	4.5	2.5	-1.11
21	Dec-04	4.5	7	-0.62	47	Jun-18	4.5	2.5	-1.11
22	Jun-05	4.5	9	-0.40	48	Nov-18	4.5	2.5	-1.11
23	Dec-05	4.5	6	-0.73	49	May-19	4.5	2.5	-1.11
24	Jun-06	4.5	9	-0.40	50	Nov-19	4.5	2.5	-1.11
25	Nov-06	4.5	9	-0.40					
26	Jun-07	4.5	5	-0.84					
27	Nov-07	4.5	16	0.36					
28	Jun-08	4.5	6	-0.73					
29	Nov-08	4.5	5	-0.84					
30	Jun-09	4.5	2.5	-1.11					
31	Nov-09	4.5	2.5	-1.11					
32	Jun-10	4.5	2.5	-1.11					
33	Nov-10	4.5	2.5	-1.11					
34	Jun-11	4.5	5	-0.84					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

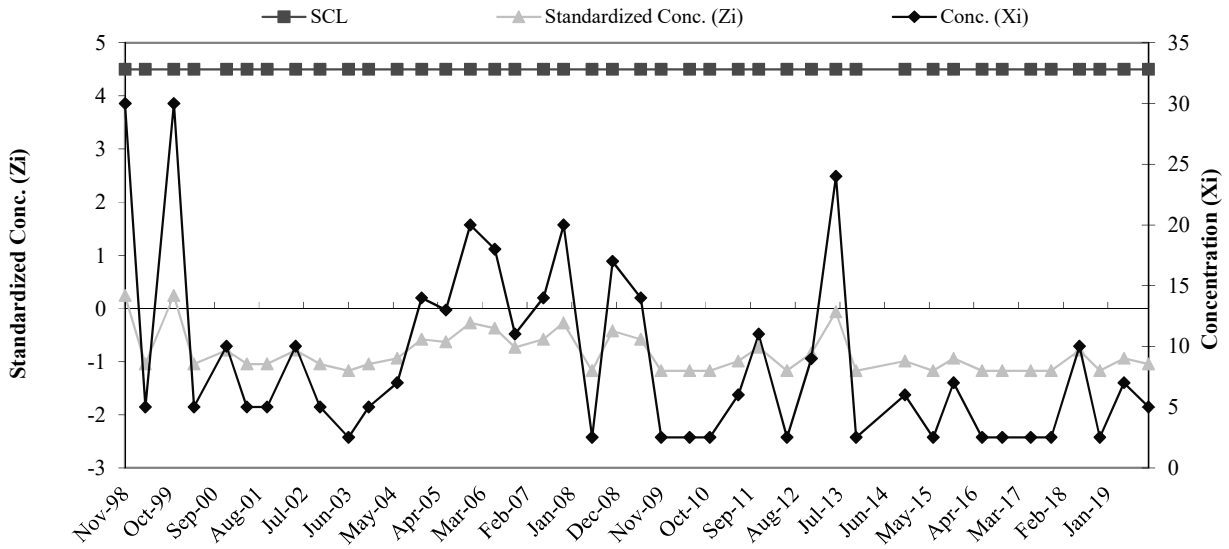


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-7 Zn

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	10		
2	Aug-95	10		
3	Feb-96	22		
4	Jun-96	20	**25.25**	**19.40**
5	Aug-96	60		
6	Nov-96	50		
7	May-97	10		
8	May-98	20		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-98	4.5	30	0.24	35	Nov-11	4.5	11	-0.73
10	Apr-99	4.5	5	-1.04	36	Jun-12	4.5	2.5	-1.17
11	Nov-99	4.5	30	0.24	37	Dec-12	4.5	9	-0.84
12	Apr-00	4.5	5	-1.04	38	Jun-13	4.5	24	-0.06
13	Dec-00	4.5	10	-0.79	39	Nov-13	4.5	2.5	-1.17
14	May-01	4.5	5	-1.04	40	Nov-14	4.5	6	-0.99
15	Oct-01	4.5	5	-1.04	41	Jun-15	4.5	2.5	-1.17
16	May-02	4.5	10	-0.79	42	Nov-15	4.5	7	-0.94
17	Nov-02	4.5	5	-1.04	43	Jun-16	4.5	2.5	-1.17
18	Jun-03	4.5	2.5	-1.17	44	Nov-16	4.5	2.5	-1.17
19	Nov-03	4.5	5	-1.04	45	Jun-17	4.5	2.5	-1.17
20	Jun-04	4.5	7	-0.94	46	Nov-17	4.5	2.5	-1.17
21	Dec-04	4.5	14	-0.58	47	Jun-18	4.5	10	-0.79
22	Jun-05	4.5	13	-0.63	48	Nov-18	4.5	2.5	-1.17
23	Dec-05	4.5	20	-0.27	49	May-19	4.5	7	-0.94
24	Jun-06	4.5	18	-0.37	50	Nov-19	4.5	5	-1.04
25	Nov-06	4.5	11	-0.73			4.5		
26	Jun-07	4.5	14	-0.58					
27	Nov-07	4.5	20	-0.27					
28	Jun-08	4.5	2.5	-1.17					
29	Nov-08	4.5	17	-0.43					
30	Jun-09	4.5	14	-0.58					
31	Nov-09	4.5	2.5	-1.17					
32	Jun-10	4.5	2.5	-1.17					
33	Nov-10	4.5	2.5	-1.17					
34	Jun-11	4.5	6	-0.99					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

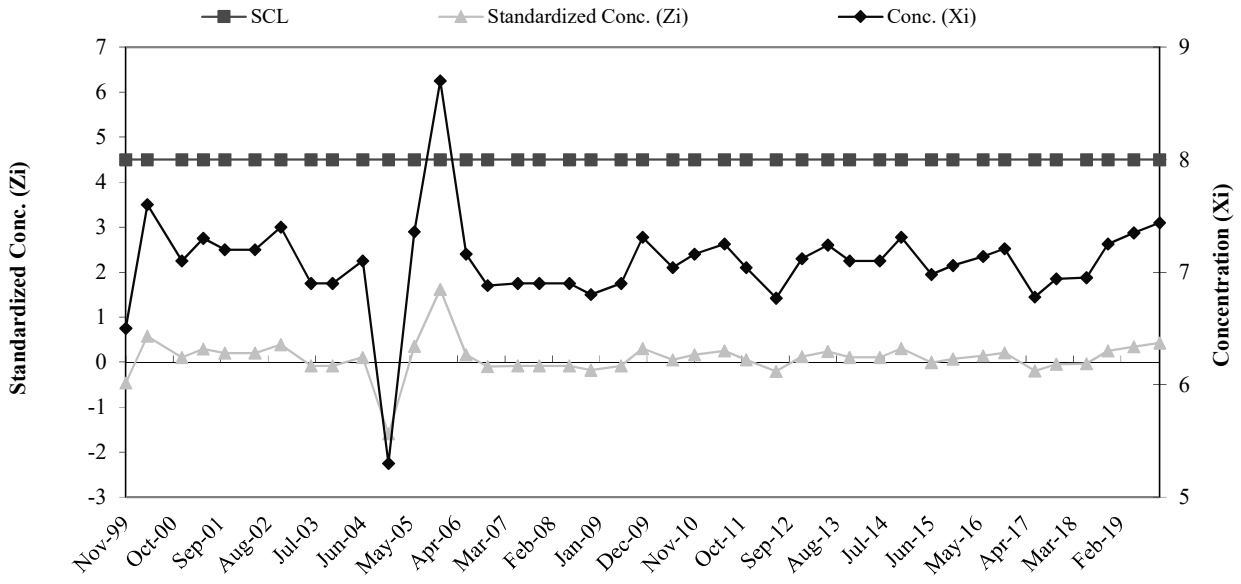


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-7 pH

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	7.5	6.99	1.06
2	Jun-96	6.9		
3	Aug-96	7.6		
4	Nov-96	8.0		
5	May-97	7.2		
6	May-98	6.6		
7	Nov-98	4.6		
8	Apr-99	7.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-99	4.5	6.5	-0.46	33	Nov-11	4.5	7.0	0.05
10	Apr-00	4.5	7.6	0.58	34	Jun-12	4.5	6.8	-0.21
11	Dec-00	4.5	7.1	0.11	35	Dec-12	4.5	7.1	0.13
12	May-01	4.5	7.3	0.30	36	Jun-13	4.5	7.2	0.24
13	Oct-01	4.5	7.2	0.20	37	Nov-13	4.5	7.1	0.11
14	May-02	4.5	7.2	0.20	38	Jun-14	4.5	7.1	0.11
15	Nov-02	4.5	7.4	0.39	39	Nov-14	4.5	7.3	0.30
16	Jun-03	4.5	6.9	-0.08	40	Jun-15	4.5	7.0	-0.01
17	Nov-03	4.5	6.9	-0.08	41	Nov-15	4.5	7.1	0.07
18	Jun-04	4.5	7.1	0.11	42	Jun-16	4.5	7.1	0.14
19	Dec-04	4.5	5.3	-1.60	43	Nov-16	4.5	7.2	0.21
20	Jun-05	4.5	7.4	0.35	44	Jun-17	4.5	6.8	-0.20
21	Dec-05	4.5	8.7	1.62	45	Nov-17	4.5	6.9	-0.04
22	Jun-06	4.5	7.2	0.16	46	Jun-18	4.5	7.0	-0.04
23	Nov-06	4.5	6.9	-0.10	47	Nov-18	4.5	7.3	0.25
24	Jun-07	4.5	6.9	-0.08	48	May-19	4.5	7.4	0.34
25	Nov-07	4.5	6.9	-0.08	49	Nov-19	4.5	7.4	0.43
26	Jun-08	4.5	6.9	-0.08					
27	Nov-08	4.5	6.8	-0.18					
28	Jun-09	4.5	6.9	-0.08					
29	Nov-09	4.5	7.3	0.30					
30	Jun-10	4.5	7.0	0.05					
31	Nov-10	4.5	7.2	0.16					
32	Jun-11	4.5	7.3	0.25					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

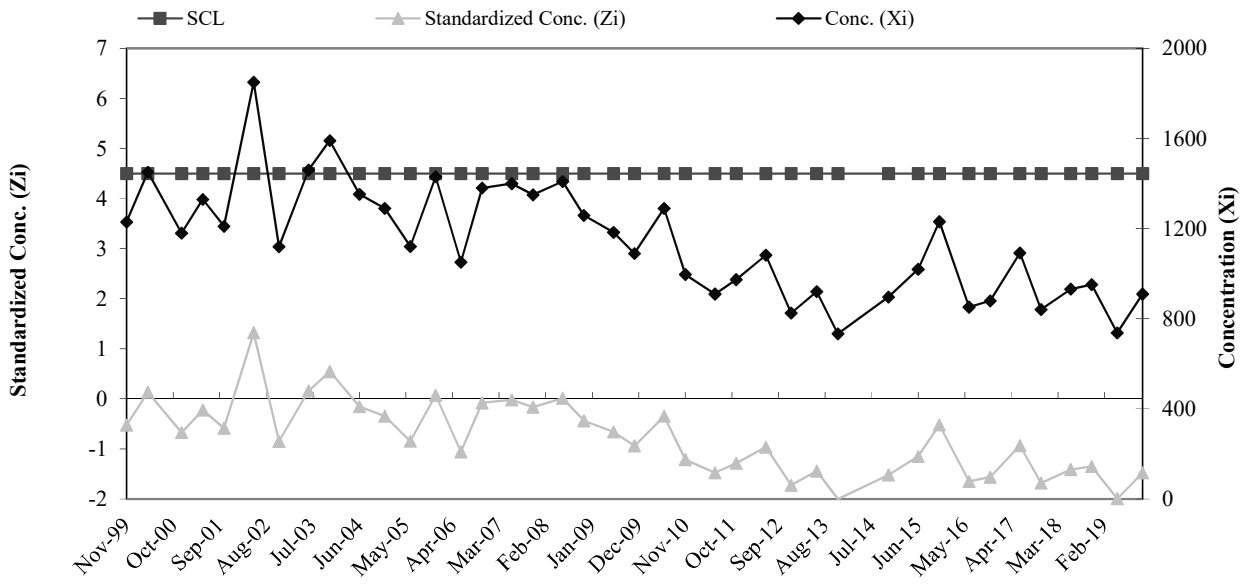


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-7 SpC

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	1509.0		
2	Jun-96	1508.0		
3	Aug-96	1567.0		
4	Nov-96	1960.0	**1,405.88**	**336.33**
5	May-97	780.0		
6	May-98	1270.0		
7	Nov-98	1240.0		
8	Apr-99	1413.0		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-99	4.5	1230.0	-0.52	33	Nov-11	4.5	974.0	-1.28
10	Apr-00	4.5	1450.0	0.13	34	Jun-12	4.5	1082.0	-0.96
11	Dec-00	4.5	1180.0	-0.67	35	Dec-12	4.5	825.0	-1.73
12	May-01	4.5	1330.0	-0.23	36	Jun-13	4.5	921.0	-1.44
13	Oct-01	4.5	1210.0	-0.58	37	Nov-13	4.5	733.0	-2.00
14	May-02	4.5	1850.0	1.32	38	Nov-14	4.5	896.0	-1.52
15	Nov-02	4.5	1120.0	-0.85	39	Jun-15	4.5	1019.0	-1.15
16	Jun-03	4.5	1460.0	0.16	40	Nov-15	4.5	1231.0	-0.52
17	Nov-03	4.5	1590.0	0.55	41	Jun-16	4.5	852.0	-1.65
18	Jun-04	4.5	1353.0	-0.16	42	Nov-16	4.5	880.0	-1.56
19	Dec-04	4.5	1290.0	-0.34	43	Jun-17	4.5	1092.0	-0.93
20	Jun-05	4.5	1121.0	-0.85	44	Nov-17	4.5	841.0	-1.68
21	Dec-05	4.5	1430.0	0.07	45	Jun-18	4.5	932.0	-1.41
22	Jun-06	4.5	1051.0	-1.06	46	Nov-18	4.5	952.0	-1.35
23	Nov-06	4.5	1380.0	-0.08	47	May-19	4.5	737.0	-1.99
24	Jun-07	4.5	1400.0	-0.02	48	Nov-19	4.5	910.0	-1.47
25	Nov-07	4.5	1350.0	-0.17			4.5		
26	Jun-08	4.5	1410.0	0.01					
27	Nov-08	4.5	1258.0	-0.44					
28	Jun-09	4.5	1184.0	-0.66					
29	Nov-09	4.5	1090.0	-0.94					
30	Jun-10	4.5	1290.0	-0.34					
31	Nov-10	4.5	997.0	-1.22					
32	Jun-11	4.5	910.0	-1.47					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

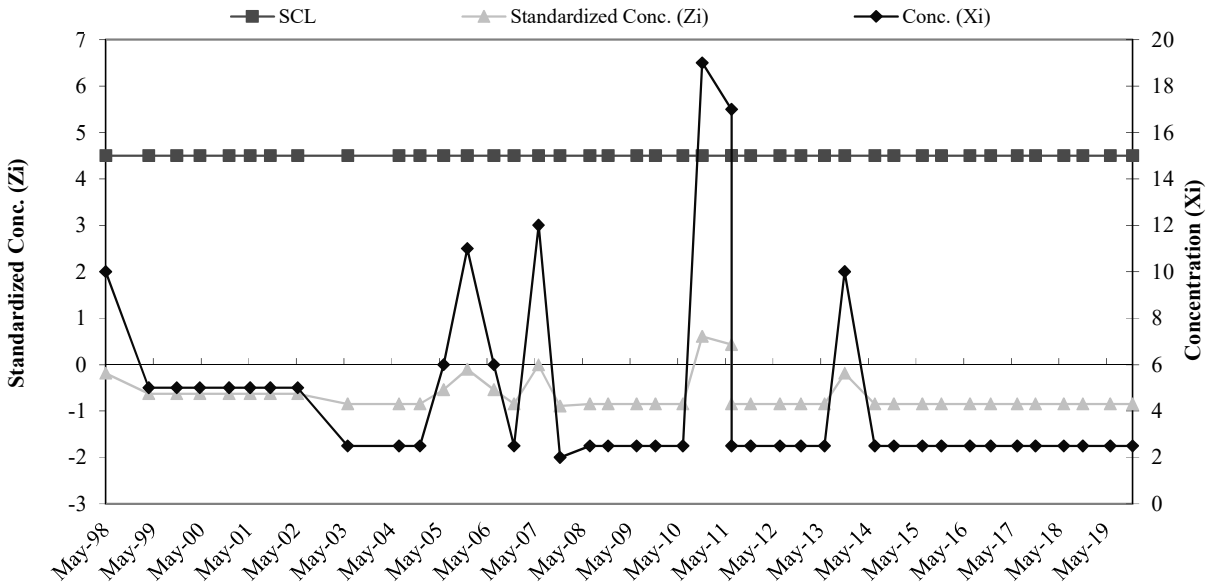


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-9 Cr

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	10		
2	Aug-95	37		
3	Feb-96	10		
4	Jun-96	10	**12.12**	**11.34**
5	Aug-96	10		
6	Nov-96	10		
7	May-97	5		
8	Nov-97	5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	10	-0.19	34	Nov-11	4.5	2.5	-0.85
10	Apr-99	4.5	5	-0.63	35	Jun-12	4.5	2.5	-0.85
11	Nov-99	4.5	5	-0.63	36	Dec-12	4.5	2.5	-0.85
12	Apr-00	4.5	5	-0.63	37	Jun-13	4.5	2.5	-0.85
13	Dec-00	4.5	5	-0.63	38	Nov-13	4.5	10	-0.19
14	May-01	4.5	5	-0.63	39	Jun-14	4.5	2.5	-0.85
15	Oct-01	4.5	5	-0.63	40	Nov-14	4.5	2.5	-0.85
16	May-02	4.5	5	-0.63	41	Jun-15	4.5	2.5	-0.85
17	Jun-03	4.5	2.5	-0.85	42	Nov-15	4.5	2.5	-0.85
18	Jun-04	4.5	2.5	-0.85	43	Jun-16	4.5	2.5	-0.85
19	Dec-04	4.5	2.5	-0.85	44	Nov-16	4.5	2.5	-0.85
20	Jun-05	4.5	6	-0.54	45	Jun-17	4.5	2.5	-0.85
21	Dec-05	4.5	11	-0.10	46	Nov-17	4.5	2.5	-0.85
22	Jun-06	4.5	6	-0.54	47	Jun-18	4.5	2.5	-0.85
23	Nov-06	4.5	2.5	-0.85	48	Nov-18	4.5	2.5	-0.85
24	Jun-07	4.5	12	-0.01	49	Jun-19	4.5	2.5	-0.85
25	Nov-07	4.5	2	-0.89	50	Nov-19	4.5	2.5	-0.85
26	Jul-08	4.5	2.5	-0.85					
27	Nov-08	4.5	2.5	-0.85					
28	Jun-09	4.5	2.5	-0.85					
29	Nov-09	4.5	2.5	-0.85					
30	Jun-10	4.5	2.5	-0.85					
31	Nov-10	4.5	19	0.61					
32	Jun-11	4.5	17	0.43					
33	Jun-11	4.5	2.5	-0.85					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

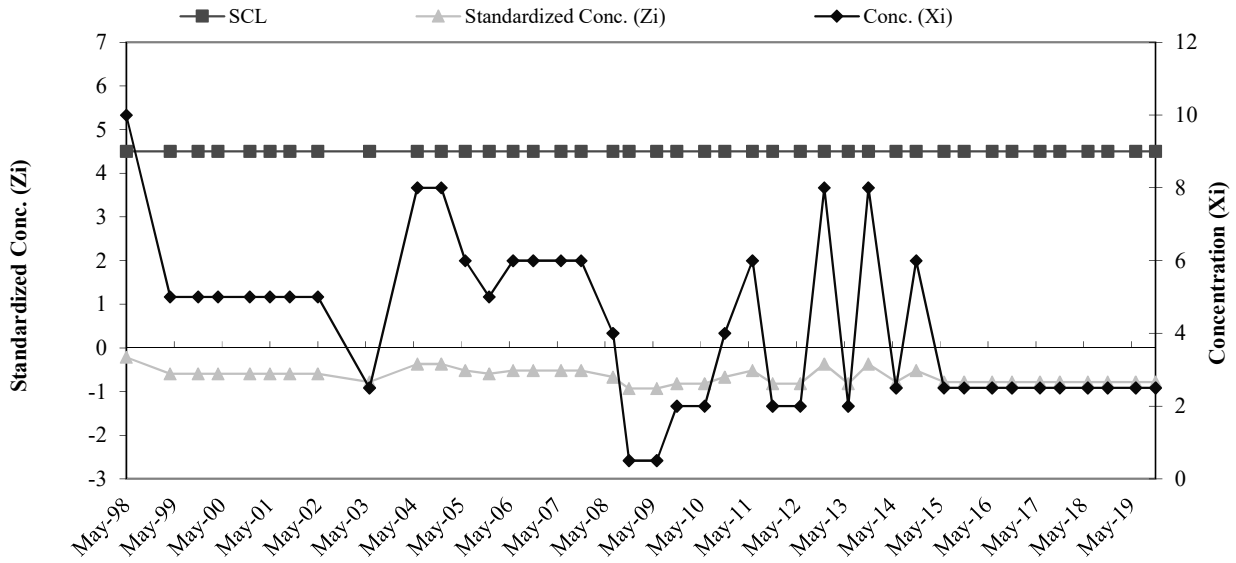


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-9 Cu

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	10		
2	Aug-95	43		
3	Feb-96	10		
4	Jun-96	10	**12.87**	**13.26**
5	Aug-96	10		
6	Nov-96	10		
7	May-97	5		
8	Nov-97	5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	10	-0.22	33	Nov-11	4.5	2	-0.82
10	Apr-99	4.5	5	-0.59	34	Jun-12	4.5	2	-0.82
11	Nov-99	4.5	5	-0.59	35	Dec-12	4.5	8	-0.37
12	Apr-00	4.5	5	-0.59	36	Jun-13	4.5	2	-0.82
13	Dec-00	4.5	5	-0.59	37	Nov-13	4.5	8	-0.37
14	May-01	4.5	5	-0.59	38	Jun-14	4.5	2.5	-0.78
15	Oct-01	4.5	5	-0.59	39	Nov-14	4.5	6	-0.52
16	May-02	4.5	5	-0.59	40	Jun-15	4.5	2.5	-0.78
17	Jun-03	4.5	2.5	-0.78	41	Nov-15	4.5	2.5	-0.78
18	Jun-04	4.5	8	-0.37	42	Jun-16	4.5	2.5	-0.78
19	Dec-04	4.5	8	-0.37	43	Nov-16	4.5	2.5	-0.78
20	Jun-05	4.5	6	-0.52	44	Jun-17	4.5	2.5	-0.78
21	Dec-05	4.5	5	-0.59	45	Nov-17	4.5	2.5	-0.78
22	Jun-06	4.5	6	-0.52	46	Jun-18	4.5	2.5	-0.78
23	Nov-06	4.5	6	-0.52	47	Nov-18	4.5	2.5	-0.78
24	Jun-07	4.5	6	-0.52	48	Jun-19	4.5	2.5	-0.78
25	Nov-07	4.5	6	-0.52	49	Nov-19	4.5	2.5	-0.78
26	Jul-08	4.5	4	-0.67					
27	Nov-08	4.5	0.5	-0.93					
28	Jun-09	4.5	0.5	-0.93					
29	Nov-09	4.5	2	-0.82					
30	Jun-10	4.5	2	-0.82					
31	Nov-10	4.5	4	-0.67					
32	Jun-11	4.5	6	-0.52					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

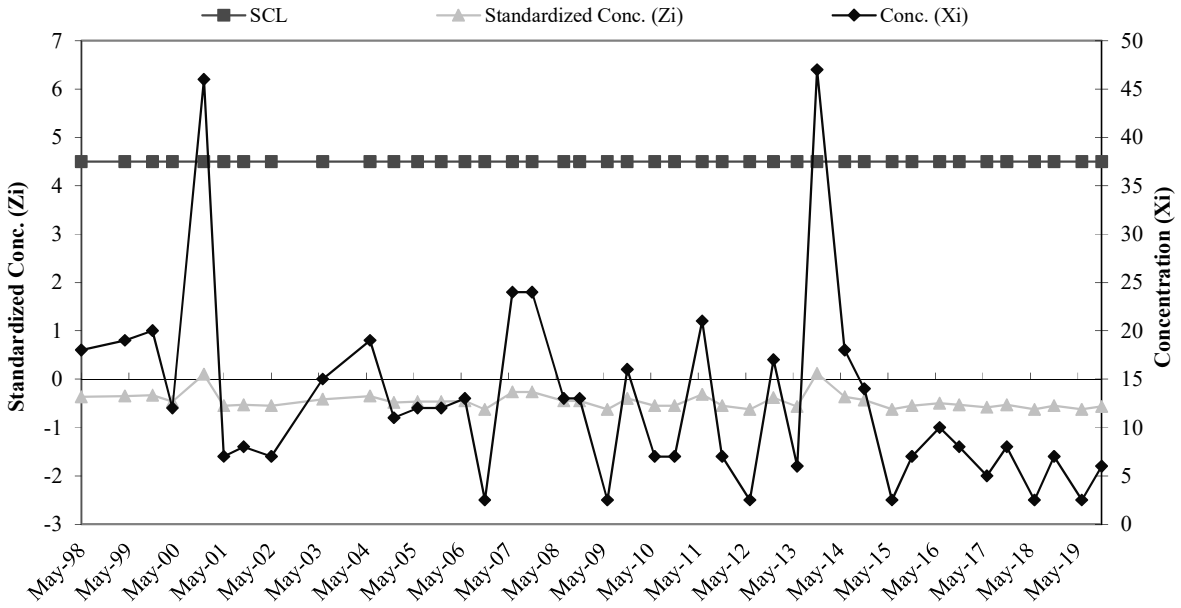


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-9 Ni

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	15		
2	Aug-95	20		
3	Feb-96	20		
4	Jun-96	10	**39.83**	**59.86**
5	Aug-96	10		
6	Nov-96	10		
7	May-97	51		
8	Nov-97	183		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	18	-0.36	33	Nov-11	4.5	7	-0.55
10	Apr-99	4.5	19	-0.35	34	Jun-12	4.5	2.5	-0.62
11	Nov-99	4.5	20	-0.33	35	Dec-12	4.5	17	-0.38
12	Apr-00	4.5	12	-0.46	36	Jun-13	4.5	6	-0.57
13	Dec-00	4.5	46	0.10	37	Nov-13	4.5	47	0.12
14	May-01	4.5	7	-0.55	38	Jun-14	4.5	18	-0.36
15	Oct-01	4.5	8	-0.53	39	Nov-14	4.5	14	-0.43
16	May-02	4.5	7	-0.55	40	Jun-15	4.5	2.5	-0.62
17	Jun-03	4.5	15	-0.41	41	Nov-15	4.5	7	-0.55
18	Jun-04	4.5	19	-0.35	42	Jun-16	4.5	10	-0.50
19	Dec-04	4.5	11	-0.48	43	Nov-16	4.5	8	-0.53
20	Jun-05	4.5	12	-0.46	44	Jun-17	4.5	5	-0.58
21	Dec-05	4.5	12	-0.46	45	Nov-17	4.5	8	-0.53
22	Jun-06	4.5	13	-0.45	46	Jun-18	4.5	2.5	-0.62
23	Nov-06	4.5	2.5	-0.62	47	Nov-18	4.5	7	-0.55
24	Jun-07	4.5	24	-0.26	48	Jun-19	4.5	2.5	-0.62
25	Nov-07	4.5	24	-0.26	49	Nov-19	4.5	6	-0.57
26	Jul-08	4.5	13	-0.45					
27	Nov-08	4.5	13	-0.45					
28	Jun-09	4.5	2.5	-0.62					
29	Nov-09	4.5	16	-0.40					
30	Jun-10	4.5	7	-0.55					
31	Nov-10	4.5	7	-0.55					
32	Jun-11	4.5	21	-0.31					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

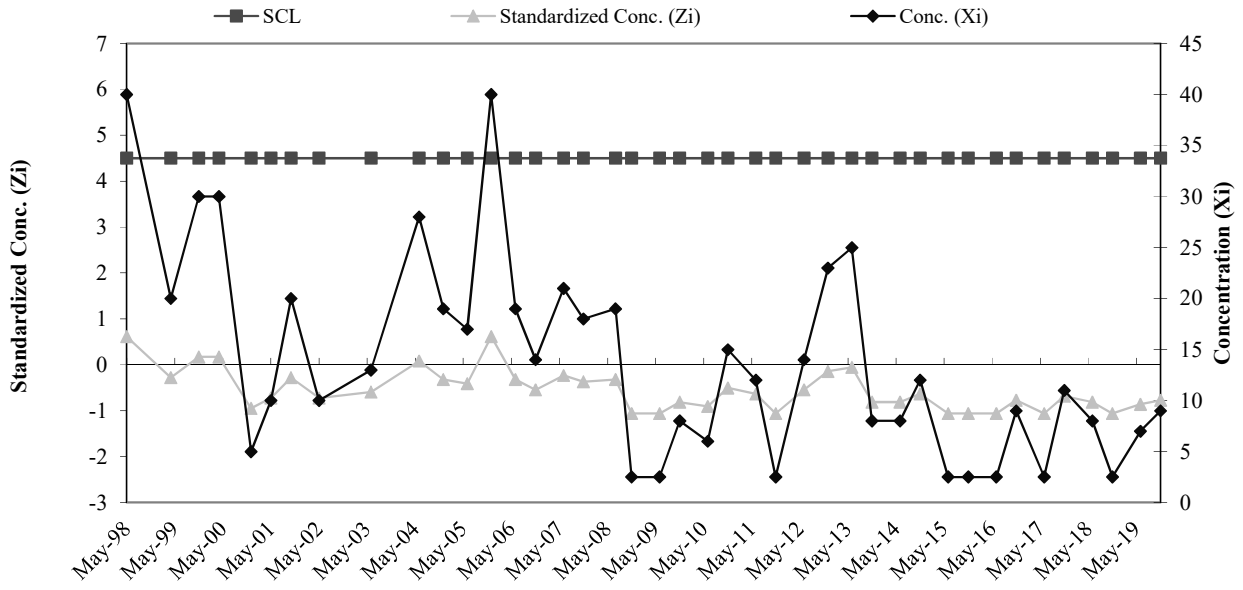


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-9 Zn

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	10		
2	Aug-95	10		
3	Feb-96	10		
4	Jun-96	10	**26.23**	**22.36**
5	Aug-96	70		
6	Nov-96	40		
7	May-97	20		
8	Nov-97	40		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	40	0.62	33	Nov-11	4.5	2.5	-1.06
10	Apr-99	4.5	20	-0.28	34	Jun-12	4.5	14	-0.55
11	Nov-99	4.5	30	0.17	35	Dec-12	4.5	23	-0.14
12	Apr-00	4.5	30	0.17	36	Jun-13	4.5	25	-0.06
13	Dec-00	4.5	5	-0.95	37	Nov-13	4.5	8	-0.82
14	May-01	4.5	10	-0.73	38	Jun-14	4.5	8	-0.82
15	Oct-01	4.5	20	-0.28	39	Nov-14	4.5	12	-0.64
16	May-02	4.5	10	-0.73	40	Jun-15	4.5	2.5	-1.06
17	Jun-03	4.5	13	-0.59	41	Nov-15	4.5	2.5	-1.06
18	Jun-04	4.5	28	0.08	42	Jun-16	4.5	2.5	-1.06
19	Dec-04	4.5	19	-0.32	43	Nov-16	4.5	9	-0.77
20	Jun-05	4.5	17	-0.41	44	Jun-17	4.5	2.5	-1.06
21	Dec-05	4.5	40	0.62	45	Nov-17	4.5	11	-0.68
22	Jun-06	4.5	19	-0.32	46	Jun-18	4.5	8	-0.82
23	Nov-06	4.5	14	-0.55	47	Nov-18	4.5	2.5	-1.06
24	Jun-07	4.5	21	-0.23	48	Jun-19	4.5	7	-0.86
25	Nov-07	4.5	18	-0.37	49	Nov-19	4.5	9	-0.77
26	Jul-08	4.5	19	-0.32					
27	Nov-08	4.5	2.5	-1.06					
28	Jun-09	4.5	2.5	-1.06					
29	Nov-09	4.5	8	-0.82					
30	Jun-10	4.5	6	-0.90					
31	Nov-10	4.5	15	-0.50					
32	Jun-11	4.5	12	-0.64					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

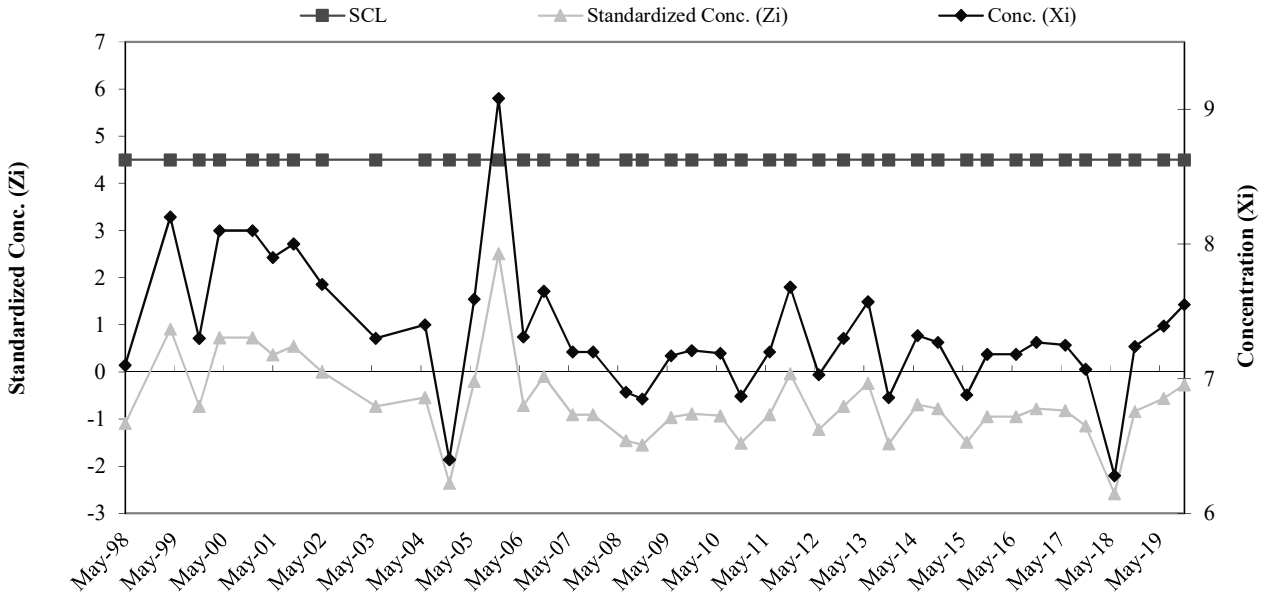


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-9 pH

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	7.7		
2	Aug-95	7.7		
3	Feb-96	7.3		
4	Jun-96	6.8	**7.20**	**0.55**
5	Aug-96	8.0		
6	Nov-96	6.8		
7	May-97	6.8		
8	Nov-97	6.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	6.6	-1.09	33	Nov-11	4.5	7.2	-0.04
10	Apr-99	4.5	7.7	0.91	34	Jun-12	4.5	6.5	-1.22
11	Nov-99	4.5	6.8	-0.73	35	Dec-12	4.5	6.8	-0.73
12	Apr-00	4.5	7.6	0.73	36	Jun-13	4.5	7.1	-0.24
13	Dec-00	4.5	7.6	0.73	37	Nov-13	4.5	6.4	-1.53
14	May-01	4.5	7.4	0.36	38	Jun-14	4.5	6.8	-0.69
15	Oct-01	4.5	7.5	0.55	39	Nov-14	4.5	6.8	-0.78
16	May-02	4.5	7.2	0.00	40	Jun-15	4.5	6.4	-1.49
17	Jun-03	4.5	6.8	-0.73	41	Nov-15	4.5	6.7	-0.94
18	Jun-04	4.5	6.9	-0.55	42	Jun-16	4.5	6.7	-0.94
19	Dec-04	4.5	5.9	-2.36	43	Nov-16	4.5	6.8	-0.78
20	Jun-05	4.5	7.1	-0.20	44	Jun-17	4.5	6.8	-0.82
21	Dec-05	4.5	8.6	2.51	45	Nov-17	4.5	6.6	-1.14
22	Jun-06	4.5	6.8	-0.71	46	Jun-18	4.5	5.8	-2.58
23	Nov-06	4.5	7.2	-0.09	47	Nov-18	4.5	6.7	-0.84
24	Jun-07	4.5	6.7	-0.91	48	Jun-19	4.5	6.9	-0.56
25	Nov-07	4.5	6.7	-0.91	49	Nov-19	4.5	7.1	-0.27
26	Jul-08	4.5	6.4	-1.45					
27	Nov-08	4.5	6.4	-1.54					
28	Jun-09	4.5	6.7	-0.96					
29	Nov-09	4.5	6.7	-0.89					
30	Jun-10	4.5	6.7	-0.93					
31	Nov-10	4.5	6.4	-1.51					
32	Jun-11	4.5	6.7	-0.91					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

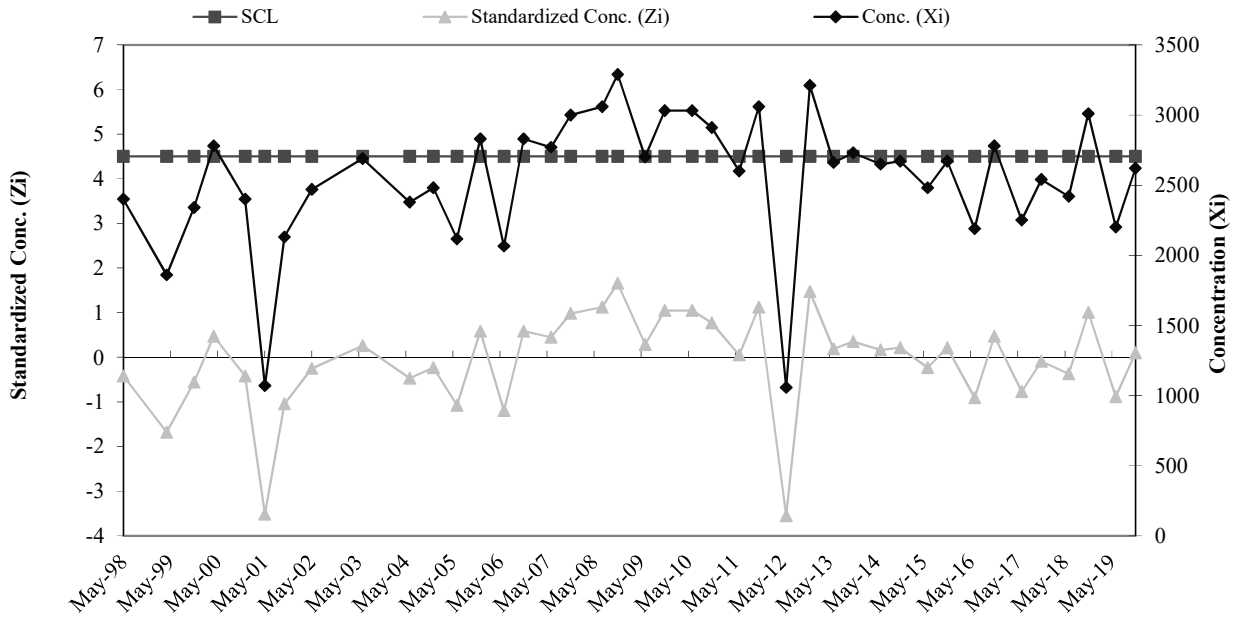


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-9 SpC

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	2400		
2	Aug-95	1829		
3	Feb-96	2860		
4	Jun-96	2550	**2,578.63**	**428.85**
5	Aug-96	2310		
6	Nov-96	3280		
7	May-97	2600		
8	Nov-97	2800		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	2400	-0.42	33	Nov-11	4.5	3060	1.12
10	Apr-99	4.5	1860	-1.68	34	Jun-12	4.5	1057	-3.55
11	Nov-99	4.5	2340	-0.56	35	Dec-12	4.5	3210	1.47
12	Apr-00	4.5	2780	0.47	36	Jun-13	4.5	2660	0.19
13	Dec-00	4.5	2400	-0.42	37	Nov-13	4.5	2730	0.35
14	May-01	4.5	1070	-3.52	38	Jun-14	4.5	2650	0.17
15	Oct-01	4.5	2130	-1.05	39	Nov-14	4.5	2670	0.21
16	May-02	4.5	2470	-0.25	40	Jun-15	4.5	2480	-0.23
17	Jun-03	4.5	2690	0.26	41	Nov-15	4.5	2670	0.21
18	Jun-04	4.5	2379	-0.47	42	Jun-16	4.5	2190	-0.91
19	Dec-04	4.5	2480	-0.23	43	Nov-16	4.5	2780	0.47
20	Jun-05	4.5	2116	-1.08	44	Jun-17	4.5	2250	-0.77
21	Dec-05	4.5	2830	0.59	45	Nov-17	4.5	2540	-0.09
22	Jun-06	4.5	2065	-1.20	46	Jun-18	4.5	2420	-0.37
23	Nov-06	4.5	2830	0.59	47	Nov-18	4.5	3010	1.01
24	Jun-07	4.5	2770	0.45	48	Jun-19	4.5	2200	-0.88
25	Nov-07	4.5	3000	0.98	49	Nov-19	4.5	2620	0.10
26	Jul-08	4.5	3060	1.12					
27	Nov-08	4.5	3290	1.66					
28	Jun-09	4.5	2700	0.28					
29	Nov-09	4.5	3030	1.05					
30	Jun-10	4.5	3030	1.05					
31	Nov-10	4.5	2910	0.77					
32	Jun-11	4.5	2600	0.05					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

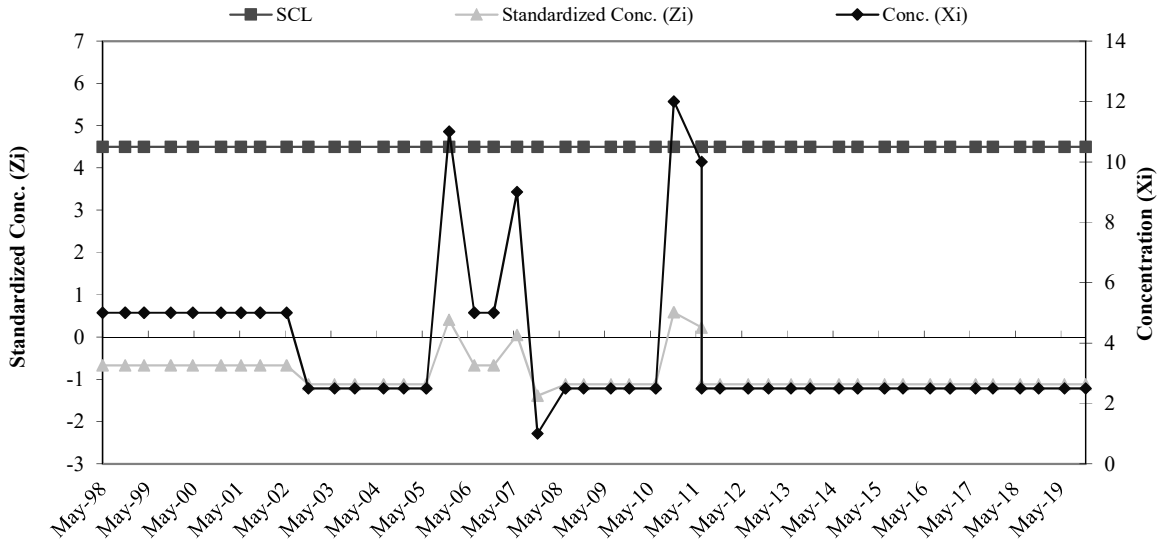


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-18a Cr

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	10		
2	Aug-95	10		
3	Feb-96	10		
4	Jun-96	10	**8.74**	**5.57**
5	Aug-96	10		
6	Nov-96	10		
7	May-97	5		
8	Nov-97	5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	5	-0.67	37	Nov-11	4.5	2.5	-1.12
10	Nov-98	4.5	5	-0.67	38	Jun-12	4.5	2.5	-1.12
11	Apr-99	4.5	5	-0.67	39	Dec-12	4.5	2.5	-1.12
12	Nov-99	4.5	5	-0.67	40	Jun-13	4.5	2.5	-1.12
13	Apr-00	4.5	5	-0.67	41	Nov-13	4.5	2.5	-1.12
14	Dec-00	4.5	5	-0.67	42	Jun-14	4.5	2.5	-1.12
15	May-01	4.5	5	-0.67	43	Nov-14	4.5	2.5	-1.12
16	Oct-01	4.5	5	-0.67	44	Jun-15	4.5	2.5	-1.12
17	May-02	4.5	5	-0.67	45	Nov-15	4.5	2.5	-1.12
18	Nov-02	4.5	2.5	-1.12	46	Jun-16	4.5	2.5	-1.12
19	Jun-03	4.5	2.5	-1.12	47	Nov-16	4.5	2.5	-1.12
20	Nov-03	4.5	2.5	-1.12	48	Jun-17	4.5	2.5	-1.12
21	Jun-04	4.5	2.5	-1.12	49	Nov-17	4.5	2.5	-1.12
22	Dec-04	4.5	2.5	-1.12	50	Jun-18	4.5	2.5	-1.12
23	Jun-05	4.5	2.5	-1.12	51	Nov-18	4.5	2.5	-1.12
24	Dec-05	4.5	11	0.41	52	Jun-19	4.5	2.5	-1.12
25	Jun-06	4.5	5	-0.67	53	Nov-19	4.5	2.5	-1.12
26	Nov-06	4.5	5	-0.67					
27	Jun-07	4.5	9	0.05					
28	Nov-07	4.5	1	-1.39					
29	Jun-08	4.5	2.5	-1.12					
30	Nov-08	4.5	2.5	-1.12					
31	Jun-09	4.5	2.5	-1.12					
32	Nov-09	4.5	2.5	-1.12					
33	Jun-10	4.5	2.5	-1.12					
34	Nov-10	4.5	12	0.59					
35	Jun-11	4.5	10	0.23					
36	Jun-11	4.5	2.5	-1.12					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

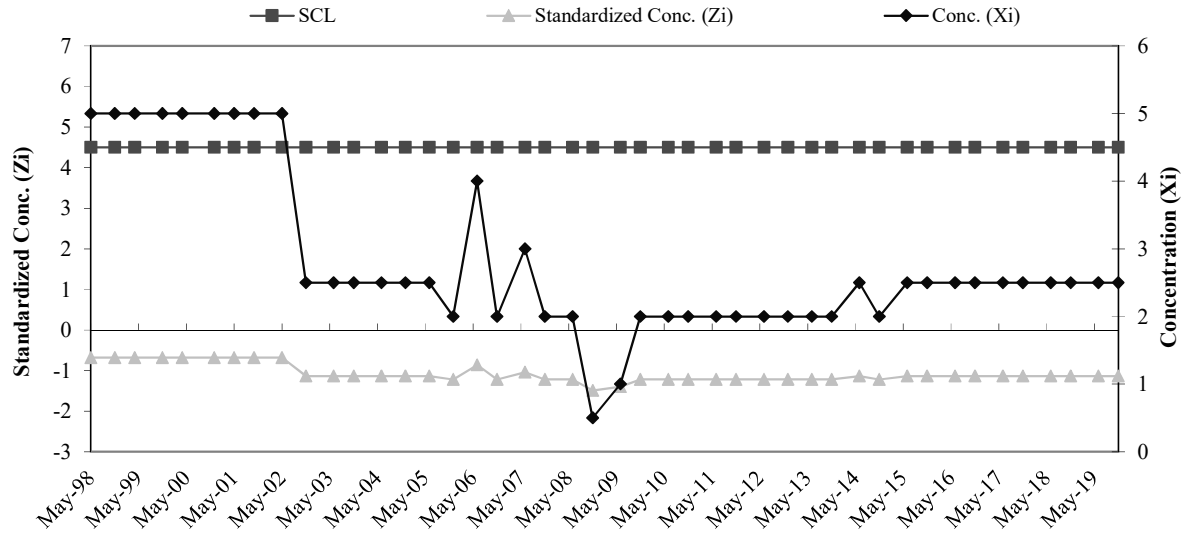


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-18a Cu

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	10		
2	Aug-95	10		
3	Feb-96	10		
4	Jun-96	10	**8.78**	**5.56**
5	Aug-96	10		
6	Nov-96	10		
7	May-97	5		
8	Nov-97	5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	5	-0.68	36	Nov-11	4.5	2	-1.22
10	Nov-98	4.5	5	-0.68	37	Jun-12	4.5	2	-1.22
11	Apr-99	4.5	5	-0.68	38	Dec-12	4.5	2	-1.22
12	Nov-99	4.5	5	-0.68	39	Jun-13	4.5	2	-1.22
13	Apr-00	4.5	5	-0.68	40	Nov-13	4.5	2	-1.22
14	Dec-00	4.5	5	-0.68	41	Jun-14	4.5	2.5	-1.13
15	May-01	4.5	5	-0.68	42	Nov-14	4.5	2	-1.22
16	Oct-01	4.5	5	-0.68	43	Jun-15	4.5	2.5	-1.13
17	May-02	4.5	5	-0.68	44	Nov-15	4.5	2.5	-1.13
18	Nov-02	4.5	2.5	-1.13	45	Jun-16	4.5	2.5	-1.13
19	Jun-03	4.5	2.5	-1.13	46	Nov-16	4.5	2.5	-1.13
20	Nov-03	4.5	2.5	-1.13	47	Jun-17	4.5	2.5	-1.13
21	Jun-04	4.5	2.5	-1.13	48	Nov-17	4.5	2.5	-1.13
22	Dec-04	4.5	2.5	-1.13	49	Jun-18	4.5	2.5	-1.13
23	Jun-05	4.5	2.5	-1.13	50	Nov-18	4.5	2.5	-1.13
24	Dec-05	4.5	2	-1.22	51	Jun-19	4.5	2.5	-1.13
25	Jun-06	4.5	4	-0.86	52	Nov-19	4.5	2.5	-1.13
26	Nov-06	4.5	2	-1.22					
27	Jun-07	4.5	3	-1.04					
28	Nov-07	4.5	2	-1.22					
29	Jun-08	4.5	2	-1.22					
30	Nov-08	4.5	0.5	-1.49					
31	Jun-09	4.5	1	-1.40					
32	Nov-09	4.5	2	-1.22					
33	Jun-10	4.5	2	-1.22					
34	Nov-10	4.5	2	-1.22					
35	Jun-11	4.5	2	-1.22					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

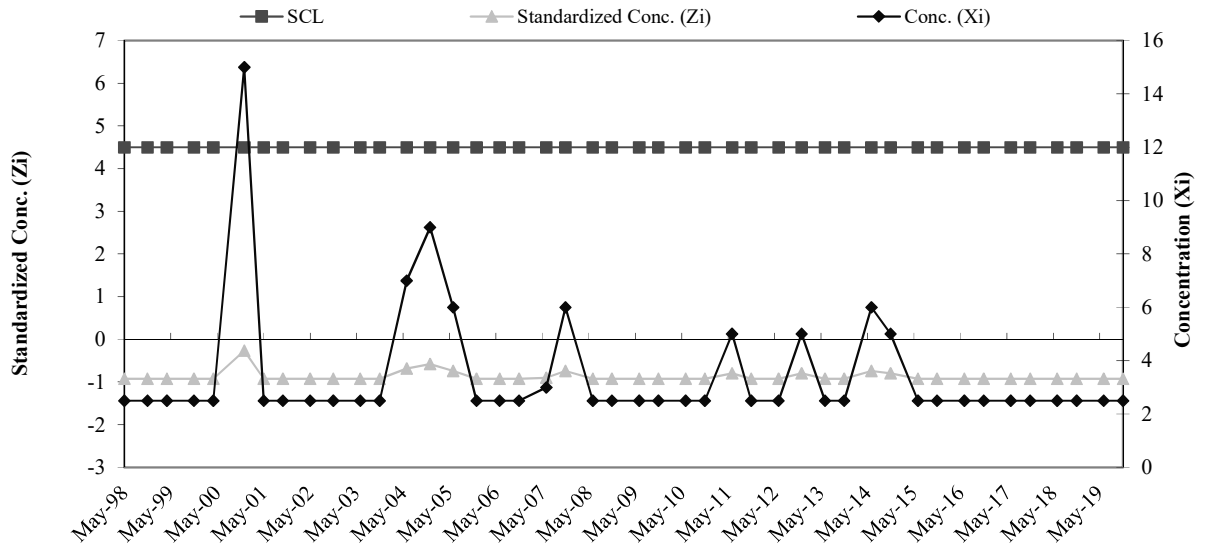


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-18a Ni

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	15		
2	Aug-95	20		
3	Feb-96	20		
4	Jun-96	10	**20.01**	**18.96**
5	Aug-96	10		
6	Nov-96	10		
7	May-97	13		
8	Nov-97	62		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	2.5	-0.92	36	Nov-11	4.5	2.5	-0.92
10	Nov-98	4.5	2.5	-0.92	37	Jun-12	4.5	2.5	-0.92
11	Apr-99	4.5	2.5	-0.92	38	Dec-12	4.5	5	-0.79
12	Nov-99	4.5	2.5	-0.92	39	Jun-13	4.5	2.5	-0.92
13	Apr-00	4.5	2.5	-0.92	40	Nov-13	4.5	2.5	-0.92
14	Dec-00	4.5	15	-0.26	41	Jun-14	4.5	6	-0.74
15	May-01	4.5	2.5	-0.92	42	Nov-14	4.5	5	-0.79
16	Oct-01	4.5	2.5	-0.92	43	Jun-15	4.5	2.5	-0.92
17	May-02	4.5	2.5	-0.92	44	Nov-15	4.5	2.5	-0.92
18	Nov-02	4.5	2.5	-0.92	45	Jun-16	4.5	2.5	-0.92
19	Jun-03	4.5	2.5	-0.92	46	Nov-16	4.5	2.5	-0.92
20	Nov-03	4.5	2.5	-0.92	47	Jun-17	4.5	2.5	-0.92
21	Jun-04	4.5	7	-0.69	48	Nov-17	4.5	2.5	-0.92
22	Dec-04	4.5	9	-0.58	49	Jun-18	4.5	2.5	-0.92
23	Jun-05	4.5	6	-0.74	50	Nov-18	4.5	2.5	-0.92
24	Dec-05	4.5	2.5	-0.92	51	Jun-19	4.5	2.5	-0.92
25	Jun-06	4.5	2.5	-0.92	52	Nov-19	4.5	2.5	-0.92
26	Nov-06	4.5	2.5	-0.92					
27	Jun-07	4.5	3	-0.90					
28	Nov-07	4.5	6	-0.74					
29	Jun-08	4.5	2.5	-0.92					
30	Nov-08	4.5	2.5	-0.92					
31	Jun-09	4.5	2.5	-0.92					
32	Nov-09	4.5	2.5	-0.92					
33	Jun-10	4.5	2.5	-0.92					
34	Nov-10	4.5	2.5	-0.92					
35	Jun-11	4.5	5	-0.79					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

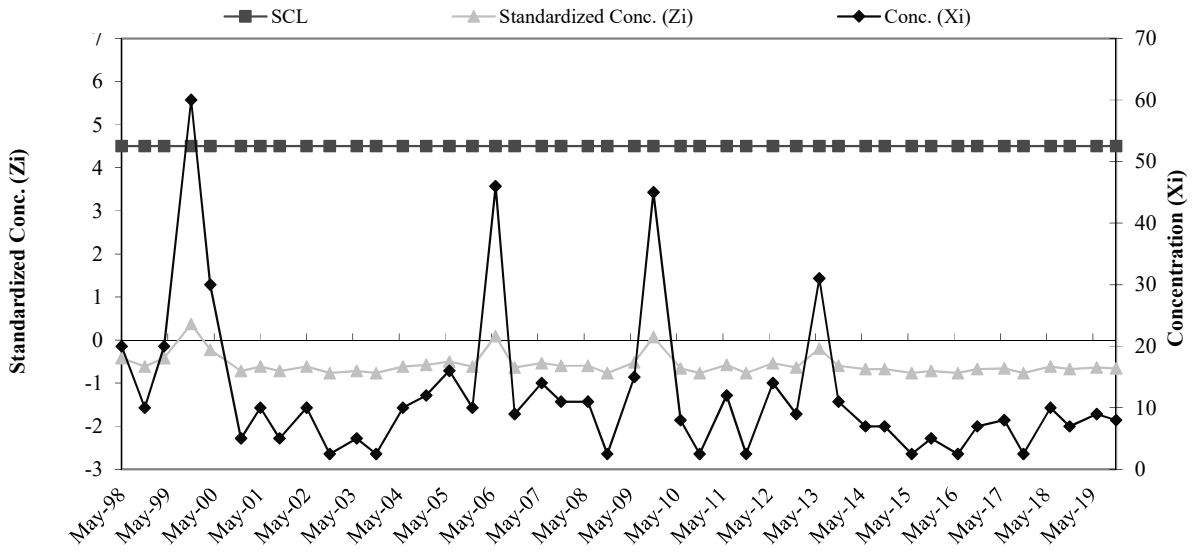


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-18a Zn

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	150		
2	Aug-95	10		
3	Feb-96	10		
4	Jun-96	10	**41.25**	**50.67**
5	Aug-96	60		
6	Nov-96	70		
7	May-97	10		
8	Nov-97	10		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	20	-0.42	36	Nov-11	4.5	2.5	-0.76
10	Nov-98	4.5	10	-0.62	37	Jun-12	4.5	14	-0.54
11	Apr-99	4.5	20	-0.42	38	Dec-12	4.5	9	-0.64
12	Nov-99	4.5	60	0.37	39	Jun-13	4.5	31	-0.20
13	Apr-00	4.5	30	-0.22	40	Nov-13	4.5	11	-0.60
14	Dec-00	4.5	5	-0.72	41	Jun-14	4.5	7	-0.68
15	May-01	4.5	10	-0.62	42	Nov-14	4.5	7	-0.68
16	Oct-01	4.5	5	-0.72	43	Jun-15	4.5	2.5	-0.76
17	May-02	4.5	10	-0.62	44	Nov-15	4.5	5	-0.72
18	Nov-02	4.5	2.5	-0.76	45	Jun-16	4.5	2.5	-0.76
19	Jun-03	4.5	5	-0.72	46	Nov-16	4.5	7	-0.68
20	Nov-03	4.5	2.5	-0.76	47	Jun-17	4.5	8	-0.66
21	Jun-04	4.5	10	-0.62	48	Nov-17	4.5	2.5	-0.76
22	Dec-04	4.5	12	-0.58	49	Jun-18	4.5	10	-0.62
23	Jun-05	4.5	16	-0.50	50	Nov-18	4.5	7	-0.68
24	Dec-05	4.5	10	-0.62	51	Jun-19	4.5	9	-0.64
25	Jun-06	4.5	46	0.09	52	Nov-19	4.5	8	-0.66
26	Nov-06	4.5	9	-0.64					
27	Jun-07	4.5	14	-0.54					
28	Nov-07	4.5	11	-0.60					
29	Jun-08	4.5	11	-0.60					
30	Nov-08	4.5	2.5	-0.76					
31	Jun-09	4.5	15	-0.52					
32	Nov-09	4.5	45	0.07					
33	Jun-10	4.5	8	-0.66					
34	Nov-10	4.5	2.5	-0.76					
35	Jun-11	4.5	12	-0.58					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

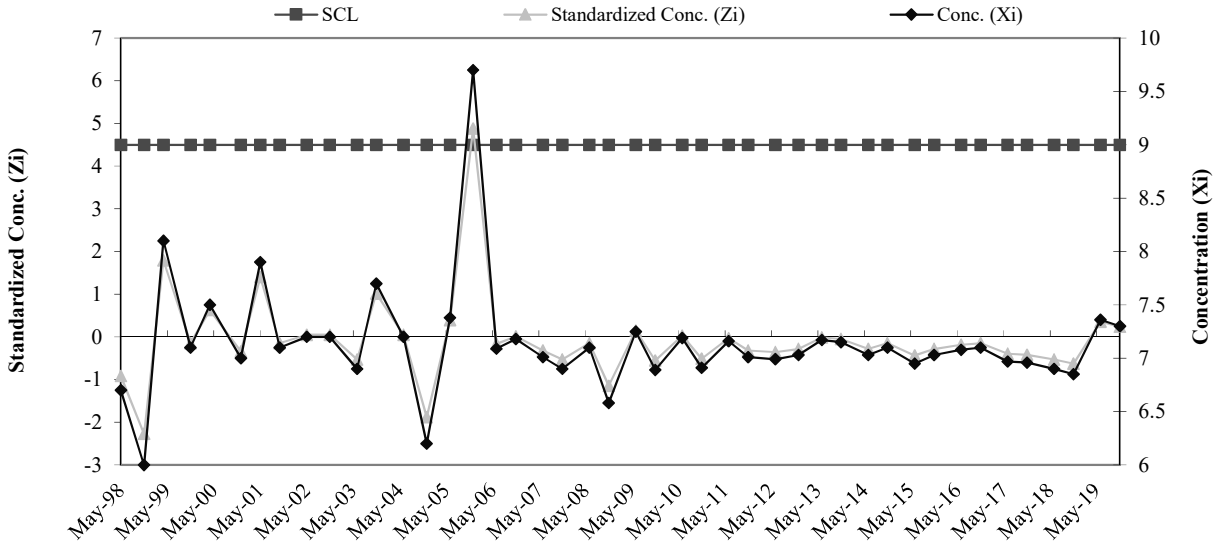


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-18a pH

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	7.5		
2	Aug-95	7.9		
3	Feb-96	7.4		
4	Jun-96	7.0	**7.18**	**0.52**
5	Aug-96	7.5		
6	Nov-96	7.2		
7	May-97	6.5		
8	Nov-97	6.4		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	6.7	-0.92	36	Nov-11	4.5	7.0	-0.32
10	Nov-98	4.5	6.0	-2.27	37	Jun-12	4.5	7.0	-0.36
11	Apr-99	4.5	8.1	1.79	38	Dec-12	4.5	7.0	-0.28
12	Nov-99	4.5	7.1	-0.14	39	Jun-13	4.5	7.2	-0.01
13	Apr-00	4.5	7.5	0.63	40	Nov-13	4.5	7.2	-0.05
14	Dec-00	4.5	7.0	-0.34	41	Jun-14	4.5	7.0	-0.28
15	May-01	4.5	7.9	1.40	42	Nov-14	4.5	7.1	-0.14
16	Oct-01	4.5	7.1	-0.14	43	Jun-15	4.5	7.0	-0.43
17	May-02	4.5	7.2	0.05	44	Nov-15	4.5	7.0	-0.28
18	Nov-02	4.5	7.2	0.05	45	Jun-16	4.5	7.1	-0.18
19	Jun-03	4.5	6.9	-0.53	46	Nov-16	4.5	7.1	-0.14
20	Nov-03	4.5	7.7	1.01	47	Jun-17	4.5	7.0	-0.40
21	Jun-04	4.5	7.2	0.05	48	Nov-17	4.5	7.0	-0.42
22	Dec-04	4.5	6.2	-1.88	49	Jun-18	4.5	6.9	-0.53
23	Jun-05	4.5	7.4	0.40	50	Nov-18	4.5	6.9	-0.63
24	Dec-05	4.5	9.7	4.88	51	Jun-19	4.5	7.4	0.36
25	Jun-06	4.5	7.1	-0.16	52	Nov-19	4.5	7.3	0.24
26	Nov-06	4.5	7.2	0.01					
27	Jun-07	4.5	7.0	-0.32					
28	Nov-07	4.5	6.9	-0.53					
29	Jun-08	4.5	7.1	-0.14					
30	Nov-08	4.5	6.6	-1.15					
31	Jun-09	4.5	7.3	0.14					
32	Nov-09	4.5	6.9	-0.55					
33	Jun-10	4.5	7.2	0.03					
34	Nov-10	4.5	6.9	-0.51					
35	Jun-11	4.5	7.2	-0.03					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

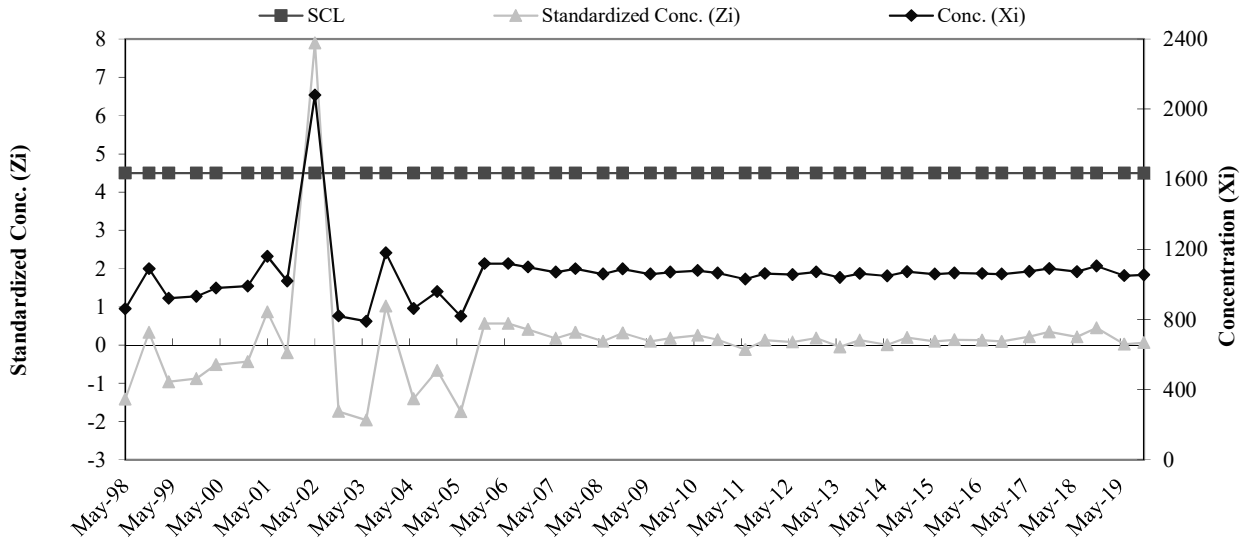


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-18a SpC

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-95	1048		
2	Aug-95	989		
3	Feb-96	1021		
4	Jun-96	944.0	**1,046.75**	**130.80**
5	Aug-96	1041		
6	Nov-96	1331		
7	May-97	900		
8	Nov-97	1100		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	May-98	4.5	862	-1.41	36	Nov-11	4.5	1063	0.12
10	Nov-98	4.5	1090.0	0.33	37	Jun-12	4.5	1057	0.08
11	Apr-99	4.5	921	-0.96	38	Dec-12	4.5	1071	0.19
12	Nov-99	4.5	932	-0.88	39	Jun-13	4.5	1040	-0.05
13	Apr-00	4.5	980	-0.51	40	Nov-13	4.5	1063	0.12
14	Dec-00	4.5	990.0	-0.43	41	Jun-14	4.5	1048	0.01
15	May-01	4.5	1160	0.87	42	Nov-14	4.5	1073	0.20
16	Oct-01	4.5	1020	-0.20	43	Jun-15	4.5	1060	0.10
17	May-02	4.5	2080	7.90	44	Nov-15	4.5	1065	0.14
18	Nov-02	4.5	820	-1.73	45	Jun-16	4.5	1063	0.12
19	Jun-03	4.5	790	-1.96	46	Nov-16	4.5	1059	0.09
20	Nov-03	4.5	1180	1.02	47	Jun-17	4.5	1075	0.22
21	Jun-04	4.5	863	-1.40	48	Nov-17	4.5	1092	0.35
22	Dec-04	4.5	960	-0.66	49	Jun-18	4.5	1074	0.21
23	Jun-05	4.5	819	-1.74	50	Nov-18	4.5	1106	0.45
24	Dec-05	4.5	1120	0.56	51	Jun-19	4.5	1050	0.02
25	Jun-06	4.5	1120	0.56	52	Nov-19	4.5	1055	0.06
26	Nov-06	4.5	1100	0.41					
27	Jun-07	4.5	1070	0.18					
28	Nov-07	4.5	1090	0.33					
29	Jun-08	4.5	1060	0.10					
30	Nov-08	4.5	1088	0.32					
31	Jun-09	4.5	1060	0.10					
32	Nov-09	4.5	1070	0.18					
33	Jun-10	4.5	1080	0.25					
34	Nov-10	4.5	1065	0.14					
35	Jun-11	4.5	1031	-0.12					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

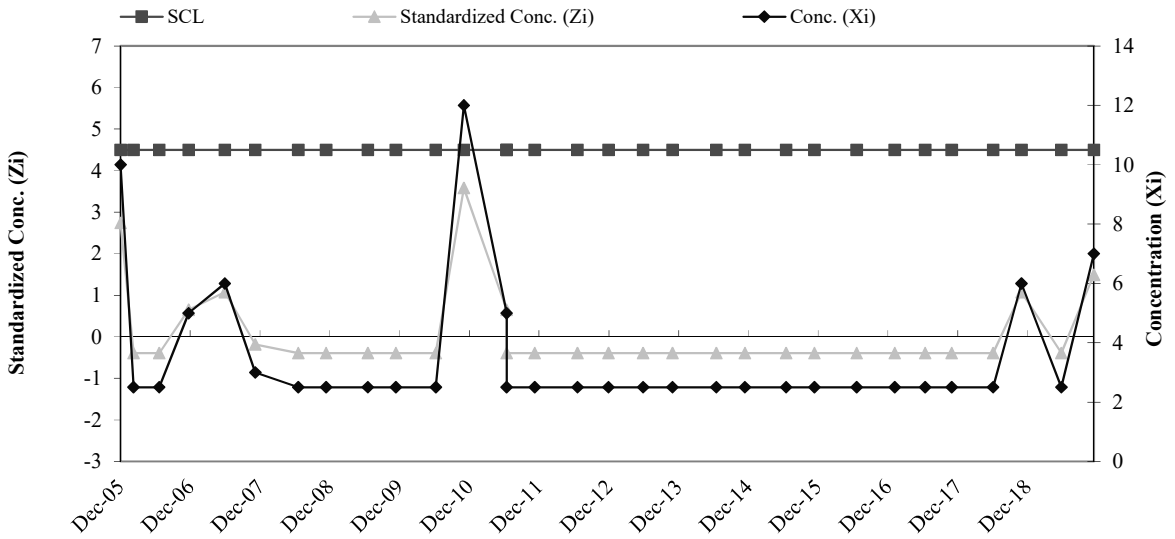


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-19a Cr

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	May-98	5		
2	May-01	5		
3	May-02	5		
4	Jun-03	2.5	**3.44**	**2.39**
5	Nov-03	2.5		
6	Jun-04	2.5		
7	Dec-04	2.5		
8	Jun-05	2.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Dec-05	4.5	10	2.74	37	Nov-18	4.5	6	1.07
10	Feb-06	4.5	2.5	-0.39	38	Jun-19	4.5	2.5	-0.39
11	Jun-06	4.5	2.5	-0.39	39	Nov-19	4.5	7	1.49
12	Nov-06	4.5	5	0.65					
13	Jun-07	4.5	6	1.07					
14	Nov-07	4.5	3	-0.18					
15	Jun-08	4.5	2.5	-0.39					
16	Nov-08	4.5	2.5	-0.39					
17	Jun-09	4.5	2.5	-0.39					
18	Nov-09	4.5	2.5	-0.39					
19	Jun-10	4.5	2.5	-0.39					
20	Nov-10	4.5	12	3.58					
21	Jun-11	4.5	5	0.65					
22	Jun-11	4.5	2.5	-0.39					
23	Nov-11	4.5	2.5	-0.39					
24	Jun-12	4.5	2.5	-0.39					
25	Dec-12	4.5	2.5	-0.39					
26	Jun-13	4.5	2.5	-0.39					
27	Nov-13	4.5	2.5	-0.39					
28	Jun-14	4.5	2.5	-0.39					
29	Nov-14	4.5	2.5	-0.39					
30	Jun-15	4.5	2.5	-0.39					
31	Nov-15	4.5	2.5	-0.39					
32	Jun-16	4.5	2.5	-0.39					
33	Jan-17	4.5	2.5	-0.39					
34	Jun-17	4.5	2.5	-0.39					
35	Nov-17	4.5	2.5	-0.39					
36	Jun-18	4.5	2.5	-0.39					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

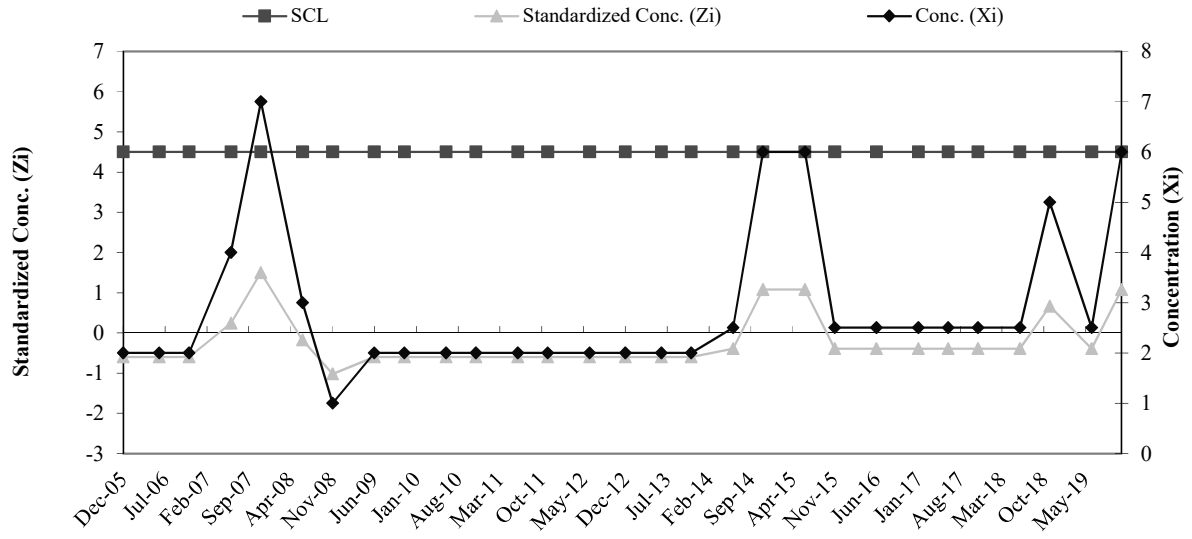


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-19a Cu

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	May-98	5		
2	May-01	5		
3	May-02	5		
4	Jun-03	2.5	**3.43**	**2.38**
5	Nov-03	2.5		
6	Jun-04	2.5		
7	Dec-04	2.5		
8	Jun-05	2.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Dec-05	4.5	2	-0.60	36	Jun-19	4.5	2.5	-0.39
10	Jun-06	4.5	2	-0.60		Nov-19	4.5	6	1.08
11	Nov-06	4.5	2	-0.60					
12	Jun-07	4.5	4	0.24					
13	Nov-07	4.5	7	1.50					
14	Jun-08	4.5	3	-0.18					
15	Nov-08	4.5	1	-1.02					
16	Jun-09	4.5	2	-0.60					
17	Nov-09	4.5	2	-0.60					
18	Jun-10	4.5	2	-0.60					
19	Nov-10	4.5	2	-0.60					
20	Jun-11	4.5	2	-0.60					
21	Nov-11	4.5	2	-0.60					
22	Jun-12	4.5	2	-0.60					
23	Dec-12	4.5	2	-0.60					
24	Jun-13	4.5	2	-0.60					
25	Nov-13	4.5	2	-0.60					
26	Jun-14	4.5	2.5	-0.39					
27	Nov-14	4.5	6	1.08					
28	Jun-15	4.5	6	1.08					
29	Nov-15	4.5	2.5	-0.39					
30	Jun-16	4.5	2.5	-0.39					
31	Jan-17	4.5	2.5	-0.39					
32	Jun-17	4.5	2.5	-0.39					
33	Nov-17	4.5	2.5	-0.39					
34	Jun-18	4.5	2.5	-0.39					
35	Nov-18	4.5	5	0.66					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

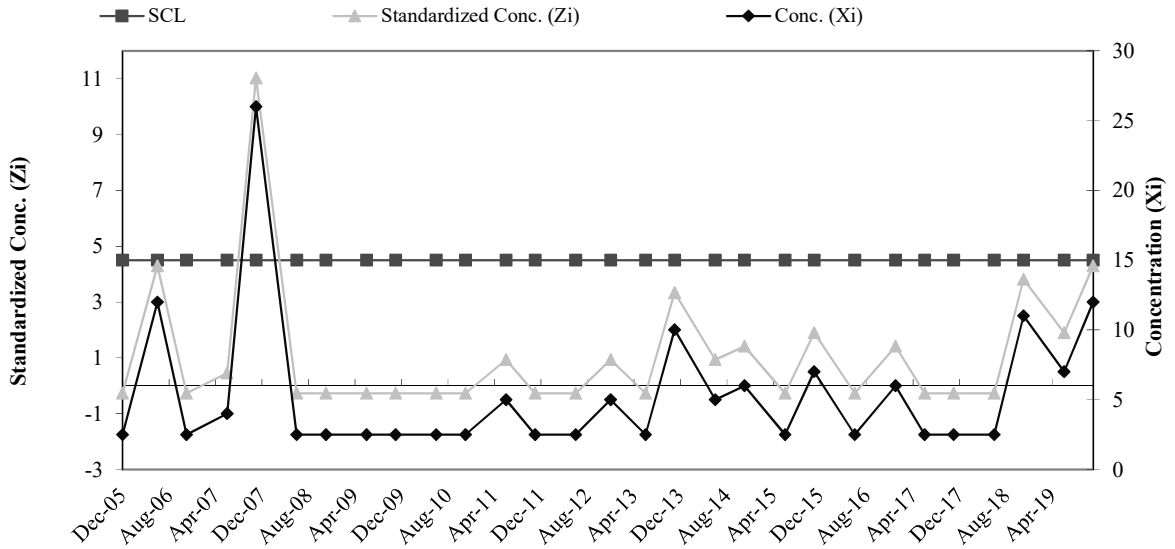


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-19a Ni

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	May-98	2.5		
2	May-01	2.5		
3	May-02	2.5		
4	Jun-03	2.5	**3.06**	**2.08**
5	Nov-03	2.5		
6	Jun-04	2.5		
7	Dec-04	2.5		
8	Jun-05	7		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Dec-05	4.5	2.5	-0.27	37	Jun-19	4.5	7	1.89
10	Jun-06	4.5	12	4.30	38	Nov-19	4.5	12	4.30
11	Nov-06	4.5	2.5	-0.27					
12	Jun-07	4.5	4	0.45					
13	Nov-07	4.5	26	11.03					
14	Jun-08	4.5	2.5	-0.27					
15	Nov-08	4.5	2.5	-0.27					
16	Jun-09	4.5	2.5	-0.27					
17	Nov-09	4.5	2.5	-0.27					
19	Jun-10	4.5	2.5	-0.27					
20	Nov-10	4.5	2.5	-0.27					
21	Jun-11	4.5	5	0.93					
22	Nov-11	4.5	2.5	-0.27					
23	Jun-12	4.5	2.5	-0.27					
24	Dec-12	4.5	5	0.93					
25	Jun-13	4.5	2.5	-0.27					
26	Nov-13	4.5	10	3.34					
27	Jun-14	4.5	5	0.93					
28	Nov-14	4.5	6	1.41					
29	Jun-15	4.5	2.5	-0.27					
30	Nov-15	4.5	7	1.89					
31	Jun-16	4.5	2.5	-0.27					
32	Jan-17	4.5	6	1.41					
33	Jun-17	4.5	2.5	-0.27					
34	Nov-17	4.5	2.5	-0.27					
35	Jun-18	4.5	2.5	-0.27					
36	Nov-18	4.5	11	3.82					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

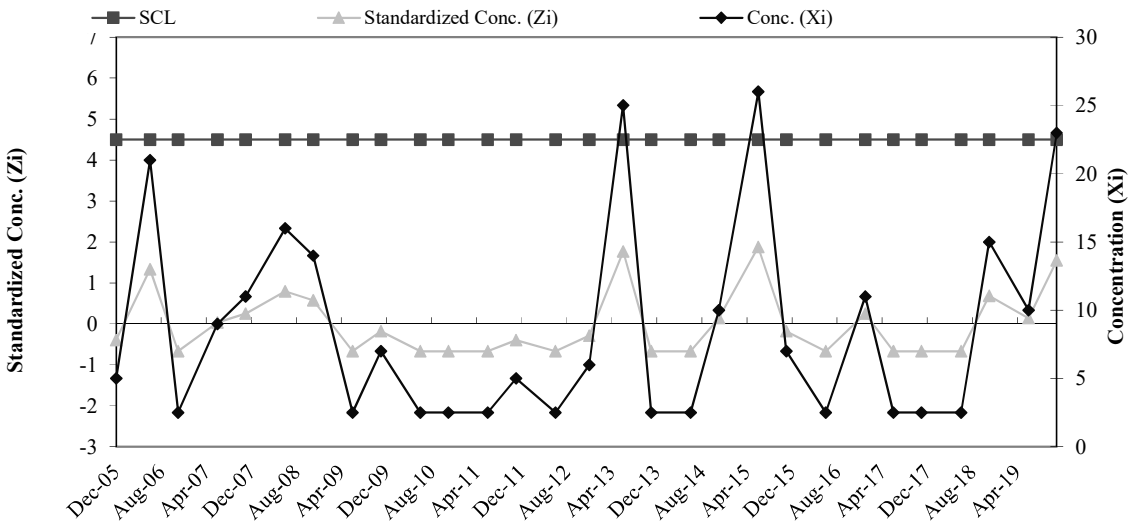


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-19a Zn

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	May-98	30	**8.69**	**9.24**
2	May-01	5		
3	May-02	10		
4	Jun-03	2.5		
5	Nov-03	2.5		
6	Jun-04	8		
7	Dec-04	9		
8	Jun-05	2.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Dec-05	4.5	5	-0.40	37	Nov-19	4.5	23	1.55
10	Jun-06	4.5	21	1.33					
11	Nov-06	4.5	2.5	-0.67					
12	Jun-07	4.5	9	0.03					
13	Nov-07	4.5	11	0.25					
14	Jun-08	4.5	16	0.79					
15	Nov-08	4.5	14	0.57					
16	Jun-09	4.5	2.5	-0.67					
17	Nov-09	4.5	7	-0.18					
18	Jun-10	4.5	2.5	-0.67					
19	Nov-10	4.5	2.5	-0.67					
20	Jun-11	4.5	2.5	-0.67					
21	Nov-11	4.5	5	-0.40					
22	Jun-12	4.5	2.5	-0.67					
23	Dec-12	4.5	6	-0.29					
24	Jun-13	4.5	25	1.77					
25	Nov-13	4.5	2.5	-0.67					
26	Jun-14	4.5	2.5	-0.67					
27	Nov-14	4.5	10	0.14					
28	Jun-15	4.5	26	1.87					
29	Nov-15	4.5	7	-0.18					
30	Jun-16	4.5	2.5	-0.67					
31	Jan-17	4.5	11	0.25					
32	Jun-17	4.5	2.5	-0.67					
33	Nov-17	4.5	2.5	-0.67					
34	Jun-18	4.5	2.5	-0.67					
35	Nov-18	4.5	15	0.68					
36	Jun-19	4.5	10	0.14					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

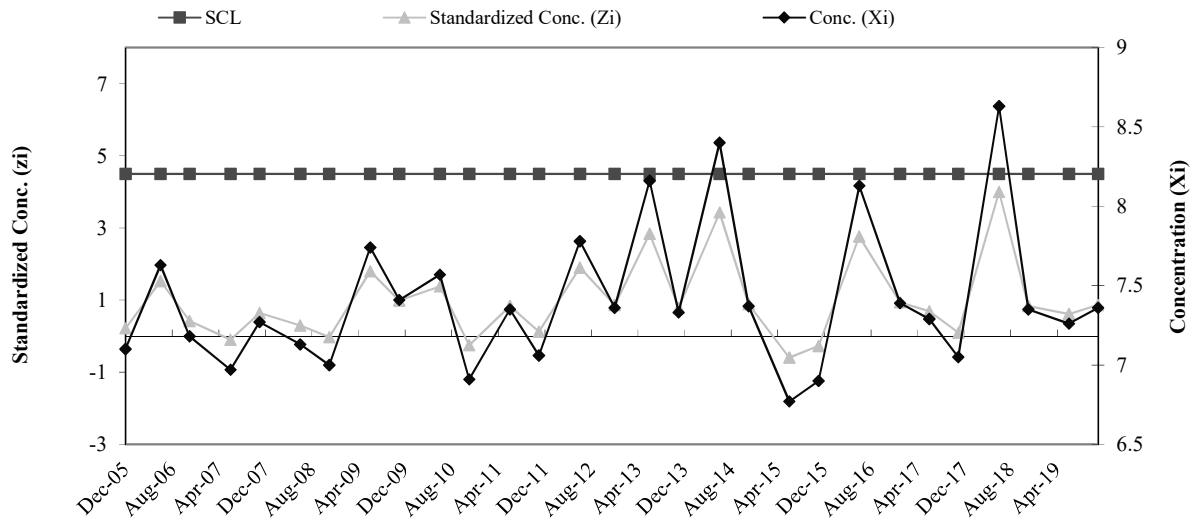


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-19a pH

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	May-98	6.8		
2	May-01	7.1		
3	May-02	7.2		
4	Jun-03	6.9	**7.01**	**0.40**
5	Nov-03	7.6		
6	Jun-04	7.2		
7	Dec-04	6.2		
8	Jun-05	7.1		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Dec-05	4.5	7.1	0.22					
10	Jun-06	4.5	7.6	1.53					
11	Nov-06	4.5	7.2	0.42					
12	Jun-07	4.5	7.0	-0.10					
13	Nov-07	4.5	7.3	0.64					
14	Jun-08	4.5	7.1	0.29					
15	Nov-08	4.5	7.0	-0.03					
16	Jun-09	4.5	7.7	1.80					
17	Nov-09	4.5	7.4	0.99					
18	Jun-10	4.5	7.6	1.38					
19	Nov-10	4.5	6.9	-0.25					
20	Jun-11	4.5	7.4	0.84					
21	Nov-11	4.5	7.1	0.12					
22	Jun-12	4.5	7.8	1.90					
23	Dec-12	4.5	7.4	0.86					
24	Jun-13	4.5	8.2	2.84					
25	Nov-13	4.5	7.3	0.79					
26	Jun-14	4.5	8.4	3.43					
27	Nov-14	4.5	7.4	0.89					
28	Jun-15	4.5	6.8	-0.60					
29	Nov-15	4.5	6.9	-0.27					
30	Jun-16	4.5	8.1	2.76					
31	Jan-17	4.5	7.4	0.94					
32	Jun-17	4.5	7.3	0.69					
33	Nov-17	4.5	7.1	0.10					
34	Jun-18	4.5	8.6	4.00					
35	Nov-18	4.5	7.4	0.84					
36	Jun-19	4.5	7.3	0.61					
37	Nov-19	4.5	7.4	0.86					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

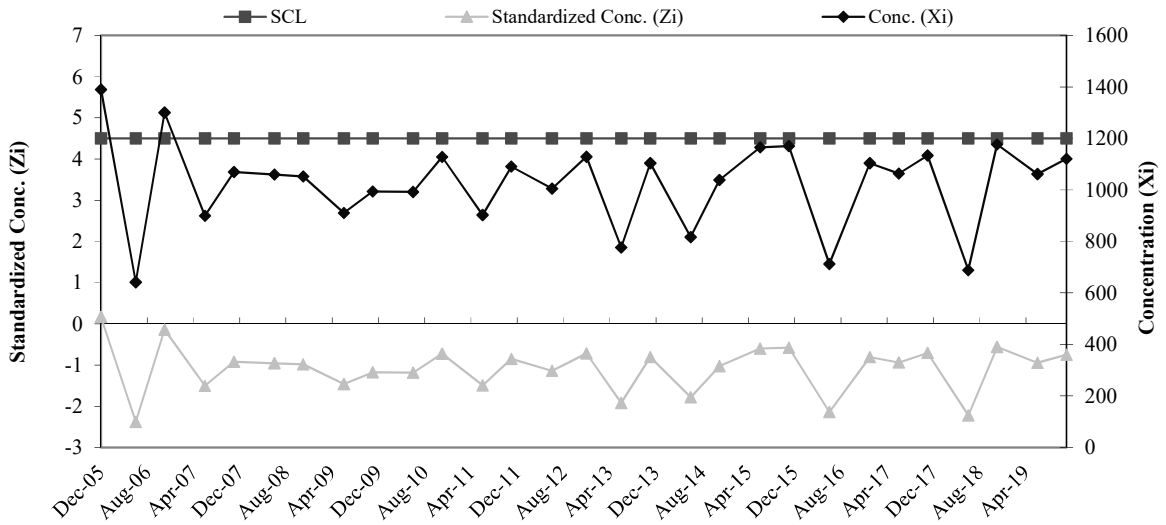


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-19a SpC

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	May-98	1480		
2	May-01	1050		
3	May-02	1740		
4	Jun-03	1350	**1,340.63**	**293.72**
5	Nov-03	1620		
6	Jun-04	1316		
7	Dec-04	1340		
8	Jun-05	829		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Dec-05	4.5	1390	0.17					
10	Jun-06	4.5	642	-2.38					
11	Nov-06	4.5	1300	-0.14					
12	Jun-07	4.5	899	-1.50					
13	Nov-07	4.5	1070	-0.92					
14	Jun-08	4.5	1060	-0.96					
15	Nov-08	4.5	1052	-0.98					
16	Jun-09	4.5	911	-1.46					
17	Nov-09	4.5	994	-1.18					
18	Jun-10	4.5	992	-1.19					
19	Nov-10	4.5	1128	-0.72					
20	Jun-11	4.5	902	-1.49					
21	Nov-11	4.5	1091	-0.85					
22	Jun-12	4.5	1005	-1.14					
23	Dec-12	4.5	1129	-0.72					
24	Jun-13	4.5	777	-1.92					
25	Nov-13	4.5	1104	-0.81					
26	Jun-14	4.5	817	-1.78					
27	Nov-14	4.5	1038	-1.03					
28	Jun-15	4.5	1165	-0.60					
29	Nov-15	4.5	1170	-0.58					
30	Jun-16	4.5	712	-2.14					
31	Jan-17	4.5	1104	-0.81					
32	Jun-17	4.5	1064	-0.94					
33	Nov-17	4.5	1134	-0.70					
34	Jun-18	4.5	688	-2.22					
35	Nov-18	4.5	1176	-0.56					
36	Jun-19	4.5	1062	-0.95					
37	Nov-19	4.5	1121	-0.75					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

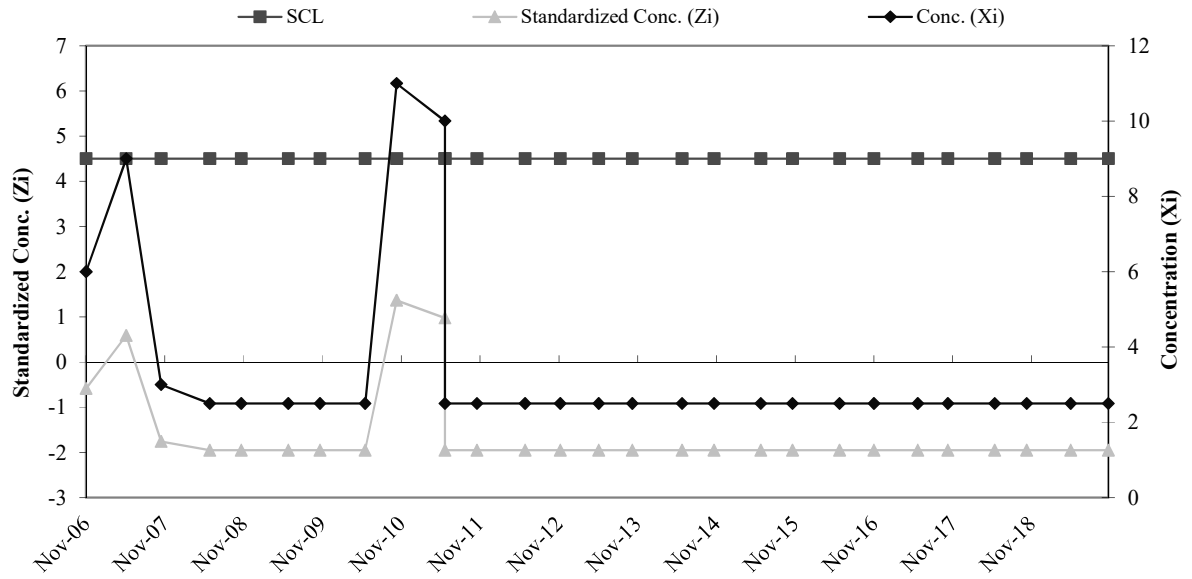


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-24 Cr

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Aug-96	10	**7.50**	**2.56**
2	Nov-96	10		
3	May-97	5		
4	May-98	5		
5	Nov-03	5		
6	Jun-05	8		
7	Dec-05	11		
8	Jun-06	6		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-06	4.5	6	-0.59	35	May-19	4.5	2.5	-1.95
10	Jun-07	4.5	9	0.59	36	Nov-19	4.5	2.5	-1.95
11	Nov-07	4.5	3	-1.76					
12	Jun-08	4.5	2.5	-1.95					
13	Nov-08	4.5	2.5	-1.95					
14	Jun-09	4.5	2.5	-1.95					
15	Nov-09	4.5	2.5	-1.95					
16	Jun-10	4.5	2.5	-1.95					
17	Nov-10	4.5	11	1.37					
18	Jun-11	4.5	10	0.98					
19	Jun-11	4.5	2.5	-1.95					
20	Nov-11	4.5	2.5	-1.95					
21	Jun-12	4.5	2.5	-1.95					
22	Dec-12	4.5	2.5	-1.95					
23	Jun-13	4.5	2.5	-1.95					
24	Nov-13	4.5	2.5	-1.95					
25	Jun-14	4.5	2.5	-1.95					
26	Nov-14	4.5	2.5	-1.95					
27	Jun-15	4.5	2.5	-1.95					
28	Nov-15	4.5	2.5	-1.95					
29	Jun-16	4.5	2.5	-1.95					
30	Nov-16	4.5	2.5	-1.95					
31	Jun-17	4.5	2.5	-1.95					
32	Nov-17	4.5	2.5	-1.95					
33	Jun-18	4.5	2.5	-1.95					
34	Nov-18	4.5	2.5	-1.95					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

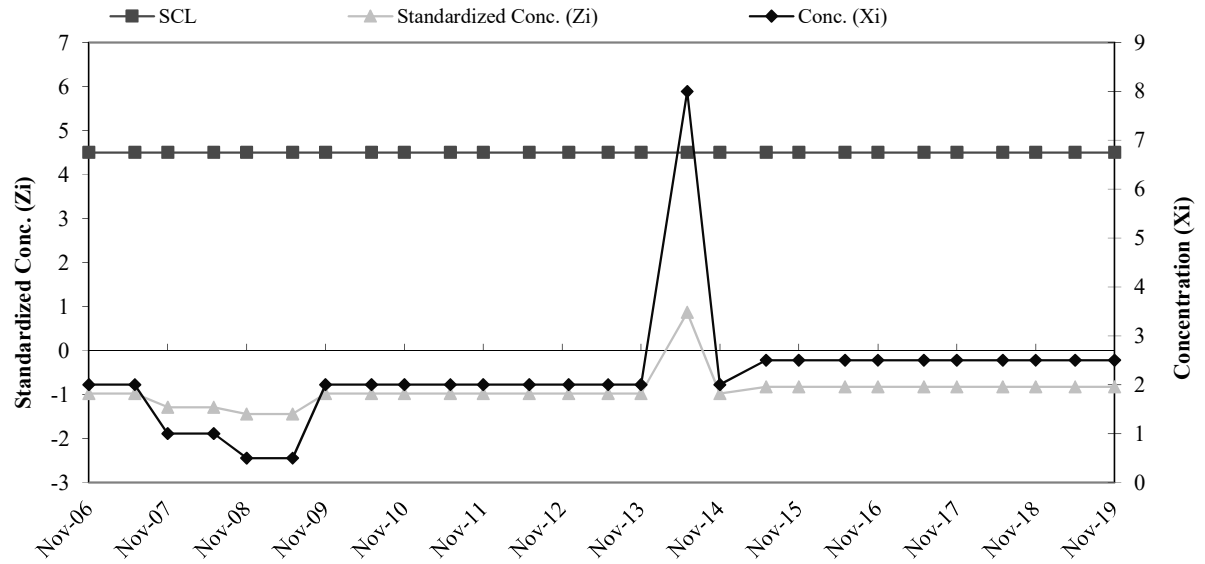


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-24 Cu

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Aug-96	10		
2	Nov-96	10		
3	May-97	5		
4	May-98	5	**5.19**	**3.25**
5	Nov-03	5		
6	Jun-05	2.5		
7	Dec-05	2		
8	Jun-06	2		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-06	4.5	2	-0.98	35	Nov-19	4.5	2.5	-0.83
10	Jun-07	4.5	2	-0.98					
11	Nov-07	4.5	1	-1.29					
12	Jun-08	4.5	1	-1.29					
13	Nov-08	4.5	0.5	-1.44					
14	Jun-09	4.5	0.5	-1.44					
15	Nov-09	4.5	2	-0.98					
16	Jun-10	4.5	2	-0.98					
17	Nov-10	4.5	2	-0.98					
18	Jun-11	4.5	2	-0.98					
19	Nov-11	4.5	2	-0.98					
20	Jun-12	4.5	2	-0.98					
21	Dec-12	4.5	2	-0.98					
22	Jun-13	4.5	2	-0.98					
23	Nov-13	4.5	2	-0.98					
24	Jun-14	4.5	8	0.87					
25	Nov-14	4.5	2	-0.98					
26	Jun-15	4.5	2.5	-0.83					
27	Nov-15	4.5	2.5	-0.83					
28	Jun-16	4.5	2.5	-0.83					
29	Nov-16	4.5	2.5	-0.83					
30	Jun-17	4.5	2.5	-0.83					
31	Nov-17	4.5	2.5	-0.83					
32	Jun-18	4.5	2.5	-0.83					
33	Nov-18	4.5	2.5	-0.83					
34	May-19	4.5	2.5	-0.83					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

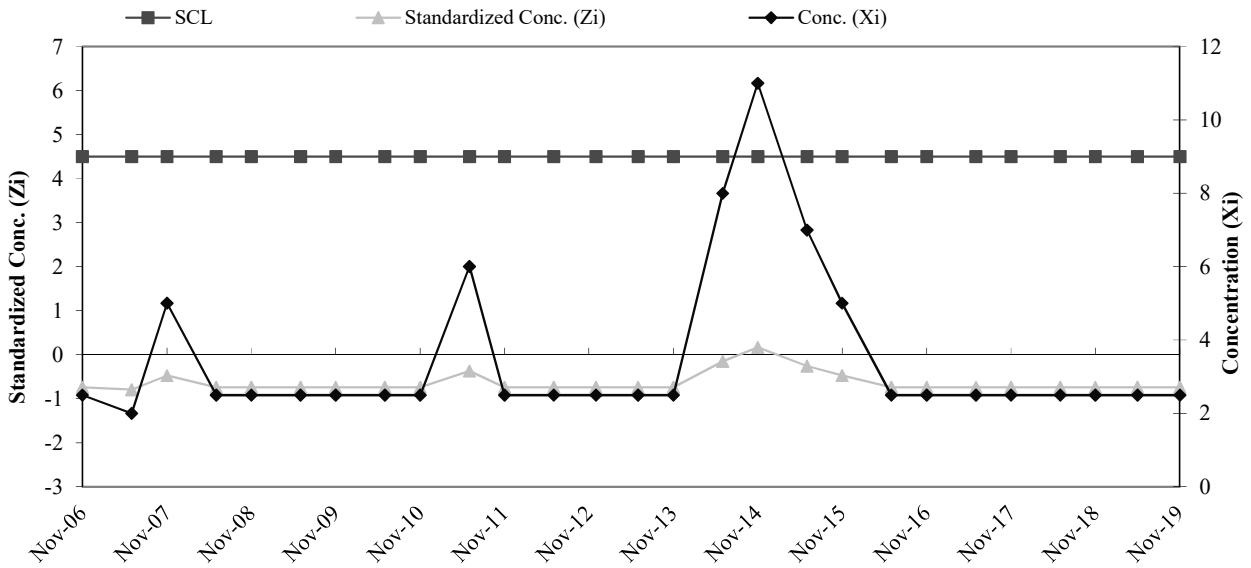


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-24 Ni

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Aug-96	10		
2	Nov-96	10		
3	May-97	31		
4	May-98	8	**9.44**	**9.35**
5	Nov-03	9		
6	Jun-05	2.5		
7	Dec-05	2.5		
8	Jun-06	2.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-06	4.5	2.5	-0.74	35	Nov-19	4.5	2.5	-0.74
10	Jun-07	4.5	2	-0.80					
11	Nov-07	4.5	5	-0.47					
12	Jun-08	4.5	2.5	-0.74					
13	Nov-08	4.5	2.5	-0.74					
14	Jun-09	4.5	2.5	-0.74					
15	Nov-09	4.5	2.5	-0.74					
16	Jun-10	4.5	2.5	-0.74					
17	Nov-10	4.5	2.5	-0.74					
18	Jun-11	4.5	6	-0.37					
19	Nov-11	4.5	2.5	-0.74					
20	Jun-12	4.5	2.5	-0.74					
21	Dec-12	4.5	2.5	-0.74					
22	Jun-13	4.5	2.5	-0.74					
23	Nov-13	4.5	2.5	-0.74					
24	Jun-14	4.5	8	-0.15					
25	Nov-14	4.5	11	0.17					
26	Jun-15	4.5	7	-0.26					
27	Nov-15	4.5	5	-0.47					
28	Jun-16	4.5	2.5	-0.74					
29	Nov-16	4.5	2.5	-0.74					
30	Jun-17	4.5	2.5	-0.74					
31	Nov-17	4.5	2.5	-0.74					
32	Jun-18	4.5	2.5	-0.74					
33	Nov-18	4.5	2.5	-0.74					
34	May-19	4.5	2.5	-0.74					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

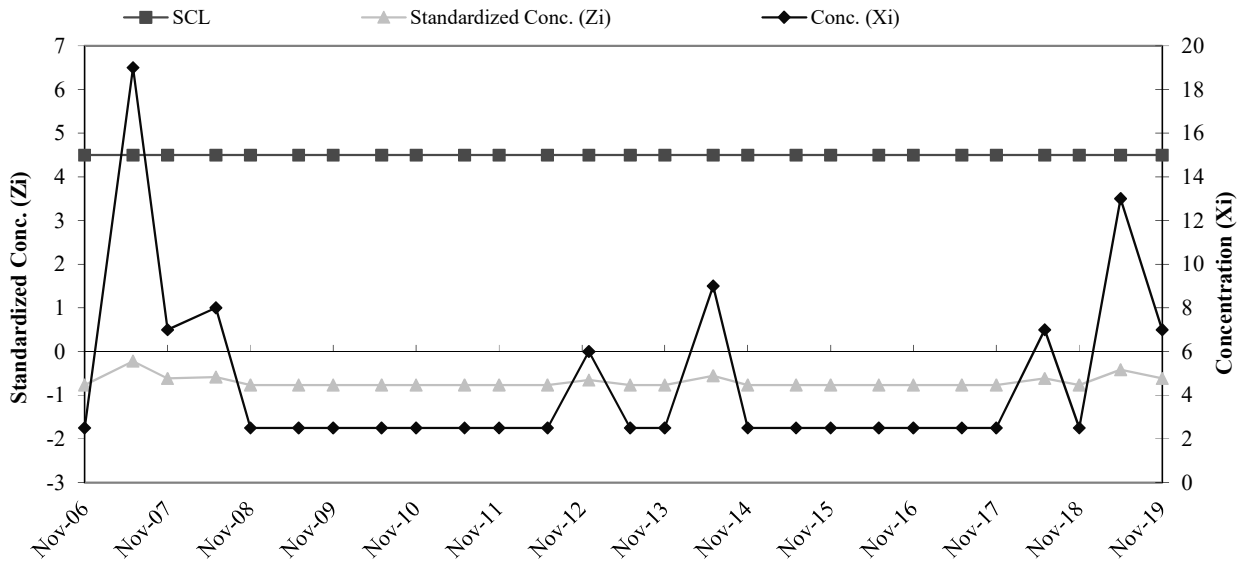


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-24 Zn

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Aug-96	90		
2	Nov-96	50		
3	May-97	10		
4	May-98	20	**25.63**	**30.14**
5	Nov-03	20		
6	Jun-05	2.5		
7	Dec-05	10		
8	Jun-06	2.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-06	4.5	2.5	-0.77	35	Nov-19	4.5	7	-0.62
10	Jun-07	4.5	19	-0.22					
11	Nov-07	4.5	7	-0.62					
12	Jun-08	4.5	8	-0.58					
13	Nov-08	4.5	2.5	-0.77					
14	Jun-09	4.5	2.5	-0.77					
15	Nov-09	4.5	2.5	-0.77					
16	Jun-10	4.5	2.5	-0.77					
17	Nov-10	4.5	2.5	-0.77					
18	Jun-11	4.5	2.5	-0.77					
19	Nov-11	4.5	2.5	-0.77					
20	Jun-12	4.5	2.5	-0.77					
21	Dec-12	4.5	6	-0.65					
22	Jun-13	4.5	2.5	-0.77					
23	Nov-13	4.5	2.5	-0.77					
24	Jun-14	4.5	9	-0.55					
25	Nov-14	4.5	2.5	-0.77					
26	Jun-15	4.5	2.5	-0.77					
27	Nov-15	4.5	2.5	-0.77					
28	Jun-16	4.5	2.5	-0.77					
29	Nov-16	4.5	2.5	-0.77					
30	Jun-17	4.5	2.5	-0.77					
31	Nov-17	4.5	2.5	-0.77					
32	Jun-18	4.5	7	-0.62					
33	Nov-18	4.5	2.5	-0.77					
34	May-19	4.5	13	-0.42					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

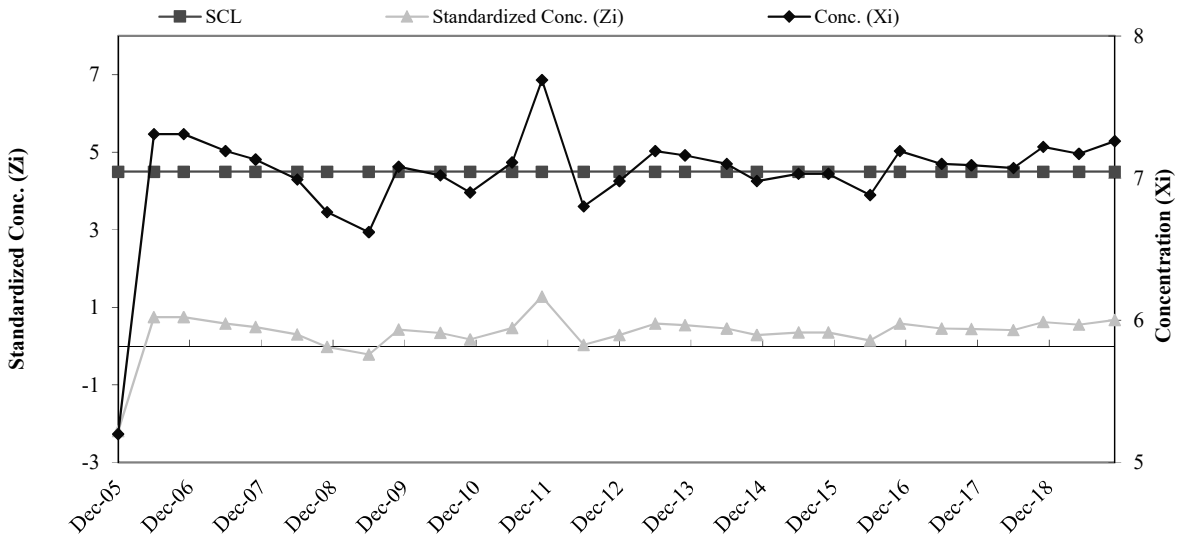


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-24 pH

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Aug-96	7.8	**6.78**	**0.72**
2	Nov-96	7.1		
3	May-97	6.4		
4	May-98	7		
5	Nov-98	6		
6	Nov-99	7		
7	May-01	6.4		
8	Jun-05	7.3		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Dec-05	4.5	5.2	-2.20	35	Nov-19	4.5	7.3	0.68
10	Jun-06	4.5	7.3	0.75					
11	Nov-06	4.5	7.3	0.75					
12	Jun-07	4.5	7.2	0.58					
13	Nov-07	4.5	7.1	0.50					
14	Jun-08	4.5	7.0	0.30					
15	Nov-08	4.5	6.8	-0.02					
14	Jun-09	4.5	6.6	-0.22					
15	Nov-09	4.5	7.1	0.43					
16	Jun-10	4.5	7.0	0.34					
17	Nov-10	4.5	6.9	0.17					
18	Jun-11	4.5	7.1	0.47					
19	Nov-11	4.5	7.7	1.28					
20	Jun-12	4.5	6.8	0.03					
21	Dec-12	4.5	7.0	0.29					
22	Jun-13	4.5	7.2	0.58					
23	Nov-13	4.5	7.2	0.54					
24	Jun-14	4.5	7.1	0.45					
25	Nov-14	4.5	7.0	0.29					
26	Jun-15	4.5	7.0	0.36					
27	Nov-15	4.5	7.0	0.36					
28	Jun-16	4.5	6.9	0.15					
29	Nov-16	4.5	7.2	0.58					
30	Jun-17	4.5	7.1	0.45					
31	Nov-17	4.5	7.1	0.44					
32	Jun-18	4.5	7.1	0.41					
33	Nov-18	4.5	7.2	0.62					
34	May-19	4.5	7.2	0.55					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

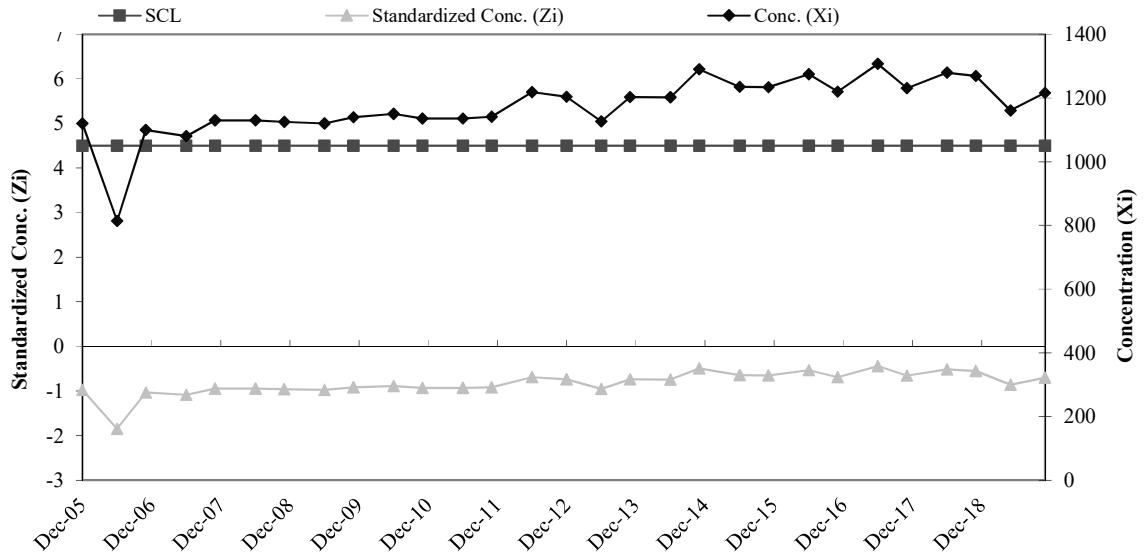


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-24 SpC

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Aug-96	1502		
2	Nov-96	2030		
3	May-97	1700		
4	May-98	1410	**1,462.00**	**351.23**
5	Nov-98	1595		
6	Nov-99	1152		
7	May-01	1450		
8	Jun-05	857		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)	Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Dec-05	4.5	1120	-0.97	37	Nov-19	4.5	1216	-0.70
10	Jun-06	4.5	814	-1.84					
11	Nov-06	4.5	1100	-1.03					
12	Jun-07	4.5	1080	-1.09					
13	Nov-07	4.5	1130	-0.95					
14	Jun-08	4.5	1130	-0.95					
15	Nov-08	4.5	1125	-0.96					
16	Jun-09	4.5	1120	-0.97					
17	Nov-09	4.5	1140	-0.92					
18	Jun-10	4.5	1150	-0.89					
19	Nov-10	4.5	1136	-0.93					
20	Jun-11	4.5	1136	-0.93					
21	Nov-11	4.5	1141	-0.91					
22	Jun-12	4.5	1219	-0.69					
23	Dec-12	4.5	1204	-0.73					
24	Jun-13	4.5	1127	-0.95					
25	Nov-13	4.5	1203	-0.74					
26	Jun-14	4.5	1202	-0.74					
27	Nov-14	4.5	1290	-0.49					
28	Jun-15	4.5	1235	-0.65					
29	Nov-15	4.5	1234	-0.65					
30	Jun-16	4.5	1275	-0.53					
31	Nov-16	4.5	1220	-0.69					
32	Jun-17	4.5	1307	-0.44					
33	Nov-17	4.5	1231	-0.66					
34	Jun-18	4.5	1280	-0.52					
35	Nov-18	4.5	1269	-0.55					
36	May-19	4.5	1161	-0.86					

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

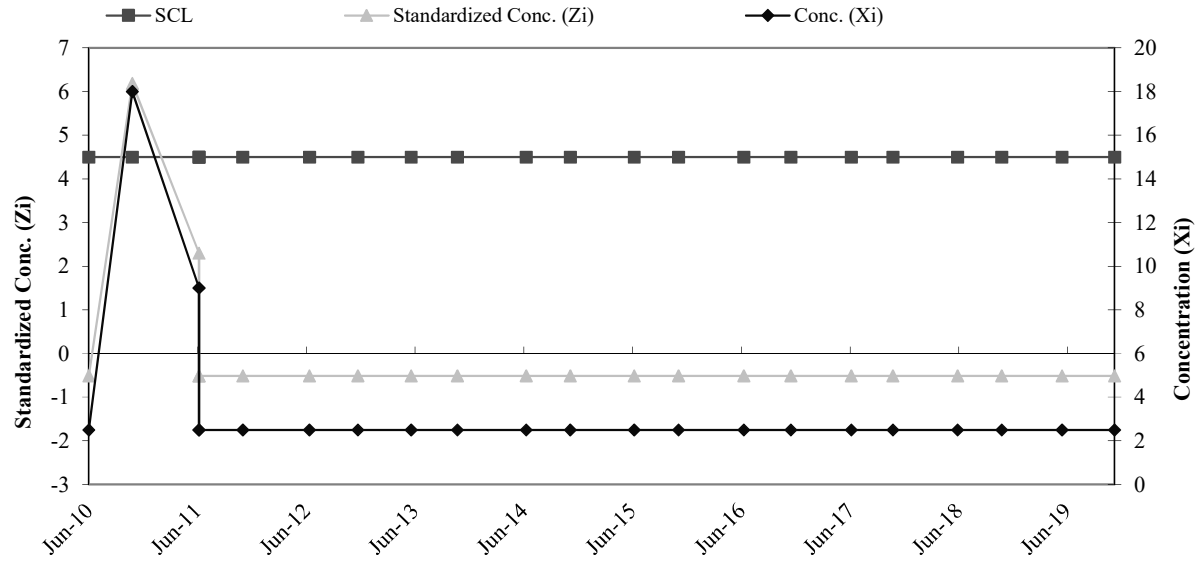


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-28 Cr

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-06	5	**3.69**	**2.31**
2	Dec-06	2.5		
3	Jun-07	9		
4	Nov-07	3		
5	Jun-08	2.5		
6	Nov-08	2.5		
7	Jun-09	2.5		
8	Nov-09	2.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Jun-10	4.5	2.5	-0.51
10	Nov-10	4.5	18	6.19
11	Jun-11	4.5	9	2.30
12	Jun-11	4.5	2.5	-0.51
13	Jun-11	4.5	2.5	-0.51
14	Nov-11	4.5	2.5	-0.51
15	Jun-12	4.5	2.5	-0.51
16	Dec-12	4.5	2.5	-0.51
17	Jun-13	4.5	2.5	-0.51
18	Nov-13	4.5	2.5	-0.51
19	Jun-14	4.5	2.5	-0.51
20	Nov-14	4.5	2.5	-0.51
21	Jun-15	4.5	2.5	-0.51
22	Nov-15	4.5	2.5	-0.51
23	Jun-16	4.5	2.5	-0.51
24	Nov-16	4.5	2.5	-0.51
25	Jun-17	4.5	2.5	-0.51
26	Nov-17	4.5	2.5	-0.51
27	Jun-18	4.5	2.5	-0.51
28	Nov-18	4.5	2.5	-0.51
29	May-19	4.5	2.5	-0.51
30	Nov-19	4.5	2.5	-0.51

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

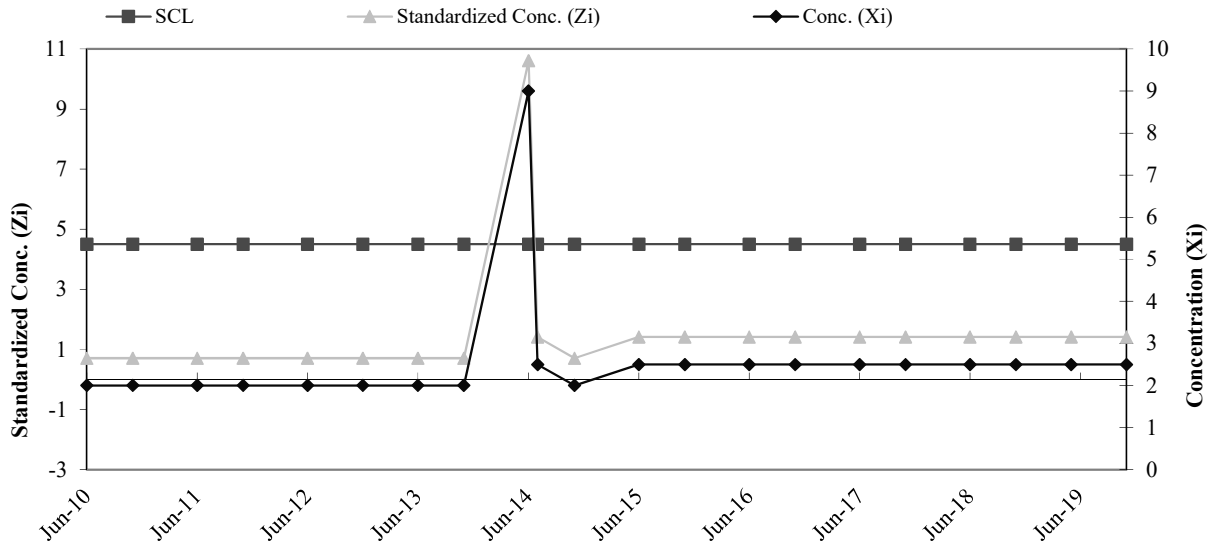


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-28 Cu

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-06	2		
2	Dec-06	2		
3	Jun-07	2		
4	Nov-07	2	**1.50**	**0.71**
5	Jun-08	1		
6	Nov-08	0.5		
7	Jun-09	0.5		
8	Nov-09	2		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Jun-10	4.5	2	0.71
10	Nov-10	4.5	2	0.71
11	Jun-11	4.5	2	0.71
12	Nov-11	4.5	2	0.71
13	Jun-12	4.5	2	0.71
14	Dec-12	4.5	2	0.71
15	Jun-13	4.5	2	0.71
16	Nov-13	4.5	2	0.71
17	Jun-14	4.5	9	10.61
18	Jul-14	4.5	2.5	1.41
19	Nov-14	4.5	2	0.71
20	Jun-15	4.5	2.5	1.41
21	Nov-15	4.5	2.5	1.41
22	Jun-16	4.5	2.5	1.41
23	Nov-16	4.5	2.5	1.41
24	Jun-17	4.5	2.5	1.41
25	Nov-17	4.5	2.5	1.41
26	Jun-18	4.5	2.5	1.41
27	Nov-18	4.5	2.5	1.41
28	May-19	4.5	2.5	1.41
29	Nov-19	4.5	2.5	1.41

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

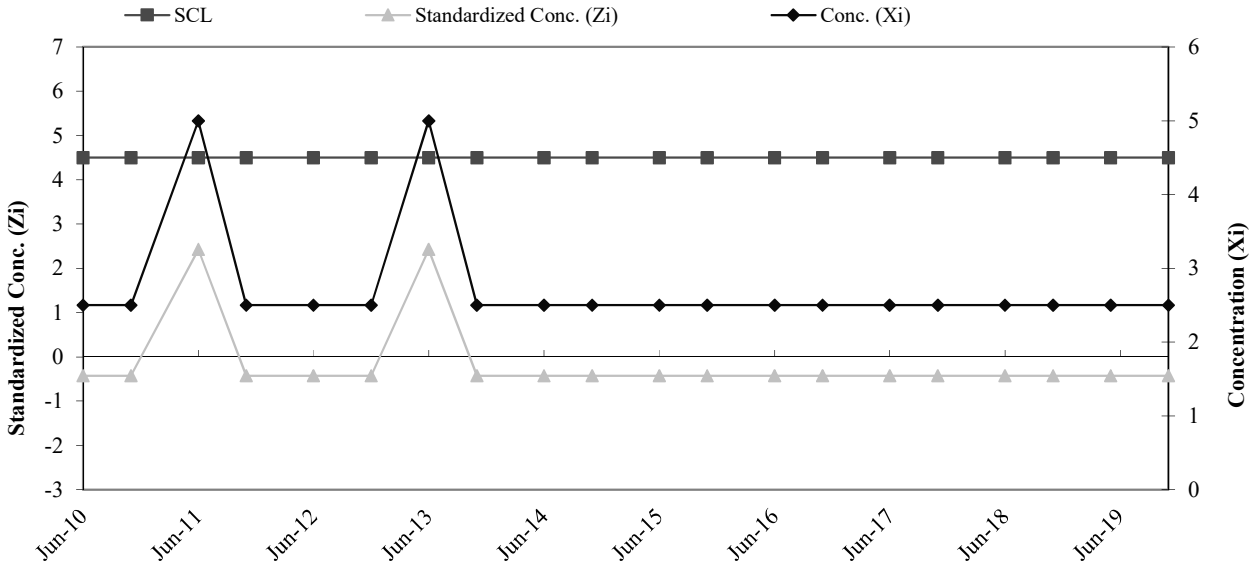


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-28 Ni

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Jun-06	2.5		
2	Dec-06	2.5		
3	Jun-07	3		
4	Nov-07	5	**2.88**	**0.88**
5	Jun-08	2.5		
6	Nov-08	2.5		
7	Jun-09	2.5		
8	Nov-09	2.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Jun-10	4.5	2.5	-0.43
10	Nov-10	4.5	2.5	-0.43
9	Jun-11	4.5	5	2.43
10	Nov-11	4.5	2.5	-0.43
11	Jun-12	4.5	2.5	-0.43
12	Dec-12	4.5	2.5	-0.43
13	Jun-13	4.5	5	2.43
14	Nov-13	4.5	2.5	-0.43
15	Jun-14	4.5	2.5	-0.43
16	Nov-14	4.5	2.5	-0.43
17	Jun-15	4.5	2.5	-0.43
18	Nov-15	4.5	2.5	-0.43
19	Jun-16	4.5	2.5	-0.43
20	Nov-16	4.5	2.5	-0.43
21	Jun-17	4.5	2.5	-0.43
22	Nov-17	4.5	2.5	-0.43
23	Jun-18	4.5	2.5	-0.43
24	Nov-18	4.5	2.5	-0.43
25	May-19	4.5	2.5	-0.43
26	Nov-19	4.5	2.5	-0.43

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

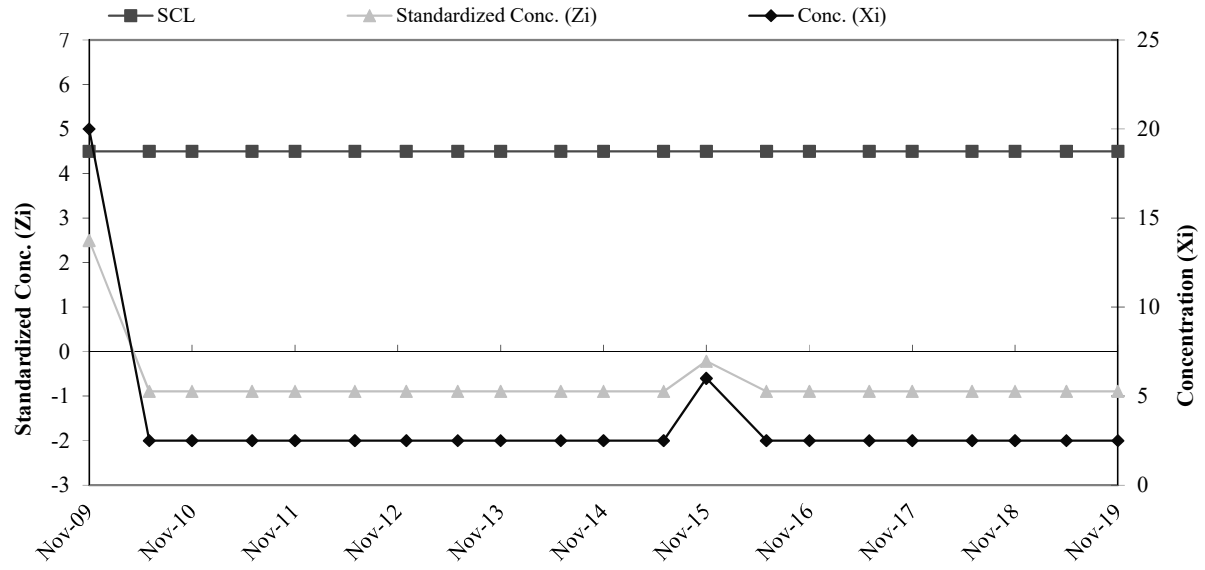


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-28 Zn

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Nov-05	7		
2	Jun-06	18		
3	Dec-06	5		
4	Jun-07	6	**7.13**	**5.16**
5	Nov-07	11		
6	Jun-08	5		
7	Nov-08	2.5		
8	Jun-09	2.5		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-09	4.5	20	2.50
10	Jun-10	4.5	2.5	-0.90
11	Nov-10	4.5	2.5	-0.90
12	Jun-11	4.5	2.5	-0.90
13	Nov-11	4.5	2.5	-0.90
14	Jun-12	4.5	2.5	-0.90
15	Dec-12	4.5	2.5	-0.90
16	Jun-13	4.5	2.5	-0.90
17	Nov-13	4.5	2.5	-0.90
18	Jun-14	4.5	2.5	-0.90
19	Nov-14	4.5	2.5	-0.90
20	Jun-15	4.5	2.5	-0.90
21	Nov-15	4.5	6	-0.22
22	Jun-16	4.5	2.5	-0.90
23	Nov-16	4.5	2.5	-0.90
24	Jun-17	4.5	2.5	-0.90
25	Nov-17	4.5	2.5	-0.90
26	Jun-18	4.5	2.5	-0.90
27	Nov-18	4.5	2.5	-0.90
28	May-19	4.5	2.5	-0.90
29	Nov-19	4.5	2.5	-0.90

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

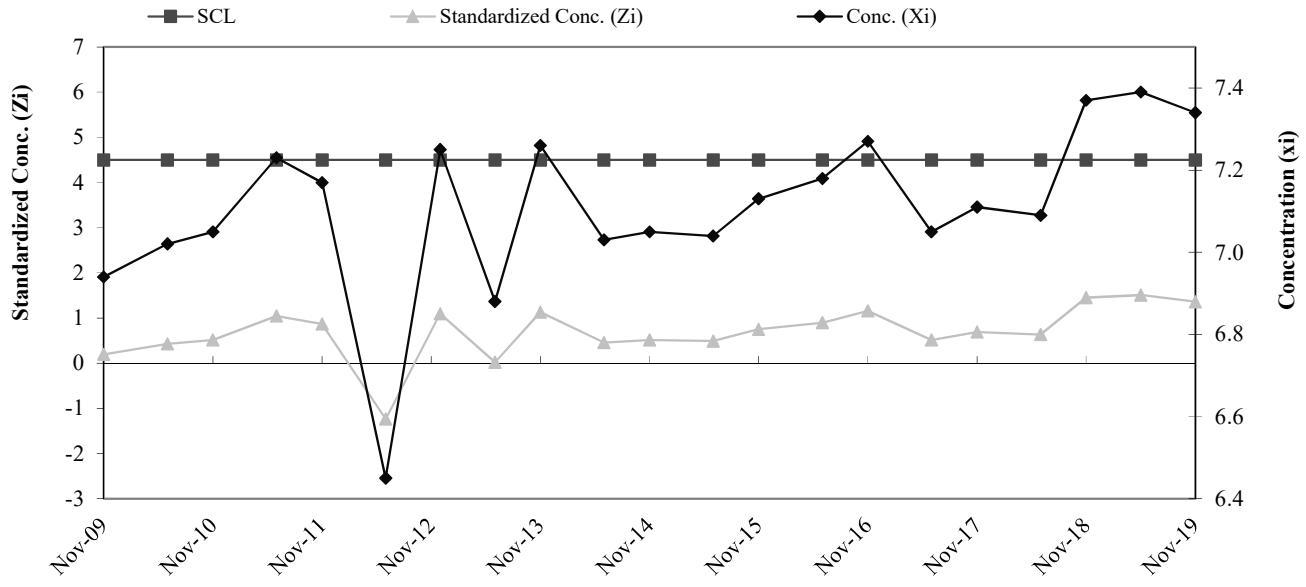


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-28 pH

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Nov-05	6.2		
2	Jun-06	7.1		
3	Dec-06	7.4		
4	Jun-07	6.8	**6.87**	**0.34**
5	Nov-07	6.8		
6	Jun-08	6.9		
7	Nov-08	6.8		
8	Jun-09	7.0		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-09	4.5	6.9	0.19
10	Jun-10	4.5	7.0	0.43
11	Nov-10	4.5	7.1	0.51
12	Jun-11	4.5	7.2	1.04
13	Nov-11	4.5	7.2	0.87
14	Jun-12	4.5	6.5	-1.24
15	Dec-12	4.5	7.3	1.10
16	Jun-13	4.5	6.9	0.02
17	Nov-13	4.5	7.3	1.13
18	Jun-14	4.5	7.0	0.46
19	Nov-14	4.5	7.1	0.51
20	Jun-15	4.5	7.0	0.49
21	Nov-15	4.5	7.1	0.75
22	Jun-16	4.5	7.2	0.89
23	Nov-16	4.5	7.3	1.16
24	Jun-17	4.5	7.1	0.51
25	Nov-17	4.5	7.1	0.69
26	Jun-18	4.5	7.1	0.63
27	Nov-18	4.5	7.4	1.45
28	May-19	4.5	7.4	1.51
29	Nov-19	4.5	7.3	1.36

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean

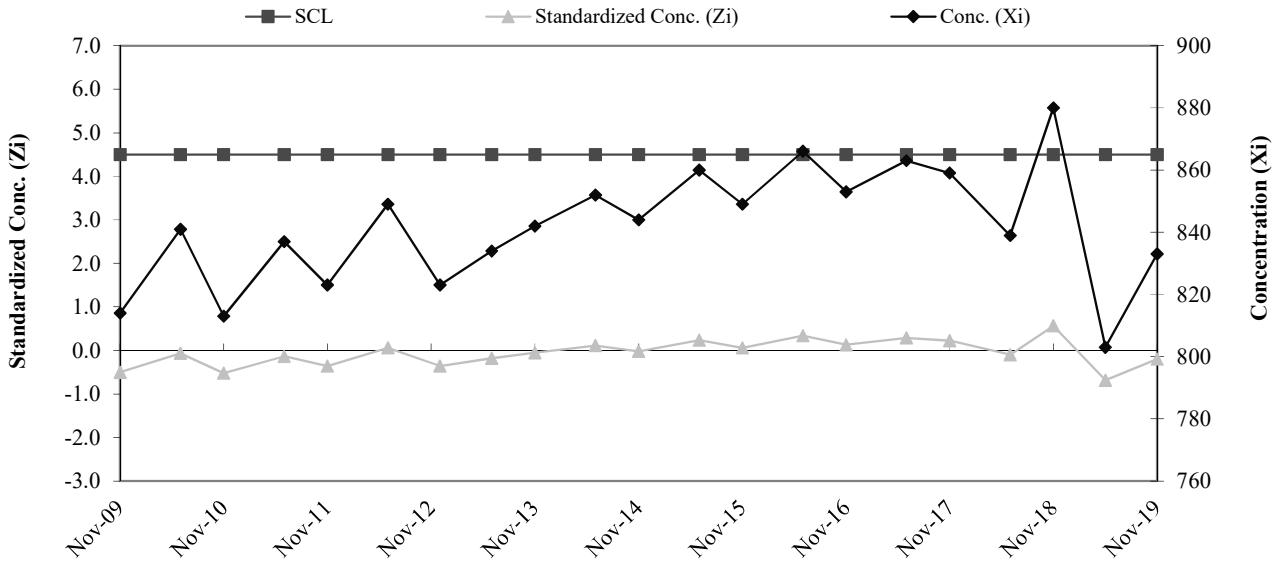


COLDWATER ROAD LANDFILL FACILITY
RCRA GROUND WATER DETECTION MONITORING SYSTEM
SHEWART CONTROL CHART
B-28 SpC

Baseline Data				
Ti	Date	Conc.	Mean	Std. Dev
1	Nov-05	994		
2	Jun-06	828		
3	Dec-06	812		
4	Jun-07	845	**845.13**	**61.71**
5	Nov-07	816		
6	Jun-08	840		
7	Nov-08	804		
8	Jun-09	822		

Ti	Date	SCL	Conc. (Xi)	Standardized Conc. (Zi)
9	Nov-09	4.5	814	-0.50
10	Jun-10	4.5	841	-0.07
11	Nov-10	4.5	813	-0.52
12	Jun-11	4.5	837	-0.13
13	Nov-11	4.5	823	-0.36
14	Jun-12	4.5	849	0.06
15	Dec-12	4.5	823	-0.36
16	Jun-13	4.5	834	-0.18
17	Nov-13	4.5	842	-0.05
18	Jun-14	4.5	852	0.11
19	Nov-14	4.5	844	-0.02
20	Jun-15	4.5	860	0.24
21	Nov-15	4.5	849	0.06
22	Jun-16	4.5	866	0.34
23	Nov-16	4.5	853	0.13
24	Jun-17	4.5	863	0.29
25	Nov-17	4.5	859	0.22
26	Jun-18	4.5	839	-0.10
27	Nov-18	4.5	880	0.57
28	May-19	4.5	803	-0.68
29	Nov-19	4.5	833	-0.20

h = Decision Value for CUSUM, SCL = Shewart Control Limit, k = Standard Error Shift Detection Parameter, Zi = Standardized Mean



APPENDIX F

Vault A Analytical Table

TABLE 1
RACER Trust - Coldwater Road Landfill Facility
Landfill Leak Detection Vaults - Historical Analytical Results
Inorganics and Metals

		Indicator Parameters					Dissolved Metals (µg/L)			
Vault	Sample Date	TOC (mg/L)	TSS (mg/L)	pH	SpC	Temp	Cr	Cu	Ni	Zn
	MDEQ Residential Drinking Water Criteria & RBSLs						*100 (A)*	*1,000 (E)*	*100 (A)*	*2,400*
	23-Mar-95	4.6	<1	7.50	690	--	<20	<20	<40	180
	20-Jun-95	8.9	2.0	6.80	1900	--	24	21	<30	<20
	30-Aug-95	8.2	2.0	6.90	2000	--	<20	<20	<40	<20
	28-Nov-95	9.1	<1	7.00	1900	--	23	31	43	24
	27-Mar-96	140.0	<10	7.20	2000	--	<20	<20	46	<20
Vault A	18-Jun-96	12.0	<10	6.90	2000	--	<20	<20	<20	<20
	20-Aug-96	32.0	<5	7.10	1900	--	<20	<20	<20	30
	11-Nov-96	18.0	5.0	7.10	2000	--	<20	<20	30	60
	19-Feb-97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	9-May-97	13.0	17.0	6.67	1940	9.7	<10	<10	71	90
	12-Aug-97	6.0	4.0	5.98	1810	12.8	<10	<10	88	60
	15-Nov-97	8.0	12.0	6.50	2000	12.0	<10	10	125	100
	9-Feb-98	6.0	8.0	6.40	1960	11.5	<10	<10	73	60
	14-May-98	12.0	15.0	6.90	1760	17.4	<10	20	13	200
	14-Aug-98	5.0	6.0	6.70	--	--	<10	<10	15	160
	13-Nov-98	5.0	12.0	6.50	1990	16.5	<10	<10	20	220
	19-Mar-99	5.7	8.0	6.80	1334	13.6	<10	10	14	60
	6-May-99	5.6	16.0	6.85	3250	26.2	<10	<10	15	20
	23-Jul-99	5.7	3.0	6.30	1470	18.9	<5	9	13	19
	22-Oct-99	5.0	3.0	5.86	1750	12.1	<10	<10	16	30
	14-Mar-00	5.6	<1	7.60	1410	10.7	<10	<10	15	20
	20-Jun-00	7.0	3.0	6.90	1410	18.3	<10	<10	12	20
	13-Sep-00	5.9	5.0	7.50	1650	15.1	<5	<10	14	20
	10-Nov-00	6.4	2.0	7.20	1470	11.8	<10	100	10	150
	12-Mar-01	6.0	1.0	7.43	1530	12.8	<10	<10	7	10
	24-May-01	9.4	10.0	7.56	1380	11.9	<10	<10	10	20
	31-Aug-01	5.3	10.6	7.49	1450	12.5	<5	<10	14	9
	16-Nov-01	5.1	3.0	6.77	1300	12.4	<10	<10	15	50
	8-Mar-02	NS	NS	NS	NS	NS	NS	NS	NS	NS
	31-May-02	2.4	54.0	7.23	1470	13.8	<10	<10	<5	40
	5-Sep-02	4.7	6.0	6.60	--	--	<5	<5	14	140
	12-Dec-02	NS	NS	NS	NS	NS	NS	NS	NS	NS
	18-Mar-03	6.7	8.0	6.81	1290	12	<5	<5	9	99
	4-Jun-03	2.0	11.0	6.78	1370	11.3	<5	<5	10	<5
	5-Oct-03	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8-Dec-03	NS	NS	NS	NS	NS	NS	NS	NS	NS
	27-Feb-04	NS	NS	NS	NS	NS	NS	NS	NS	NS
	30-Jun-04	4.5	55.0	6.99	1318	12.5	<5	<5	8	<5
	19-Nov-04	3.4	2.0	6.85	1120	11.4	6	<5	15	14
Duplicate	19-Nov-04	4.4	4.0	--	--	--	6	<5	18	16
	15-Jun-05	6.0	8.0	6.00	1640	13.4	<5	<5	13	21
	17-Jan-06	5.9	12785	10.01	1630	8.4	<5	<5	13	8
Re-sample	14-Feb-06	--	--	7.88	1800	8.5	--	--	14	--
	29-Jun-06	NS	NS	NS	NS	NS	NS	NS	NS	NS
	28-Nov-06	4.7	438	7.73	1940	13.2	<5	<4	13	6
	6-Jun-07	4.9	11	6.76	1990	11.7	13	4	20	8
	12-Nov-07	5.9	70	6.76	2030	12.4	4	5	21	11
	24-Jun-08	5.0	371	6.89	2060	13.3	<5	<1	25	5
	17-Nov-08	5.8	23	6.06	2060	9.2	<5	<1	22	<5
	23-Jun-09	5.5	88	7.01	2050	13.6	<5	11	27	36
Vault A	17-Nov-09	6	8	7.07	2090	10.3	<5	<4	22	7
	14-Jun-10	6	10	7.05	2070	13.1	8	<4	16	6
	20-Jun-11	6.7	9	7.33	2010	12.2	30	<4	27	39
Re-sample	14-Jul-11	--	--	--	--	--	<5	--	--	--
	14-Nov-11	7.0	316	6.93	2080	11.5	<5	<4	20	<5
	25-Jun-12	6.0	6	5.75	1870	11.9	<5	4	25	<5
Duplicate	25-Jun-12	6.0	6	5.75	1872	11.9	<5	6	25	10
	5-Dec-12	5.8	2	6.76	1820	10.6	<5	<4	24	10
Duplicate	5-Dec-12	5.8	3	6.76	1814	10.6	<5	<4	24	8
	6-Jun-13	6.1	4	6.71	1882	11.0	<5	<4	22	<5
	4-Nov-13	5.0	<1	6.71	1630	11.2	<5	<4	18	<5
	23-Jun-14	5.0	3	6.82	1579	13.2	<5	<4	18	<5
	18-Nov-14	4.1	2	6.27	1525	6.6	<5	<4	25	20
	25-Jun-15	4.5	2	6.64	1507	11.2	<5	6	21	10
	17-Nov-15	3.6	1	6.64	1423	11.7	<5	<5	20	5
	21-Jun-16	3.8	<3	6.93	1364	12.0	<5	<5	14	<5
Duplicate	21-Jun-16	3.9	<3	6.93	1362	12.0	<5	<5	13	<5
	28-Nov-16	3.3	<3	6.82	1378	11.4	<5	<5	15	<5
	19-Jun-17	4.2	<3	6.90	1450	11.4	<5	<5	15	<5
	6-Nov-17	3.6	<3	6.16	1363	11.8	<5	<5	17	<5
	11-Jun-18	4.3	<3	6.45	1447	11.0	<5	<5	15	10
	7-Nov-18	4.1	<3	6.50	1451	6.0	<5	<5	16	6
	29-May-19	8.4	<3	7.13	1436	9.1	<5	<5	15	<5
	19-Nov-19	**5.8**	**<3**	**6.89**	**1291**	**10.6**	**<5**	**<5**	**15**	**<5**

Notes: "<" - Not detected above specified detection limit.
"NS" - Not sampled - no liquid.
"SpC" - Specific conductivity in micro siemens (uS).
"Temp" - Temperature in degrees celsius.
"--" - Physical parameter not measured (insturment failure or duplicate sample).
Exceeds MDEQ Residential Drinking Water Criteria
"A" - Criterion is the state of Michigan drinking water standard established pursuant to Section 5 of 1976 PA 399, MCL 325.1005.
"E" - Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA)


OBG
Part of Ramboll