URS

May 10, 2019

Mr. David Szymanski
New York State Department of Environmental Conservation
270 Michigan Ave.
Buffalo, NY 14203

Via Email: david.szymanski@dec.ny.gov

Re: Revised Semi-Annual Report July 2018 – December 2018
Pfohl Brothers Landfill, Town of Cheektowaga, New York

Dear Mr. Szymanski:

Enclosed is one copy of the Revised July 2018 – December 2018 Semi-Annual Report for the Pfohl Brothers Landfill in Cheektowaga, New York. A hard copy has also been sent to Ms. Pamela Tames, P.E. of the United States Environmental Protection Agency.

The report was revised to add a map showing all public and private drinking water wells within ½ mile of the site. This was required as part of the emerging contaminants sampling and requested by Jaspal Walia of the New York State Department of Environmental Conservation in an e-mail dated April 24, 2019.

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

Sincerely,

URS CORPORATION

Robert J. Murphy, P.G.
Project Manager

Enclosures

cc: Pamela Tames, P.E. - USEPA (w/attachments)
Patrick Bowen, P.E. – Town of Cheektowaga (w/attachments)

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SEMI ANNUAL REPORT
OPERATION AND MAINTENANCE
JULY 2018 TO DECEMBER 2018
PFOHL BROTHERS LANDFILL
CHEEKTOWAGA, NY

Submitted to:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
270 MICHIGAN AVENUE
BUFFALO, NEW YORK 14203

Prepared by:

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TOWN OF CHEEKTOWAGA
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MAY
2019

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1.0 INTRODUCTION

1.1 Background

The Pfohl Brothers Landfill is located on Aero Drive in the Town of Cheektowaga, New York (Figure 1-1). The site is listed as site No. 915043 on the New York State Department of Environmental Conservation's (NYSDEC's) Registry of Inactive Hazardous Waste Disposal Sites. A Consent Order between NYSDEC and potentially responsible parties (PRPs) for closure of the site was signed in 2001 and remedial construction commenced in 2001. The remedy included consolidation of waste material, capping of the waste disposal and consolidation areas, and encircling the landfill areas with a groundwater collection system to prevent off-site migration. The remedial action was completed in 2002.

Responsibility for implementing the remedy was divided between a "steering committee" of industrial PRPs and the Town of Cheektowaga. The steering committee responsibilities lay generally with the capital construction activities of the remedy including waste consolidation, cap and drainage system installation, etc. The Town of Cheektowaga, which was named as a PRP for disposal of municipal waste at the Pfohl Brothers Landfill when it was operating, is performing the operation and maintenance (O&M) activities at the landfill, pursuant to a settlement agreement between the Town and the steering committee.

1.2 Operation and Maintenance Activities

While construction of the remedy was substantially complete by late 2002, the final O&M manual was not approved by the NYSDEC until March 10, 2006. However, the Town of Cheektowaga and its consultant (URS Corporation – New York) assumed most of the operational responsibilities since 2002. This includes a variety of general maintenance activities as outlined in Section 2 and sampling and other monitoring activities outlined in Section 3.

Beginning in 2004, the Town and URS assumed all of the O&M activities described in the O&M plan. This is the semi-annual report as called for by Section 3.6 of the O&M plan.

2.0 GENERAL MAINTENANCE ACTIVITIES

Since completion of construction activities in 2002, personnel from the Town of Cheektowaga Engineering Department have performed general activities to ensure the physical operation of the landfill as intended by the design. The various O&M activities performed by the Town from July 2018 through December 2018 included the following actions:

- The amount of groundwater discharged through the collection system was recorded on a daily basis. The flow rate displayed by each wet well pump at the time of daily inspection and the total cumulative volume of flow was recorded for each wet well on daily inspection sheets. Examples of the daily inspection sheet for this reporting period are attached in Appendix A.
- Total cumulative effluent flow rates and volumes were summarized on a monthly basis. The monthly totals for the period, including graphs showing daily total discharge (gallons) as a function of calendar day, are presented in Appendix B.
- The wet well pumps were shut down during wet weather flow conditions as necessary at various times throughout the year. Such actions were only taken upon request of the Buffalo Sewer Authority (BSA) during heavy storm events in order to reduce the hydraulic load on the BSA treatment system during such events. Shutdown events are recorded and included with the monthly flow data in Appendix B as previously requested by NYSDEC.
- Plowed snow to access the Control Building when necessary.
- Cleaned/replaced check valves as necessary at all six (6) wet wells and replaced surge suppressors and fuses as needed for pump station instrumentation equipment.
- Cleaned upper level equipment and applied corrosion inhibitor fluid.
- Inspected wet wells for excessive corrosion to critical equipment.
- Tabulated annual flow totals and reset totalizer equipment
- Repaired network cabling at the Control Building.
- Repaired faulty electrical terminations for the wet well WW-04 flow meter.
- Replaced flexible discharge hose in wet well WW-05.

- Replaced the 1.5 HP pump in wet well WW-05.
- Investigated inhibited flows in wet well WW-05 and determined that the primary discharge lines require cleaning.
- Mowed the cap and trimmed vegetation along perimeter chain link fence, as needed.
- Inspected and maintained perimeter security fencing. Iroquois Fence replaced/repaired 135’ of fence on the southern fence line.

3.0 MONITORING ACTIVITIES

The Town of Cheektowaga retained URS Corporation to perform monitoring activities as outlined in Section 3.1 of the O&M plan. During the period of January 2004 through the present, URS performed groundwater hydraulic monitoring (Section 3.1.1.2 of the O&M plan) and effluent monitoring (Section 3.1.4 of the O&M plan) on a quarterly basis. URS also performed the semi-annual groundwater quality monitoring (Section 3.1.1.3 of the O&M plan) during this period. A summary of the monitoring activities is presented in the following subsections. Hydraulic and groundwater sampling locations are shown on Figure 3-1.

3.1 Groundwater Hydraulic Monitoring

Groundwater and surface water elevations were monitored on a quarterly basis at all locations listed in Table 3.1 of the O&M Plan. The hydraulic monitoring data tables showing groundwater elevations are presented in Appendix C. In Appendix C, Table C-1 lists the measured elevations and Table C-2 provides a comparison of the measured levels in the wells and corresponding manholes/wet wells.

The data presented in Appendix C indicate that groundwater levels outside the collection system were higher than the levels measured in the corresponding wet well or manhole for each measurement date with only one exception. The water elevation in WW-6 was higher (1.78') than the nearest monitoring well GW-34S on September 12, 2018. Therefore, these data demonstrate that the collection system is largely operating as designed.

3.2 Groundwater Quality Monitoring

This semi-annual round of groundwater sampling was conducted between November 13 and 15, 2018. All overburden and bedrock wells listed in Table 3.2 of the O&M plan were purged and sampled using dedicated/disposable equipment. Figure 3-1 shows the well locations. Low flow sampling techniques were used at most monitoring well locations with the exceptions noted below.

Passive diffusion bags (PDBs) were placed in three monitoring wells with low recharge rates (GW-04S, GW-07S, and GW-07D) on September 12, 2018. The PDBs were removed from the wells during the sampling event, poured into the appropriate sample containers for analysis of

volatile organic compounds (VOCs). Following removal of the PDBs, the three wells were purged dry and sampled for field water quality parameters. The other required analytical parameters (i.e., semivolatile organic compounds [SVOCs] and metals) were collected after water levels recovered (the next day for GW-07D and GW-07S and later the same day for GW-04S).

Purge logs and sampling summary sheets are provided in Appendix D. Measurements of pH, specific conductivity, temperature, dissolved oxygen, oxidation reduction potential, and turbidity taken during purging are included in Appendix D. Following collection, the samples were packed with ice in coolers and transported under chain-of-custody (CoC) control to Test America Laboratories of Amherst, New York.

Groundwater samples were analyzed for the parameters listed in Table 3.2 of the O&M plan as revised in accordance with Table 3-6 in the Semi Annual Report dated September 2007 (January through June 2007) and as approved by the December 6, 2006 and November 29, 2007 correspondence from the NYSDEC authorizing a reduction in the parameters list (included as Table 3-1 in this report). Table 3-2 of this report presents the groundwater sample results compared with NYSDEC Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Class GA water quality standards.

Emerging Contaminants

In a letter dated June 12, 2018, the NYSDEC requested analysis of groundwater for the presence of the emerging contaminants 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS). A work plan was prepared by URS and submitted to the NYSDEC and approved on November 7, 2018. The November 2018 sampling event included sampling and analysis for 1,4-dioxane and PFAS at four wells (GW-08D, GW-08SR, GW-26D, and GW-35S) in accordance with the approved work plan.

Laboratory Report

The groundwater analytical data package was prepared by Test America in accordance with NYSDEC Category A deliverable requirements. It was reviewed for compliance with analytical method requirements and the following guidelines: *National Functional Guidelines for Superfund Organic Methods Data Review*, EPA-540-R-2017-002, January 2017; and *National Functional Guidelines for Inorganic Superfund Data Review*, EPA-540-R-2017-001, January

2017. Qualifications applied to the data include "J/UJ" (estimated concentration/estimated quantitation limit), "J+" (estimated concentration with possible high bias), and "U" (not detected).

A Data Applicability Report (DAR) was prepared following the guidelines provided in NYSDEC Division of Environmental Remediation (DER-10) *Technical Guidance for Site Investigation and Remediation, Appendix 2B,* dated May 2010. The DAR dated February 2019 is submitted separately from this report.

Results

No VOCs were detected at concentrations above the Class GA water quality standards at any location. Two SVOCs were detected at concentrations above the Class GA water quality standards. 1,4-Dichlorobenzene was detected in well GW-03D at an estimated concentration of 4.2 micrograms per liter (µg/L), slightly exceeding its standard of 3.0 µg/L. Bis(2-Ethylhexyl)phthalate was detected in well GW-07D at an estimated concentration of 5.4 µg/L, slightly exceeding its standard of 5.0 µg/L.

Among the metals, iron, magnesium, manganese, and sodium routinely exceed Class GA standards in most site wells. In addition, chromium was detected at concentrations exceeding its respective Class GA standard in wells GW-07D and GW-08D. Antimony, nickel, and lead were also detected at concentrations exceeding their respective Class GA standards in well GW-07D.

Results from the emerging contaminants sampling are shown on Table 3-3. Perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic acid (PFOS) were compared to the USEPA Drinking Water Health Advisory (USEPA, May 2016) of 70 nanograms per liter (ng/L) (individually or combined). There is currently no state criteria or guidance for 1,4-dioxane, however, it was not detected in the four wells sampled. One or more PFAS were detected in each of the wells sampled. Concentrations of PFOA and PFOS were well below the USEPA Drinking Water Health Advisory of 70 ng/L. The New York State Geographic Information Systems (GIS) Clearinghouse database was reviewed for public and private drinking water wells within ½ mile of the site. No wells were identified within the ½ mile boundary. The nearest well is located approximately 1 mile north of the site, near the intersection of Main Street and Transit Road, and is shown on Figure 3-2.

Comparison to Historical Results

Organics

Results are consistent with historical results; there have been very few and infrequent detections of VOCs/SVOCs.

Metals

No significant changes in metals concentrations were observed when compared to previous analytical results. The concentrations of iron, magnesium, manganese, and sodium in most site wells were similar to the concentrations found during previous sampling events.

Sodium concentrations were generally elevated in bedrock wells (GW-01D, GW-03D, GW-08D and GW-26D) and shallow wells adjacent to roads (GW-01S). The sodium concentrations were also elevated in GW-03S and GW-08SR. The higher sodium concentrations in the bedrock wells may be attributed to the bedrock composition and the elevated concentration in the shallow wells may be the result of seasonal road de-icing activities.

Trend Analysis

Organics

There is an insufficient number and frequency of detections to define trends.

Metals

A trend analysis of groundwater parameters that routinely exceed Class GA groundwater standards was performed and is presented in Figures E-1 through E-19 of Appendix E. A review of the trend analysis indicated that no significant changes or trends in concentrations of any of the parameters exceeding groundwater standards have occurred over the semi-annual sampling events except as described below. Figure E-1 for GW-01D, indicates an upward trend in sodium concentrations since monitoring began. Figure E-2 for GW-01S, indicates an upward trend in manganese concentrations and a downward trend in sodium concentration since monitoring began. Figure E-3 for GW-03D indicates downward trends for iron, manganese, and sodium. Figure E-4 indicates upward trends for magnesium and sodium and a downward trend for manganese in GW-03S since monitoring began. Figure E-5 for GW-04D, indicates a slight

increasing trend for magnesium. Figure E-6 for GW-04S, indicates an upward trend for magnesium and a downward trend for manganese. Figures E-7 and E-8 indicate magnesium has trended upward since sampling began at locations GW-07D and GW-07S. Figure E-9 for GW-08D shows a decreasing trend for both iron and manganese since monitoring began. Figure E-11 for GW-26D indicates downward trends for iron and manganese. Figures E-12 and E-13 for GW-28S and GW-29S, respectively, indicate a decreasing trend for sodium since monitoring began. Figure E-14 for GW-30S shows a decreasing trend for iron, magnesium, manganese, and sodium with possible seasonal variations. Figure E-16 shows an apparent seasonal variation in sodium concentration in monitoring well GW-32S, and magnesium appears to be decreasing. Figure E-18 for GW-34S indicates an apparent seasonal fluctuation in manganese concentration and decreasing trends for magnesium and sodium.

3.3 Groundwater Discharge Monitoring

URS completed two quarterly sampling events (September 2018 and December 2018) of the groundwater collection system discharge since the previous semi-annual report. The sampling was performed in accordance with the requirements of Discharge Permit No. 16-04-CH016 between the Buffalo Sewer Authority (BSA) and the Town of Cheektowaga. A copy of the permit, which shows the monitoring parameters and associated discharge limits, is included as Appendix F.

During the sampling events in September 2018 and December 2018, each regulated parameter was below the limits set by the permit. Copies of the data summary tables that were included with the monitoring reports submitted to the BSA are included as Appendix G.

3.4 Monitoring Well Inspections

During the November 2018 groundwater sampling event, a well inspection was performed. All wells appeared to be in good condition with the exception of previously existing damage to the risers on GW-07D, GW-01S, and GW-01D. The monitoring well inspection logs may be found in Appendix H.

4.0 SUMMARY AND RECOMMENDATIONS

General Maintenance: The Town will continue to maintain mechanical equipment at the landfill on an as-needed basis and operate the groundwater collection and discharge system as designed. The Town will also continue regular inspections, mow the cap once per year, and plow snow to access the Control Building, as necessary.

Groundwater Hydraulic Monitoring: Hydraulic monitoring has been performed on a quarterly basis in conjunction with the discharge monitoring. Water level measurement data demonstrates that the hydraulic gradient is from outside the landfill towards the collection trench, as designed. Continued quarterly monitoring is recommended.

Groundwater Quality Monitoring: Groundwater sample results indicate that only low levels of SVOCs and metals are present. Similar concentrations of most parameters were found during previous sampling events. Sampling for emerging contaminants was conducted in accordance with NYSDEC request; the results do not indicate any issues and no further sampling for emerging contaminants is recommended. The next round of groundwater sampling will be conducted in May 2019. Low flow sampling techniques will be used. Passive diffusion bags will be used again for VOC analyses at the three wells (GW-04S, GW-07S, and GW-07D) that go dry when using low flow sampling.

Groundwater Discharge Monitoring: Groundwater discharges remain within permit limits. Continued quarterly monitoring is recommended.

TABLES

TABLE 3-1

APPROVED REVISION OF TABLE 3.2 FROM THE O&M PLAN

GROUNDWATER SAMPLING SUMMARY
OPERATION AND MAINTENANCE PLAN
PFOHL BROTHERS LANDFILL SITE, CHEEKTOWAGA, NEW YORK

LOCATIONS

GW-1D/1S
GW- 3D/3S
GW- 4D/4S
GW- 7D/7S
GW- 8D/8S(R)
GW- 26D/35S
GW- 28S
GW- 29S
GW- 30S
GW- 31S
GW- 32S
GW- 33S
GW- 34S

FREQUENCY

semi-annually for overburden and bedrock groundwater

PARAMETERS

Field	pH
	conductivity
	temperature
	turbidity
VOCs	Acetone
	Benzene
	1,2-Dichloroethene (total)
	1,1,2-Trichloroethane
	Vinyl chloride
SVOCs	Phenol
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	bis(2-Ethylhexyl)phthalate

TABLE 3-1 (continued)

APPROVED REVISION OF TABLE 3.2 FROM THE O&M PLAN

GROUNDWATER SAMPLING SUMMARY
OPERATION AND MAINTENANCE PLAN
PFOHL BROTHERS LANDFILL SITE, CHEEKTOWAGA, NEW YORK

PARAMETERS (cont'd)

Metals	Antimony
	Arsenic
	Barium
	Cadmium
	Chromium
	Copper
	Iron
	Lead
	Magnesium
	Manganese
	Mercury
	Nickel
	Silver
	Sodium
	Zinc

TABLE 3-2
GROUNDWATER SAMPLE ANALYTICAL RESULTS
PFOHL BROTHERS LANDFILL SITE
NOVEMBER 2018

Location ID			GW-01D	GW-01S	GW-03D	GW-04D	GW-04S
Sample ID			GW-01D	GW-01S	GW-03D	GW-04D	GW-04S
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/14/18	11/14/18	11/15/18	11/14/18	11/14/18
Parameter	**Units**	*					
Volatile Organic Compounds							
Acetone	UG/L	50					5.0 J
Semivolatile Organic Compounds							
1,3-Dichlorobenzene	UG/L	3			2.9 J		
1,4-Dichlorobenzene	UG/L	3			4.2 J		
bis(2-Ethylhexyl)phthalate	UG/L	5					
Metals							
Antimony	MG/L	0.003					
Arsenic	MG/L	0.025					
Barium	MG/L	1	0.085	0.18	0.084	0.093	0.13
Cadmium	MG/L	0.005		0.00065 J		0.00064 J	
Chromium	MG/L	0.05	0.0090	0.0012 J		0.0067	0.0024 J
Copper	MG/L	0.2				0.0016 J	0.0019 J
Iron	MG/L	0.3	0.047 J	7.3	1.1	0.20	1.7
Lead	MG/L	0.025					
Magnesium	MG/L	35	38.2	22.4	17.9	79.0	29.0
Manganese	MG/L	0.3	0.019	1.0	0.26	0.022	0.13
Nickel	MG/L	0.1	0.0018 J		0.0040 J	0.0039 J	0.0041 J
Sodium	MG/L	20	110	134	164	93.8	29.6
Zinc	MG/L	2	0.0033 J	0.0024 J		0.0057 J	0.0096 J

*- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998 (includes 4/2000 and 6/2004 Addenda). Class GA. * - PCB Criteria based on sum of the aroclors.

Flags assigned during chemistry validation are shown.

Concentration Exceeds

J - The analyte was positively identified, the quantitation is an estimation. Empty cell - Not Detected.

J+ - The analyte was positively identified, the quantitation is an estimation with possible high bias.

NA - Not Analyzed.

Only Detected Results Reported.

TABLE 3-2
GROUNDWATER SAMPLE ANALYTICAL RESULTS
PFOHL BROTHERS LANDFILL SITE
NOVEMBER 2018

Location ID			GW-07D	GW-07D	GW-07S	GW-07S	GW-08D
Sample ID			GW-07D	GW-07D	GW-07S	GW-07S	GW-08D
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/13/18	11/14/18	11/13/18	11/14/18	11/14/18
Parameter	**Units**	*					
Volatile Organic Compounds							
Acetone	UG/L	50	4.7 J	NA	4.5 J	NA	
Semivolatile Organic Compounds							
1,3-Dichlorobenzene	UG/L	3		NA		NA	
1,4-Dichlorobenzene	UG/L	3		NA		NA	
bis(2-Ethylhexyl)phthalate	UG/L	5	NA	5.4	NA		
Metals							
Antimony	MG/L	0.003	NA	0.014 J	NA		
Arsenic	MG/L	0.025	NA	0.0061 J	NA		
Barium	MG/L	1	NA	0.12	NA	0.37	0.080
Cadmium	MG/L	0.005	NA	0.0042	NA	0.00054 J	
Chromium	MG/L	0.05	NA	0.66	NA	0.0014 J	0.11
Copper	MG/L	0.2	NA	0.099	NA		0.0043 J
Iron	MG/L	0.3	NA	41.9	NA	0.17	0.95
Lead	MG/L	0.025	NA	0.50	NA		
Magnesium	MG/L	35	NA	40.3	NA	43.1	17.6
Manganese	MG/L	0.3	NA	0.26	NA	0.032	0.054
Nickel	MG/L	0.1	NA	0.34	NA	0.013	0.012
Sodium	MG/L	20	NA	80.6	NA	61.8	234
Zinc	MG/L	2	NA	0.31	NA	0.0051 J	0.0082 J

*- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998 (includes 4/2000 and 6/2004 Addenda). Class GA. * - PCB Criteria based on sum of the aroclors.

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TABLE 3-2
GROUNDWATER SAMPLE ANALYTICAL RESULTS
PFOHL BROTHERS LANDFILL SITE
NOVEMBER 2018

Location ID			GW-08SR	GW-26D	GW-26D	GW-28S	GW-29S
Sample ID			GW-08SR	FD-111418	GW-26D	GW-28S	GW-29S
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/14/18	11/14/18	11/14/18	11/15/18	11/15/18
Parameter	**Units**	*		Field Duplicate (1-1)			
Volatile Organic Compounds							
Acetone	UG/L	50					
Semivolatile Organic Compounds							
1,3-Dichlorobenzene	UG/L	3					
1,4-Dichlorobenzene	UG/L	3					
bis(2-Ethylhexyl)phthalate	UG/L	5					
Metals							
Antimony	MG/L	0.003					
Arsenic	MG/L	0.025		0.0075 J	0.0065 J		0.012
Barium	MG/L	1	0.13	0.13	0.13	0.092	0.20
Cadmium	MG/L	0.005					
Chromium	MG/L	0.05					
Copper	MG/L	0.2				0.0029 J	
Iron	MG/L	0.3	8.2	3.7	3.7	0.38	10.8
Lead	MG/L	0.025					0.0036 J
Magnesium	MG/L	35	55.9	17.3	17.9	27.4	78.3
Manganese	MG/L	0.3	0.69	0.37	0.38	1.3	0.59
Nickel	MG/L	0.1	0.0015 J	0.0037 J	0.0037 J	0.0023 J	
Sodium	MG/L	20	165	332	340	16.8 J+	10.3
Zinc	MG/L	2	0.0019 J	0.0023 J	0.0057 J		

*- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998 (includes 4/2000 and 6/2004 Addenda). Class GA. * - PCB Criteria based on sum of the aroclors.

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TABLE 3-2
GROUNDWATER SAMPLE ANALYTICAL RESULTS
PFOHL BROTHERS LANDFILL SITE
NOVEMBER 2018

Location ID			GW-30S	GW-31S	GW-32S	GW-33S	GW-34S
Sample ID			GW-30S	GW-31S	GW-32S	GW-33S	GW-34S
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/15/18	11/15/18	11/15/18	11/15/18	11/15/18
Parameter	**Units**	*					
Volatile Organic Compounds							
Acetone	UG/L	50					
Semivolatile Organic Compounds							
1,3-Dichlorobenzene	UG/L	3					
1,4-Dichlorobenzene	UG/L	3					
bis(2-Ethylhexyl)phthalate	UG/L	5					
Metals							
Antimony	MG/L	0.003					
Arsenic	MG/L	0.025					
Barium	MG/L	1	0.36	0.15	0.060	0.059	0.12
Cadmium	MG/L	0.005					
Chromium	MG/L	0.05			0.0010 J	0.0021 J	0.0077
Copper	MG/L	0.2					
Iron	MG/L	0.3	15.2	3.0		0.075	0.042 J
Lead	MG/L	0.025					
Magnesium	MG/L	35	46.2	40.8	31.9	56.1	28.9
Manganese	MG/L	0.3	2.4	0.95	0.18	0.041	0.011
Nickel	MG/L	0.1		0.0040 J	0.0013 J	0.0017 J	0.0036 J
Sodium	MG/L	20	593	4.4	5.9	3.1	11.6
Zinc	MG/L	2		0.011			

*- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998 (includes 4/2000 and 6/2004 Addenda). Class GA. * - PCB Criteria based on sum of the aroclors.

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TABLE 3-2
GROUNDWATER SAMPLE ANALYTICAL RESULTS
PFOHL BROTHERS LANDFILL SITE
NOVEMBER 2018

Location ID			GW-35S
Sample ID			GW-35S
Matrix			Groundwater
Depth Interval (ft)			-
Date Sampled			11/14/18
Parameter	**Units**	*	
Volatile Organic Compounds			
Acetone	UG/L	50	
Semivolatile Organic Compounds			
1,3-Dichlorobenzene	UG/L	3	
1,4-Dichlorobenzene	UG/L	3	
bis(2-Ethylhexyl)phthalate	UG/L	5	
Metals			
Antimony	MG/L	0.003	
Arsenic	MG/L	0.025	
Barium	MG/L	1	0.14
Cadmium	MG/L	0.005	
Chromium	MG/L	0.05	
Copper	MG/L	0.2	
Iron	MG/L	0.3	
Lead	MG/L	0.025	
Magnesium	MG/L	35	36.0
Manganese	MG/L	0.3	0.012
Nickel	MG/L	0.1	
Sodium	MG/L	20	4.2
Zinc	MG/L	2	0.0025 J

*- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998 (includes 4/2000 and 6/2004 Addenda). Class GA. * - PCB Criteria based on sum of the aroclors.

Flags assigned during chemistry validation are shown.

Concentration Exceeds

J - The analyte was positively identified, the quantitation is an estimation. Empty cell - Not Detected.

J+ - The analyte was positively identified, the quantitation is an estimation with possible high bias.

NA - Not Analyzed.

Only Detected Results Reported.

TABLE 3-3
EMERGING CONTAMINANTS GROUNDWATER SAMPLE ANALYTICAL RESULTS
PFOHL BROTHERS LANDFILL SITE
NOVEMBER 2018

Location ID			FIELDQC	FIELDQC	GW-08D	GW-08SR	GW-26D
Sample ID			EB-111418	FB-111418	GW-08D	GW-08SR	FD-111418
Matrix			Quality Control	Quality Control	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/14/18	11/14/18	11/14/18	11/14/18	11/14/18
Parameter	**Units**	*	Equipment Blank (1-1)	Field Blank (1-1)			Field Duplicate (1-1)
Semivolatile Organic Compounds							
1,4-Dioxane	UG/L	-	0.26 J	NA	0.29 UJ	0.34 UJ	0.32 UJ
Per- and Polyfluoroalkyl Substances							
Perfluorobutanoic acid (PFBA)	NG/L	-	0.41 U	0.37 U	0.37 U	19	10
Perfluoropentanoic acid (PFPeA)	NG/L	-	0.75 U	0.68 U	1.3 J	1.9	6.3
Perfluorohexanoic acid (PFHxA)	NG/L	-	0.24 U	0.22 U	1.1 J	1.7 J	5.9
Perfluoroheptanoic acid (PFHpA)	NG/L	-	0.32 U	0.29 U	1.1 J	1.6 J	2.0
Perfluorooctanoic acid (PFOA)	NG/L	70	0.32 U	0.29 U	5.6	5.3	4.2
Perfluorononanoic acid (PFNA)	NG/L	-	0.38 U	0.35 U	0.36 J	0.36 U	0.35 U
Perfluorodecanoic acid (PFDA)	NG/L	-	0.38 U	0.35 U	0.35 U	0.36 U	0.35 U
Perfluoroundecanoic acid (PFUnA)	NG/L	-	0.25 U	0.23 U	0.23 U	0.24 U	0.23 U
Perfluorododecanoic acid (PFDoA)	NG/L	-	0.35 U	0.32 U	0.32 U	0.33 U	0.32 U
Perfluorotridecanoic acid (PFTriA)	NG/L	-	0.24 U	0.22 U	0.22 U	0.23 U	0.22 U
Perfluorotetradecanoic acid (PFTeA)	NG/L	-	0.45 U	0.41 U	0.41 U	0.43 U	0.42 U
Perfluorobutanesulfonic acid (PFBS)	NG/L	-	0.44 U	0.40 U	4.5	0.98 J	3.8
Perfluorohexanesulfonic acid (PFHxS)	NG/L	-	0.26 U	0.24 U	1.5 J	0.30 J	1.2 J
Perfluoroheptanesulfonic acid (PFHpS)	NG/L	-	0.82 U	0.75 U	0.75 U	0.78 U	0.76 U
Perfluorooctanesulfonic acid (PFOS)	NG/L	70	0.76 U	0.69 U	13	0.85 J	8.5
Perfluorodecane sulfonate (PFDS)	NG/L	-	0.53 U	0.48 U	0.48 U	0.50 U	0.49 U
Perfluorooctane sulfonamide (PFOSA)	NG/L	-	0.56 U	0.51 U	0.51 U	0.53 U	0.52 U
N-Methyl perfluorooctanesulfonamidoacetic acid	NG/L	-	0.45 U	0.41 U	0.41 U	0.43 U	0.42 U
N-Ethyl perfluorooctanesulfonamidoacetic acid	NG/L	-	0.70 U	0.64 U	0.64 U	0.66 U	0.65 U
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2)	NG/L	-	1.0 U	0.91 U	0.91 U	0.95 U	0.93 U

*- USEPA Drinking Water Health Advisory (USEPA, May 2016)

Flags assigned during chemistry validation are shown.

Concentration Exceeds

Detection Limits shown are MDL

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[LOGDATE] >= #11/13/2018# AND [PRCCODE] = 'PFC' OR [PARNAME] = '1,4-Dioxane'

TABLE 3-3
EMERGING CONTAMINANTS GROUNDWATER SAMPLE ANALYTICAL RESULTS
PFOHL BROTHERS LANDFILL SITE
NOVEMBER 2018

Location ID			FIELDQC	FIELDQC	GW-08D	GW-08SR	GW-26D
Sample ID			EB-111418	FB-111418	GW-08D	GW-08SR	FD-111418
Matrix			Quality Control	Quality Control	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/14/18	11/14/18	11/14/18	11/14/18	11/14/18
Parameter	**Units**	*	Equipment Blank (1-1)	Field Blank (1-1)			Field Duplicate (1-1)
Per- and Polyfluoroalkyl Substances							
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2)	NG/L	-	0.56 U	0.51 U	0.51 U	0.53 U	0.52 U
Total PFOA and PFOS	NG/L	70	ND	ND	18.6	6.15	12.7

*- USEPA Drinking Water Health Advisory (USEPA, May 2016)

Flags assigned during chemistry validation are shown.

Concentration Exceeds

Detection Limits shown are MDL

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[LOGDATE] >= #11/13/2018# AND [PRCCODE] = 'PFC' OR [PARNAME] = '1,4-Dioxane'

TABLE 3-3
EMERGING CONTAMINANTS GROUNDWATER SAMPLE ANALYTICAL RESULTS
PFOHL BROTHERS LANDFILL SITE
NOVEMBER 2018

Location ID			GW-26D	GW-35S
Sample ID			GW-26D	GW-35S
Matrix			Groundwater	Groundwater
Depth Interval (ft)			-	-
Date Sampled			11/14/18	11/14/18
Parameter	**Units**	*		
Semivolatile Organic Compounds				
1,4-Dioxane	UG/L	-	0.30 UJ	0.26 UJ
Per- and Polyfluoroalkyl Substances				
Perfluorobutanoic acid (PFBA)	NG/L	-	10	0.41 J
Perfluoropentanoic acid (PFPeA)	NG/L	-	7.8	0.71 U
Perfluorohexanoic acid (PFHxA)	NG/L	-	6.1	0.23 U
Perfluoroheptanoic acid (PFHpA)	NG/L	-	2.1	0.30 U
Perfluorooctanoic acid (PFOA)	NG/L	70	4.4	1.9 U
Perfluorononanoic acid (PFNA)	NG/L	-	0.34 U	0.36 U
Perfluorodecanoic acid (PFDA)	NG/L	-	0.34 U	0.36 U
Perfluoroundecanoic acid (PFUnA)	NG/L	-	0.22 J	0.27 J
Perfluorododecanoic acid (PFDoA)	NG/L	-	0.31 U	0.33 U
Perfluorotridecanoic acid (PFTriA)	NG/L	-	0.21 U	0.23 U
Perfluorotetradecanoic acid (PFTeA)	NG/L	-	0.40 U	0.43 U
Perfluorobutanesulfonic acid (PFBS)	NG/L	-	3.7	0.42 U
Perfluorohexanesulfonic acid (PFHxS)	NG/L	-	1.3 J	0.25 U
Perfluoroheptanesulfonic acid (PFHpS)	NG/L	-	0.73 U	0.78 U
Perfluorooctanesulfonic acid (PFOS)	NG/L	70	7.9	0.72 U
Perfluorodecane sulfonate (PFDS)	NG/L	-	0.47 U	0.51 U
Perfluorooctane sulfonamide (PFOSA)	NG/L	-	0.50 U	0.53 U
N-Methyl perfluorooctanesulfonamidoacetic acid	NG/L	-	0.40 U	0.43 U
N-Ethyl perfluorooctanesulfonamidoacetic acid	NG/L	-	0.62 U	0.67 U
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2)	NG/L	-	0.89 U	0.95 U

*- USEPA Drinking Water Health Advisory (USEPA, May 2016)

Flags assigned during chemistry validation are shown.

Concentration Exceeds

Detection Limits shown are MDL

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[LOGDATE] >= #11/13/2018# AND [PRCCODE] = 'PFC' OR [PARNAME] = '1,4-Dioxane'

TABLE 3-3
EMERGING CONTAMINANTS GROUNDWATER SAMPLE ANALYTICAL RESULTS
PFOHL BROTHERS LANDFILL SITE
NOVEMBER 2018

Location ID			GW-26D	GW-35S
Sample ID			GW-26D	GW-35S
Matrix			Groundwater	Groundwater
Depth Interval (ft)			-	-
Date Sampled			11/14/18	11/14/18
Parameter	**Units**	*		
Per- and Polyfluoroalkyl Substances				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2)	NG/L	-	0.50 U	0.53 U
Total PFOA and PFOS	NG/L	70	12.3	ND

*- USEPA Drinking Water Health Advisory (USEPA, May 2016)

Flags assigned during chemistry validation are shown.

Concentration Exceeds

Detection Limits shown are MDL

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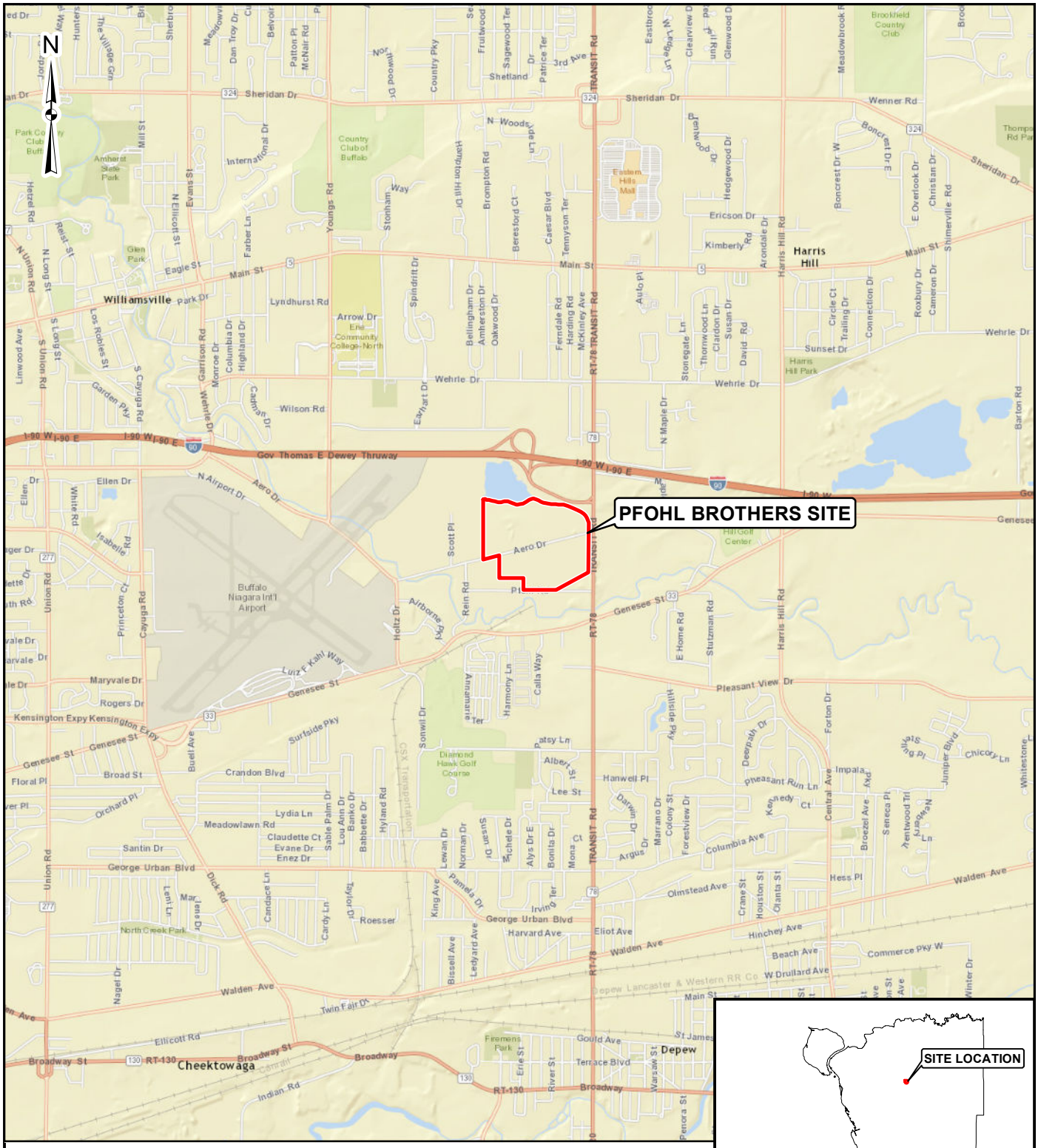
[LOGDATE] >= #11/13/2018# AND [PRCCODE] = 'PFC' OR [PARNAME] = '1,4-Dioxane'

FIGURES



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URS

PFOHL BROTHERS LANDFILL
SITE LOCATION MAP

FIGURE 1-1

Legend

- Monitoring Well Location
- Staff Gauge Location
- Manhole Location
- Wet Well Location

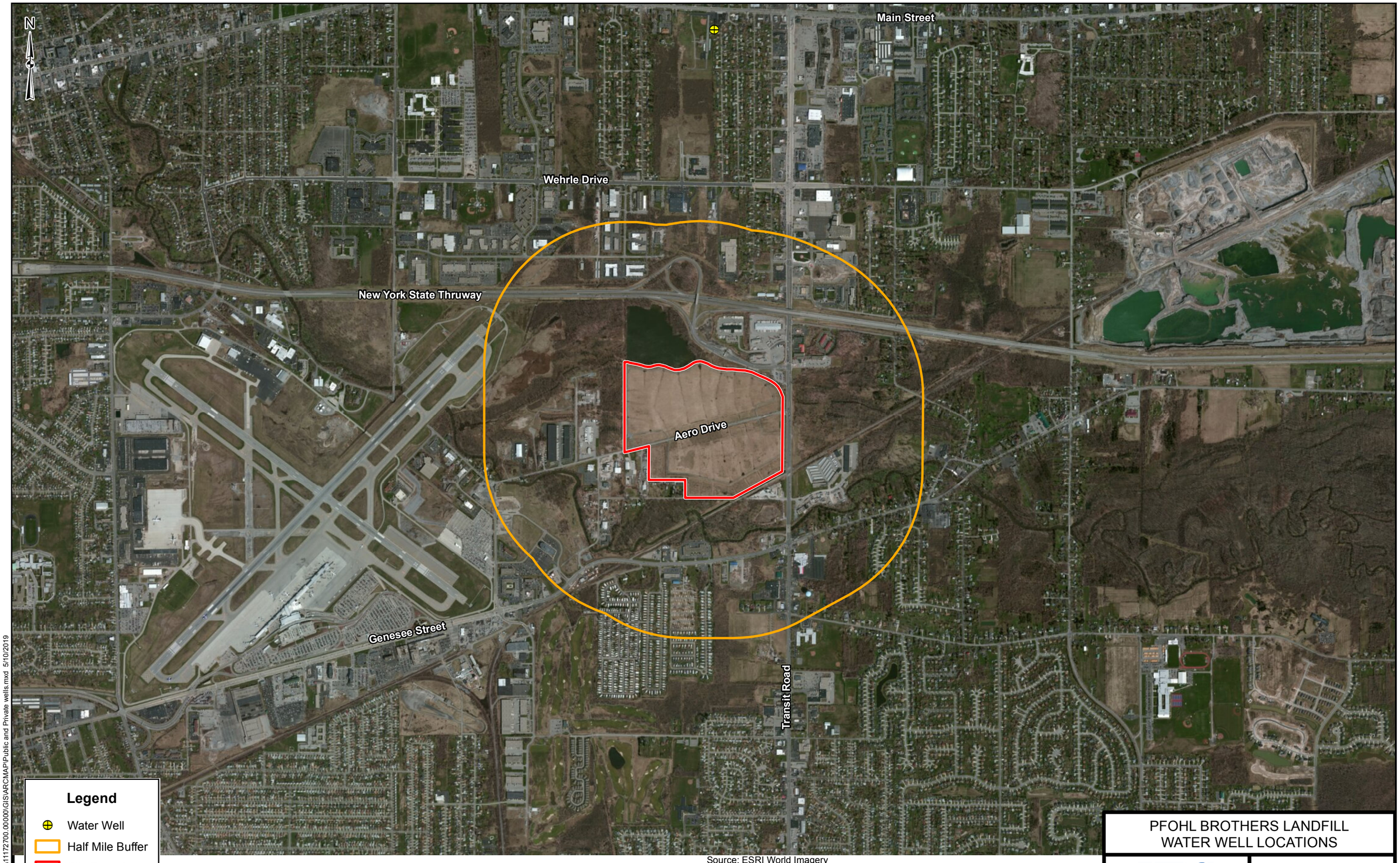
400 0 400 Feet

PFOHL BROTHERS LANDFILL
MONITORING LOCATIONS

URS

FIGURE 3-1

N:\11172700.00000\GIS\ArcView\pfhol.apr WELL LOCATIONS
12/15/2005



Legend

- Water Well
- Half Mile Buffer
- Site Boundary

NOTE:
No public or private water wells fall within 1/2 mile radius of the site

Source: ESRI World Imagery

1,600 0 1,600 Feet

PFOHL BROTHERS LANDFILL
WATER WELL LOCATIONS

URS

FIGURE 3-2

J:\Projects\11172700.00000\GIS\ARCMAP\Public and Private wells.mxd 5/10/2019

APPENDIX A

EXAMPLE DAILY INSPECTION SHEETS

Pfohl Brothers Landfill Site

Daily Logsheet

Town of Cheektowaga

Date 07/02/18

Weather conditions Clear 70's

Time 0938

Read by: JWS

	Level of Water from bottom (ft.)	Flow gallons / minute	Flow Totals gallons	Pump Run Time Hrs.
WW-3	99.0	0	1138	2792
WW-2	4.7	0	-4613	162
WW-1	4.8	0	1787884	6587
WW-6	7.5	0	5052172	16012
WW-4	7.6	0	-1166020	7757
WW-5	8.0	0	5486389	21348

Flow Totalizer at Meter chamber 12414546

Heat Trace

Outside temp **T** = 94

Current **A** = 20

Set point **SP** = 40

Surge Suppressor events 417144

Motor Control Center

Volts 480 **volts**

Amps 110 **amps**

Which WW was running?

1 2 3 4 5 6

Filter **Checked** **Changed**

Comments and/or Current Conditions

Annual Flow Reset

Pfohl Brothers Landfill Site

Daily Logsheet

Town of Cheektowaga

Date 9/26/18

Weather conditions Lt Rain

Time 1200

Read by: JWN

	Level of Water from bottom (ft.)	Flow gallons / minute	Flow Totals gallons	Pump Run Time Hrs.
WW-3	99.0	10	0	2792
WW-2	4.6	0	0	1162
WW-1	4.5	0	150864	101052
WW-6	7.2	0	3496416	116105
WW-4	6.8	0	36991	7767
WW-5	16.7	0	815751	21836

Flow Totalizer at Meter chamber 1352190

Heat Trace

Outside temp **T** = 70

Current **A** = ~~0~~

Set point **SP** = 40

Surge Suppressor events 417378

Motor Control Center

Volts 480 **volts**

Amps 5 **amps**

Which WW was running?

1 2 3 4 5 6

Filter **Checked** **Changed**

Comments and/or Current Conditions

Pfohl Brothers Landfill Site

Daily Logsheet

Town of Cheektowaga

Date 11/15/18

Time 0700

Weather conditions 30°F, breezy, cloudy

Read by: T.U.

	Level of Water from bottom (ft.)	Flow gallons / minute	Flow Totals gallons	Pump Run Time Hrs.
WW-3	99.0 (alarm)	0.0	0	2792
WW-2	4.7 ~~4.6~~	0.0	0	162
WW-1	4.3	0.0	366276	6749
WW-6	7.3	0.0	1369283	16381
WW-4	6.9	0.0	36991	7767
WW-5	5.6	25.2	1469731	22244

Flow Totalizer at Meter chamber 234 gpm - 324/313

Heat Trace

Outside temp T = 25°F

Current A = 1.8

Set point SP = 40°F

Surge Suppressor events 417433

Motor Control Center

Volts 480 volts

Amps 5 amps

Which WW was running?

1 2 3 4 (5) 6

Filter **Checked** **Changed**

Comments and/or Current Conditions

APPENDIX B

MONTHLY FLOW SUMMARIES
JULY 2018 – DECEMBER 2018

August 14, 2018

Mr. Pat Bowen, P.E.
Town Engineer
Town of Cheektowaga
Re: Pfohl Bros. Flow Data

Dear Mr. Pugh,

Enclosed for your review, please find a copy of the July 2018 Direct Discharge Flow Data Report, prepared by Jon W. Nichy.

On July 2, 2018, the Flow Totalizers were reset to zero.

Should you have any other questions or comments regarding this submittal, please contact this office @ 896-1777.

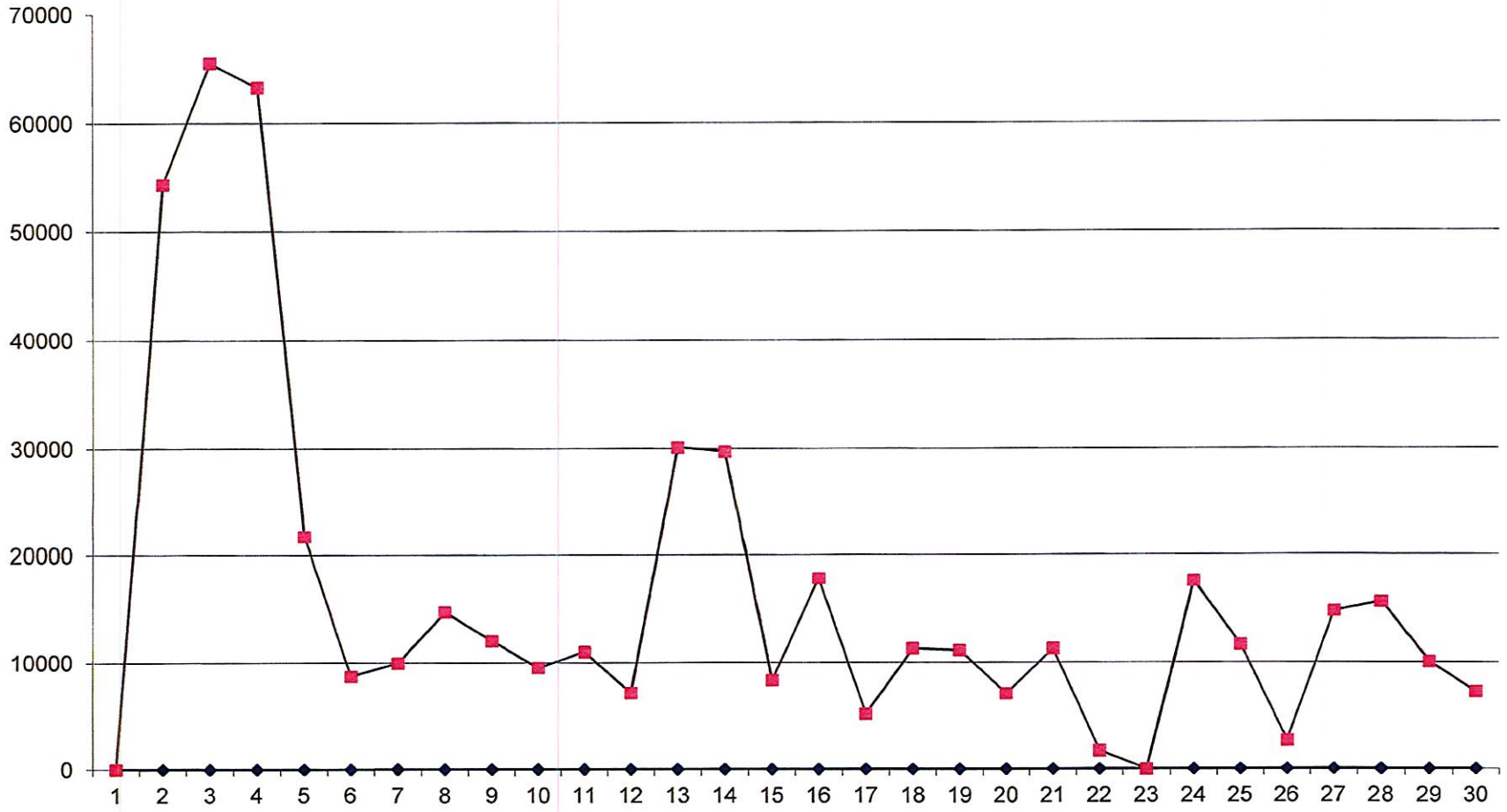
Yours truly,

Jon W. Nichy
Superintendent
Main Pump Station

Direct Discharge Flow Data

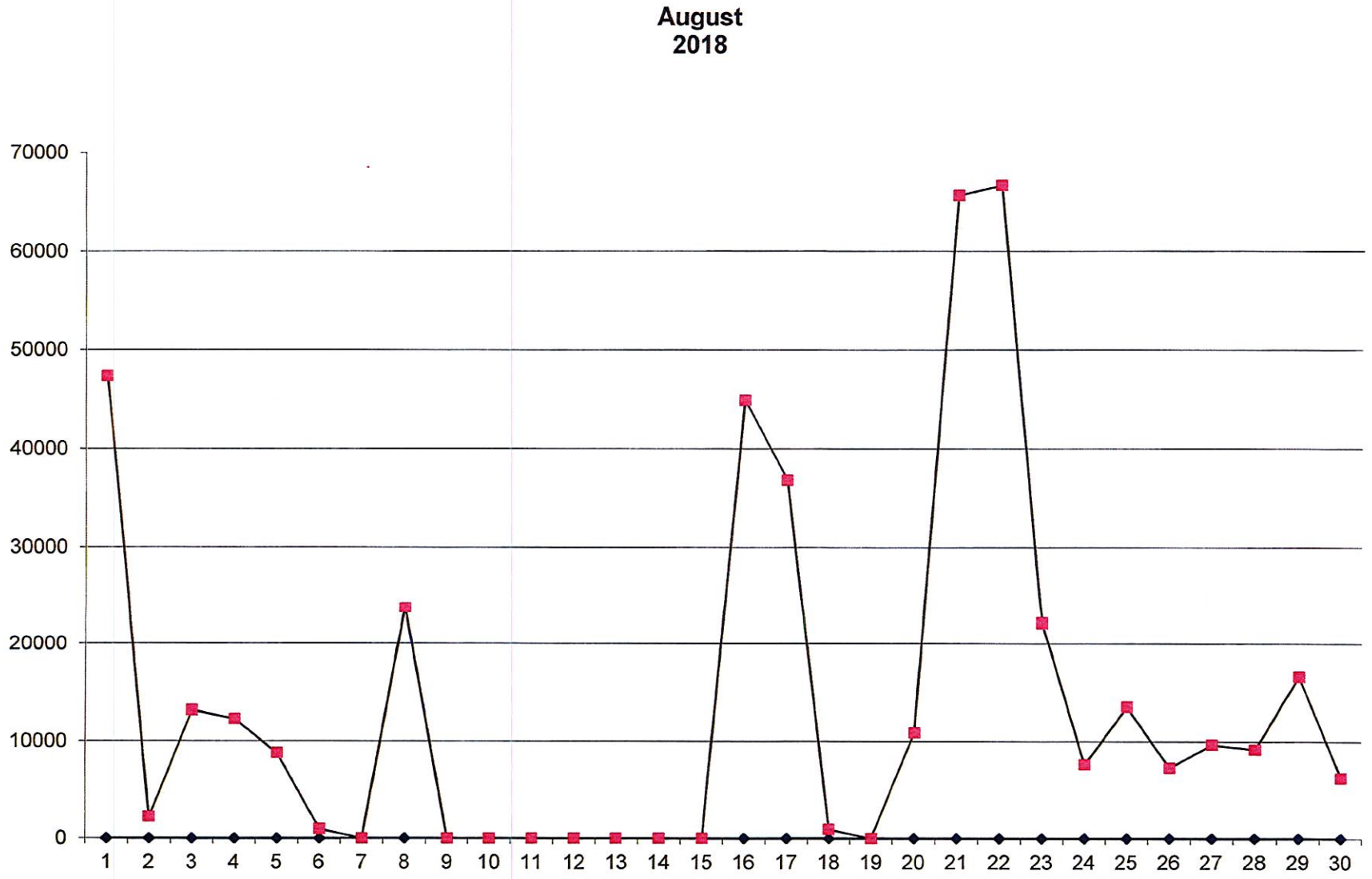
6/30/2018		12414546	0	
Jul-18	**Time; 11:58pm unless otherwise stated**	**Totalizer Reading (Gallons)**	**Daily Total Discharge (Gallons)**	**Notes**
1		12,414,546	0	
2		54,343	54,343	**Annual Reset / 23:42 inhibit**
3		119,878	65,534	07:15 enable
4		183,168	63,290	
5		204,923	21,754	
6		213,615	8,691	
7		223,556	9,940	
8		238,249	14,693	
9		250,260	12,011	
10		259,773	9,513	
11		270,785	11,011	
12		277,922	7,137	
13		308,047	30,124	
14		337,784	29,737	
15		346,111	8,326	
16		363,973	17,862	
17		369,120	5,146	04:37 inhibit / 07:30 enable
18		380,391	11,271	
19		391,490	11,099	
20		398,531	7,040	
21		409,808	11,277	
22		411,515	1,706	05:53 inhibit
23		411,515	0	
24		429,102	17,587	12:56 enable / 23:40 inhibit
25		440,751	11,649	10:16 enable
26		443,396	2,644	
27		458,167	14,771	
28		473,794	15,626	
29		483,819	10,025	
30		491,013	7,193	
31		580,828	89814	
		580,828	**580,814**	

July
2018


70000
60000
50000
40000
30000
20000
10000
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Direct Discharge Flow Data

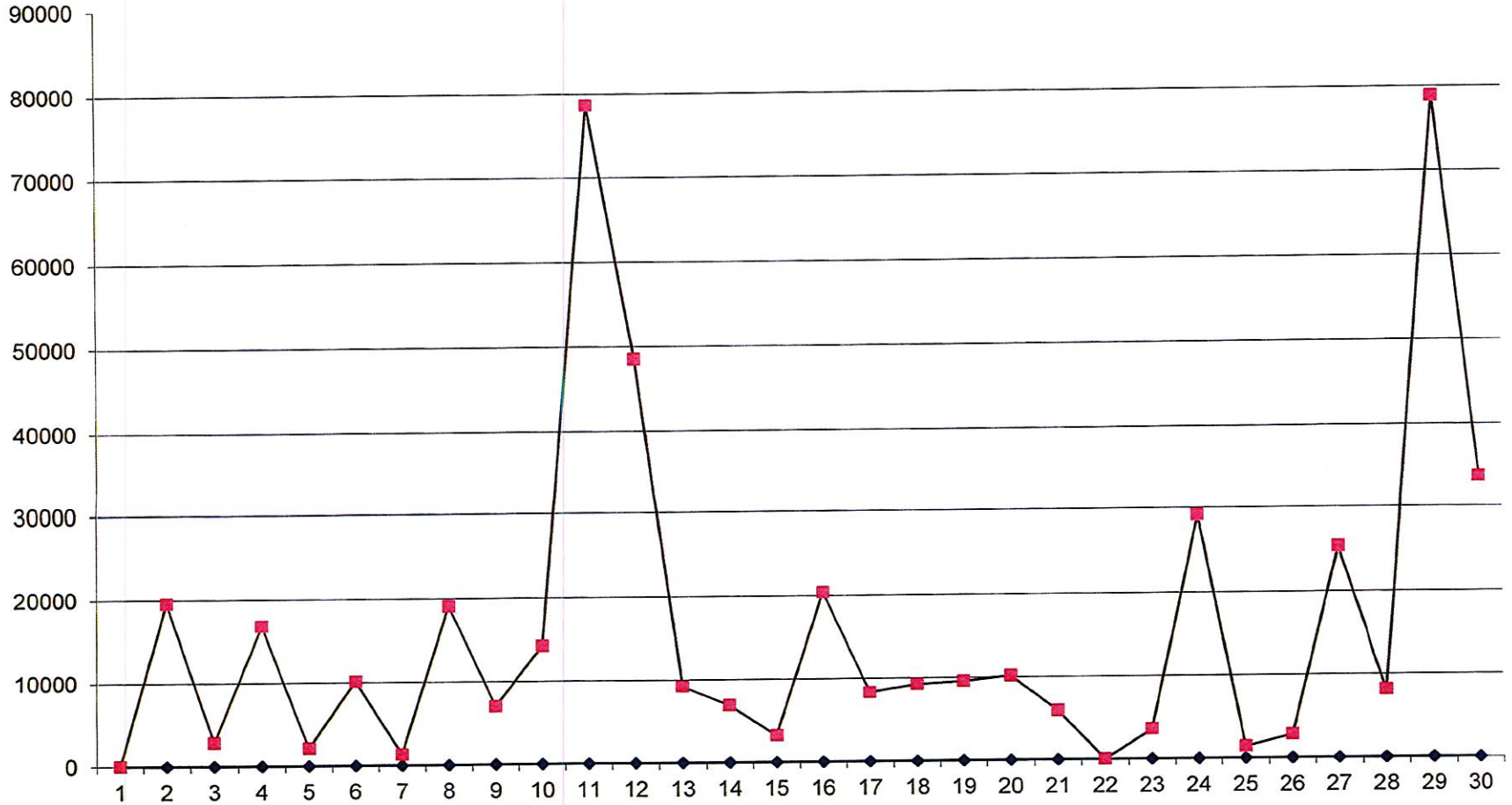
7/31/2018		580828	89,814	
Aug-18	**Time; 11:58pm unless otherwise stated**	**Totalizer Reading (Gallons)**	**Daily Total Discharge (Gallons)**	**Notes**
1		628,171	47,343	
2		630,340	2,168	
3		643,501	13,160	
4		655,751	12,249	
5		664,521	8,770	
6		665,459	938	
7		665,459	0	00:04 inhibit
8		689,219	23,759	14:44 enable
9		689,219	0	
10		689,219	0	
11		689,219	0	
12		689,219	0	
13		689,219	0	
14		689,219	0	
15		689,219	0	
16		734,143	44,923	
17		770,943	36,800	
18		771,884	940	01:50 inhibit 13:04 enable
19		771,884	0	
20		782,758	10,874	
21		848,394	65,635	
22		915,030	66,636	00:11 inhibit 10:17 enable
23		937,152	22,121	
24		944,772	7,620	
25		958,315	13,543	
26		965,593	7,277	
27		975,281	9,687	
28		984,461	9,180	
29		1,001,103	16,642	
30		1,007,339	6,235	
31		1,015,233	7894	
		434,405	**434,394**	


August
2018
70000
60000
50000
40000
30000
20000
10000
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Direct Discharge Flow Data

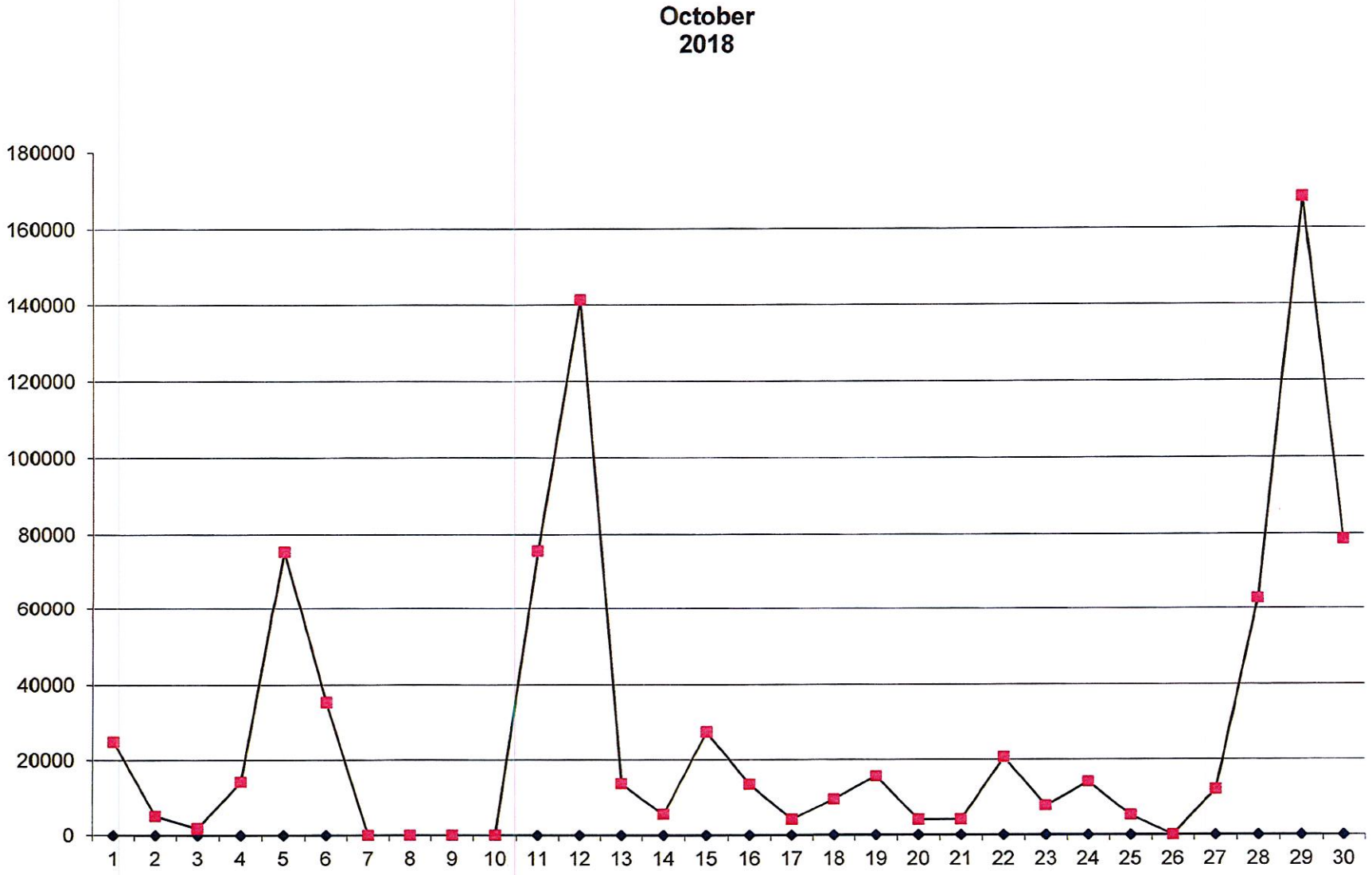
8/31/2018		1015233	89,814	
Sep-18	**Time; 11:58pm unless otherwise stated**	**Totalizer Reading (Gallons)**	**Daily Total Discharge (Gallons)**	**Notes**
1		1,015,233	0	
2		1,034,771	19,538	
3		1,037,539	2,768	
4		1,054,345	16,805	
5		1,056,420	2,074	
6		1,066,520	10,100	
7		1,067,819	1,299	
8		1,086,883	19,064	
9		1,093,873	6,989	23:20 inhibit
10		1,108,081	14,207	15:56 enable
11		1,186,690	78,609	
12		1,235,229	48,538	
13		1,244,401	9,171	
14		1,251,258	6,857	
15		1,254,433	3,175	
16		1,274,846	20,412	
17		1,283,139	8,292	
18		1,292,386	9,247	
19		1,301,954	9,567	
20		1,312,110	10,156	
21		1,318,022	5,912	
22		1,318,022	0	
23		1,321,578	3,556	
24		1,350,792	29,214	
25		1,352,189	1,396	00:14 inhibit
26		1,354,983	2,794	22:21 enable
27		1,380,334	25,350	
28		1,388,523	8,189	
29		1,467,387	78,863	
30		1,501,144	33,757	
31				
		485,911	**485,899**	

September
2018



Direct Discharge Flow Data

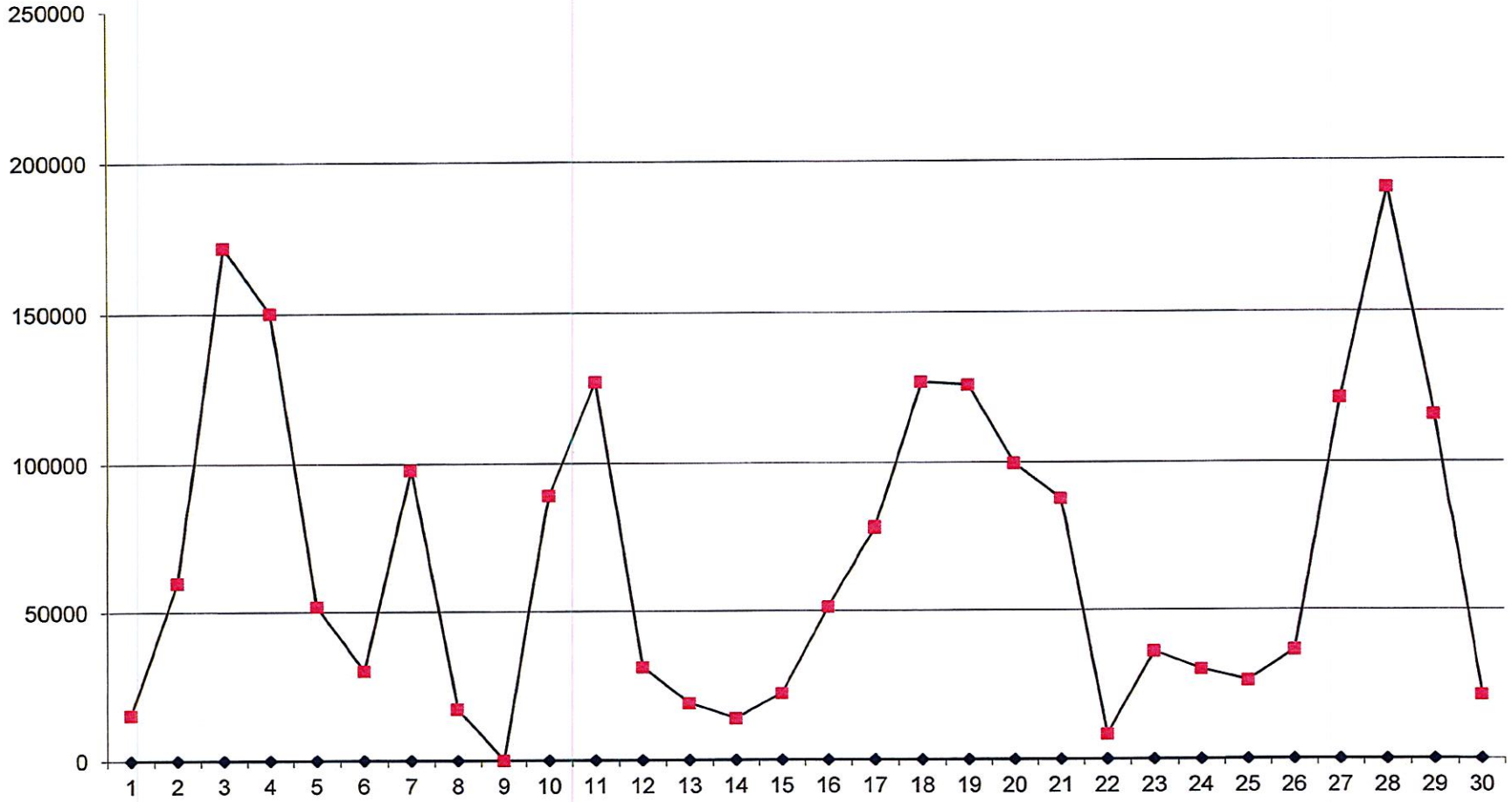
9/30/2018		1501144	33,757	
Oct-18	**Time; 11:58pm unless otherwise stated**	**Totalizer Reading (Gallons)**	**Daily Total Discharge (Gallons)**	**Notes**
1		1,525,951	24,807	
2		1,530,937	4,985	07:05 inhibit
3		1,532,709	1,771	22:56 enable
4		1,546,780	14,071	08:10 inhibit
5		1,622,222	75,441	09:50 enable
6		1,657,473	35,251	08:43 inhibit
7		1,657,473	0	
8		1,657,473	0	
9		1,657,473	0	
10		1,657,473	0	
11		1,733,199	75,725	13:14 enable
12		1,874,470	141,271	
13		1,888,058	13,588	
14		1,893,475	5,416	
15		1,920,818	27,343	
16		1,934,296	13,478	
17		1,938,359	4,063	
18		1,947,912	9,552	
19		1,963,572	15,660	
20		1,967,574	4,001	21:46 inhibit
21		1,971,648	4,074	21:32 enable
22		1,992,301	20,652	
23		2,000,087	7,786	
24		2,014,151	14,063	
25		2,019,350	5,199	
26		2,019,350	0	
27		2,031,431	12,080	05:21 inhibit
28		2,094,394	62,963	15:13 enable
29		2,262,440	168,046	
30		2,341,049	78,608	
31		2,355,318	14269	13:40 inhibit 22:35 enable
		854,174	**854,163**	


October
2018
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Direct Discharge Flow Data

10/31/2018		2355318	14,269	
Nov-18	**Time; 11:58pm unless otherwise stated**	**Totalizer Reading (Gallons)**	**Daily Total Discharge (Gallons)**	**Notes**
1		2,370,761	15,442	08:59 inhibit
2		2,430,595	59,834	14:47 enable
3		2,602,516	171,921	
4		2,752,675	150,158	
5		2,804,466	51,790	
6		2,834,604	30,138	07:07 ihibit 11:49 enable
7		2,932,582	97,977	
8		2,949,805	17,222	
9		2,949,805	0	19:53 inhibit
10		3,039,175	89,370	06:58 enable
11		3,166,382	127,206	
12		3,197,704	31,322	
13		3,216,749	19,044	
14		3,230,662	13,913	
15		3,253,035	22,372	
16		3,304,411	51,376	13:20 inhibit
17		3,382,304	77,893	07:14 enable
18		3,509,142	126,837	
19		3,634,891	125,749	
20		3,734,579	99,688	
21		3,822,538	87,959	
22		3,930,899	8,361	
23		3,867,097	36,197	
24		3,897,232	30,134	
25		3,923,614	26,382	
26		3,960,321	36,707	09:05 inhibit
27		4,081,631	121,310	07:06 enable
28		4,272,559	190,928	
29		4,388,222	115,663	
30		4,409,623	21,400	
		2,054,305	**2,054,293**	

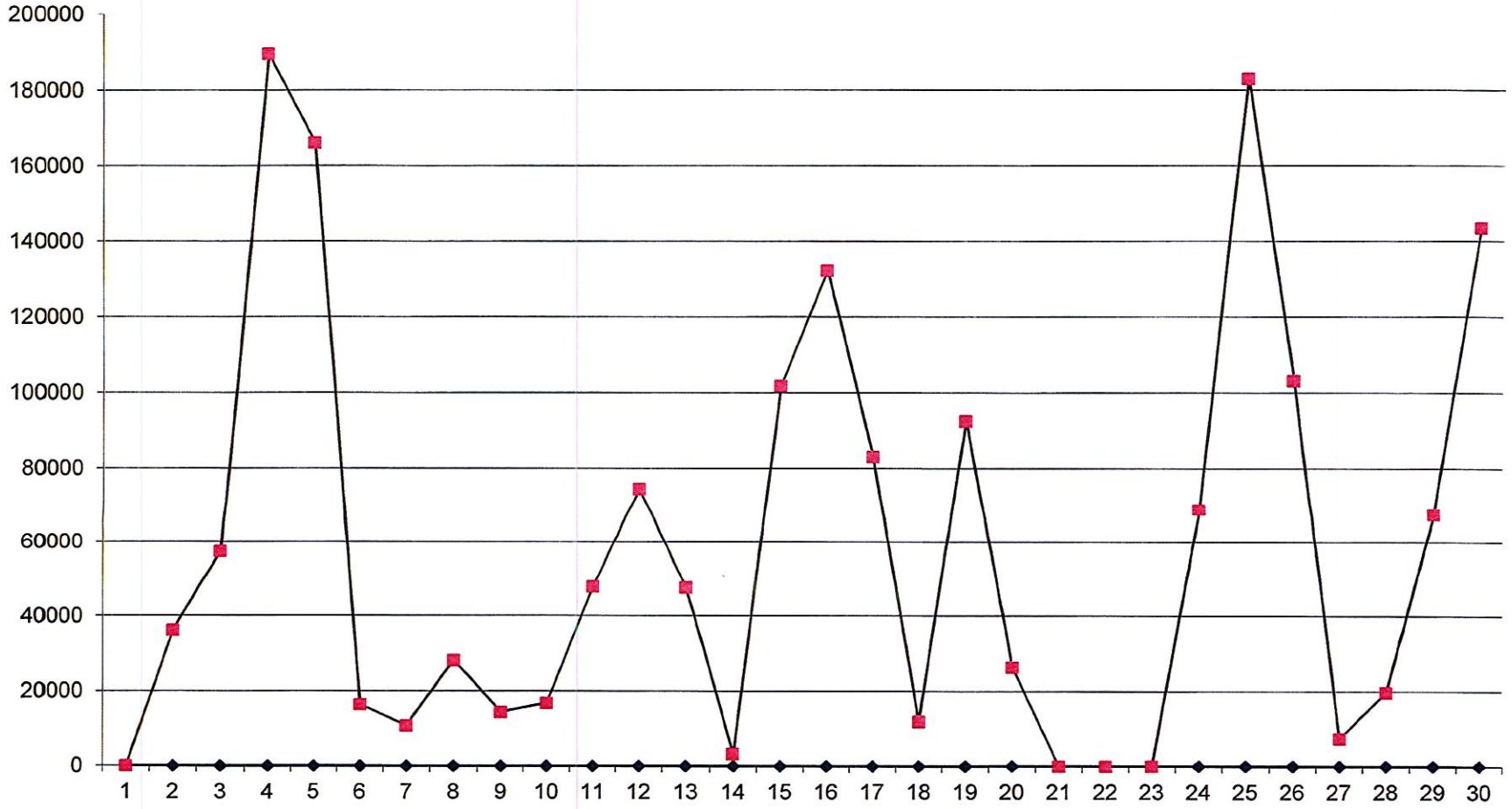
November
2018



Direct Discharge Flow Data

11/30/2018		4409623	14,269	
Dec-18	**Time; 11:58pm unless otherwise stated**	**Totalizer Reading (Gallons)**	**Daily Total Discharge (Gallons)**	**Notes**
1		4,409,623	0	21:44 inhibit
2		4,445,843	36,220	17:10 enable 21:57 inhibit
3		4,503,167	57,324	126:35 enable
4		4,692,710	189,542	
5		4,858,799	166,089	
6		4,875,040	16,240	
7		4,885,795	10,755	
8		4,913,994	28,199	
9		4,928,333	14,338	
10		4,945,013	16,680	
11		4,992,920	47,906	
12		5,067,382	74,462	
13		5,114,964	47,582	
14		5,118,106	3,142	
15		5,219,835	101,729	
16		5,352,103	132,267	
17		5,435,217	83,114	
18		5,447,070	11,853	
19		5,539,623	92,553	
20		5,565,951	26,327	23:18 inhibit
21		5,565,951	0	
22		5,565,951	0	
23		5,565,951	0	
24		5,634,674	68,723	14:55 enable
25		5,817,623	182,949	
26		5,920,739	103,116	
27		5,928,076	7,337	
28		5,947,792	19,716	
29		6,015,161	67,368	
30		6,158,762	143,601	
31		6,174,052	15289	18:22 inhibit
		1,764,429	**1,764,421**	

December
2018



APPENDIX C

HYDRAULIC MONITORING TABLES

TABLE C-1
PFOHL BROTHERS LANDFILL SITE
GROUNDWATER ELEVATIONS
JULY - DECEMBER 2018

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
GW-01D	1073088.634	1117968.213	694.41	NM	696.12	D	1						
MNW								9/12/2018 1709	3.76	692.36	0.00	692.36	
MNW								11/13/2018 1038	2.67	693.45	0.00	693.45	
MNW								12/20/2018 1225	2.83	693.29	0.00	693.29	
GW-01S	1073087.779	1117961.500	694.53	NM	696.19	S	1						
MNW								9/12/2018 1708	6.48	689.71	0.00	689.71	
MNW								11/13/2018 1037	3.55	692.64	0.00	692.64	
MNW								12/20/2018 1224	3.81	692.38	0.00	692.38	
GW-03D	1073819.106	1114602.426	692.35	NM	693.88	D	1						
MNW								9/12/2018 1533	1.97	691.91	0.00	691.91	
MNW								11/13/2018 0914	1.78	692.10	0.00	692.10	
MNW								12/20/2018 1120	1.82	692.06	0.00	692.06	
GW-03S	1073812.622	1114605.762	692.61	NM	693.80	S	1						
MNW								9/12/2018 1532	13.27	680.53	0.00	680.53	
MNW								11/13/2018 0913	DRY		NM		
MNW								12/20/2018 1120	3.73	690.07	0.00	690.07	
GW-04D	1072289.432	1114685.625	690.89	NM	692.75	D	1						
MNW								9/12/2018 1721	13.25	679.50	0.00	679.50	
MNW								11/13/2018 1014	12.65	680.10	0.00	680.10	
MNW								12/20/2018 1232	11.95	680.80	0.00	680.80	
GW-04S	1072284.456	1114685.127	690.76	NM	692.72	S	1						
MNW								9/12/2018 1720	6.71	686.01	0.00	686.01	
MNW								11/13/2018 1015	4.27	688.45	0.00	688.45	
MNW								12/20/2018 1231	4.27	688.45	0.00	688.45	

NM - No Measurement

The value noted in the column labeled Specific Gravity is an assumed value for free product, if found.

Type:

MH	Manhole Monitoring Point
MNW	Monitoring Well
SG	Staff Gauge

TABLE C-1
PFOHL BROTHERS LANDFILL SITE
GROUNDWATER ELEVATIONS
JULY - DECEMBER 2018

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
GW-07D	1071242.458	1117669.925	697.15	NM	699.94	D	1						
MNW								9/12/2018 1636	50.05	649.89	0.00	649.89	
MNW								11/13/2018 1334	45.54	654.40	0.00	654.40	
MNW								12/20/2018 1218	56.68	643.26	0.00	643.26	
GW-07S	1071238.157	1117666.265	697.47	NM	699.51	S	1						
MNW								9/12/2018 1635	7.20	692.31	0.00	692.31	
MNW								11/13/2018 1335	5.20	694.31	0.00	694.31	
MNW								12/20/2018 1219	4.82	694.69	0.00	694.69	
GW-08D	1073713.617	1116795.328	695.28	NM	697.79	D	1						
MNW								9/12/2018 1541	5.98	691.81	0.00	691.81	
MNW								11/13/2018 0929	5.73	692.06	0.00	692.06	
MNW								12/20/2018 1138	5.78	692.01	0.00	692.01	
GW-08SR	1073714.172	1116786.343	695.08	NM	697.50	S	1						
MNW								9/12/2018 1540	5.31	692.19	0.00	692.19	
MNW								11/13/2018 0929	5.10	692.40	0.00	692.40	
MNW								12/20/2018 1139	5.14	692.36	0.00	692.36	
GW-26D	1071698.573	1115997.470	696.01	NM	698.50	D	1						
MNW								9/12/2018 1621	6.82	691.68	0.00	691.68	
MNW								11/13/2018 1005	6.58	691.92	0.00	691.92	
MNW								12/20/2018 1210	6.61	691.89	0.00	691.89	
GW-28S	1073129.479	1117648.927	698.60	NM	700.95	S	1						
MNW								9/12/2018 1553	11.15	689.80	0.00	689.80	
MNW								11/13/2018 0936	8.51	692.44	0.00	692.44	
MNW								12/20/2018 1143	8.68	692.27	0.00	692.27	

NM - No Measurement

The value noted in the column labeled Specific Gravity is an assumed value for free product, if found.

Type:

MH	Manhole Monitoring Point
MNW	Monitoring Well
SG	Staff Gauge

TABLE C-1
PFOHL BROTHERS LANDFILL SITE
GROUNDWATER ELEVATIONS
JULY - DECEMBER 2018

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
GW-29S	1072552.638	1117761.993	697.50	NM	699.63	S	1						
MNW								9/12/2018 1608	10.39	689.24	0.00	689.24	
MNW								11/13/2018 0952	6.71	692.92	0.00	692.92	
MNW								12/20/2018 1155	7.36	692.27	0.00	692.27	
GW-30S	1072096.109	1117743.563	693.67	NM	696.58	S	1						
MNW								9/12/2018 1611	8.13	688.45	0.00	688.45	
MNW								11/13/2018 0954	7.82	688.76	0.00	688.76	
MNW								12/20/2018 1202	7.77	688.81	0.00	688.81	
GW-31S	1071786.280	1117191.441	695.84	NM	698.62	S	1						
MNW								9/12/2018 1615	8.27	690.35	0.00	690.35	
MNW								11/13/2018 0958	2.68	695.94	0.00	695.94	
MNW								12/20/2018 1203	2.60	696.02	0.00	696.02	
GW-32S	1071613.793	1116364.200	696.19	NM	698.37	S	1						
MNW								9/12/2018 1617	7.29	691.08	0.00	691.08	
MNW								11/13/2018 1001	2.65	695.72	0.00	695.72	
MNW								12/20/2018 1206	2.54	695.83	0.00	695.83	
GW-33S	1072165.625	1115561.866	695.94	NM	698.24	S	1						
MNW								9/12/2018 1624	DRY		NM		Dry at 8.20'
MNW								11/13/2018 1008	3.95	694.29	0.00	694.29	
MNW								12/20/2018 1212	4.05	694.19	0.00	694.19	
GW-34S	1072979.205	1114730.200	692.51	NM	694.77	S	1						
MNW								9/12/2018 1530	8.86	685.91	0.00	685.91	
MNW								11/13/2018 0902	2.50	692.27	0.00	692.27	
MNW								12/20/2018 1113	2.41	692.36	0.00	692.36	

NM - No Measurement

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Type:

MH	Manhole Monitoring Point
MNW	Monitoring Well
SG	Staff Gauge

TABLE C-1
PFOHL BROTHERS LANDFILL SITE
GROUNDWATER ELEVATIONS
JULY - DECEMBER 2018

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
GW-35S	1071701.925	1115985.585	696.19	NM	697.39	S	1						
MNW								9/12/2018 1620	6.80	690.59	0.00	690.59	
MNW								11/13/2018 1005	4.41	692.98	0.00	692.98	
MNW								12/20/2018 1209	3.28	694.11	0.00	694.11	
MH-01	1073806.665	1114810.501	698.62	NM	698.62	NA	1						
MH								9/12/2018 1531	11.17	687.45	0.00	687.45	
MH								11/13/2018 0907	10.42	688.20	0.00	688.20	
MH								12/20/2018 1118	11.32	687.30	0.00	687.30	
MH-03	1073736.789	1115259.334	699.40	NM	699.40	NA	1						
MH								9/12/2018 1537	11.23	688.17	0.00	688.17	
MH								11/13/2018 0923	11.25	688.15	0.00	688.15	
MH								12/20/2018 1133	11.26	688.14	0.00	688.14	
MH-07	1073838.229	1116243.757	696.82	NM	696.82	NA	1						
MH								9/12/2018 1538	9.46	687.36	0.00	687.36	
MH								11/13/2018 0925	9.47	687.35	0.00	687.35	
MH								12/20/2018 1136	9.95	686.87	0.00	686.87	
MH-10	1073540.729	1117381.524	703.01	NM	703.01	NA	1						
MH								9/12/2018 1550	14.53	688.48	0.00	688.48	
MH								11/13/2018 0933	14.49	688.52	0.00	688.52	
MH								12/20/2018 1141	14.45	688.56	0.00	688.56	
MH-15	1072531.567	1117761.125	699.02	NM	699.02	NA	1						
MH								9/12/2018 1607	14.81	684.21	0.00	684.21	
MH								11/13/2018 0951	14.93	684.09	0.00	684.09	
MH								12/20/2018 1156	14.98	684.04	0.00	684.04	

NM - No Measurement

The value noted in the column labeled Specific Gravity is an assumed value for free product, if found.

Type:

MH	Manhole Monitoring Point
MNW	Monitoring Well
SG	Staff Gauge

TABLE C-1
PFOHL BROTHERS LANDFILL SITE
GROUNDWATER ELEVATIONS
JULY - DECEMBER 2018

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
MH-16	1072133.714	1117748.238	698.57	NM	698.57	NA	1						
MH								9/12/2018 1610	14.55	684.02	0.00	684.02	
MH								11/13/2018 0954	14.55	684.02	0.00	684.02	
MH								12/20/2018 1200	14.65	683.92	0.00	683.92	
MH-17	1071813.137	1117180.019	702.16	NM	702.16	NA	1						
MH								9/12/2018 1614	18.16	684.00	0.00	684.00	
MH								11/13/2018 0957	18.15	684.01	0.00	684.01	
MH								12/20/2018 1203	18.22	683.94	0.00	683.94	
MH-20	1071756.395	1115997.024	706.20	NM	706.20	NA	1						
MH								9/12/2018 1619	19.72	686.48	0.00	686.48	
MH								11/13/2018 1004	19.75	686.45	0.00	686.45	
MH								12/20/2018 1208	19.75	686.45	0.00	686.45	
MH-22	1072158.023	1115589.309	698.05	NM	698.05	NA	1						
MH								9/12/2018 1623	9.01	689.04	0.00	689.04	
MH								11/13/2018 1008	9.00	689.05	0.00	689.05	
MH								12/20/2018 1212	9.00	689.05	0.00	689.05	
MH-25	1072483.928	1114820.313	698.17	NM	698.17	NA	1						
MH								9/12/2018 1525	10.76	687.41	0.00	687.41	
MH								11/13/2018 0859	10.05	688.12	0.00	688.12	
MH								12/20/2018 1108	10.85	687.32	0.00	687.32	
SG-01	1073882.887	1114813.101	NM	NM	690.00	NA	1						
SG								9/12/2018 1532	Dry		NM		Dry at 0.75
SG								11/13/2018 0907	-0.66	690.66	0.00	690.66	
SG								12/20/2018 1118	-0.72	690.72	0.00	690.72	

NM - No Measurement

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Type:

MH	Manhole Monitoring Point
MNW	Monitoring Well
SG	Staff Gauge

TABLE C-1
PFOHL BROTHERS LANDFILL SITE
GROUNDWATER ELEVATIONS
JULY - DECEMBER 2018

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
SG-02	1073738.27	1116805.85	NM	NM	690.00	NA	1						
SG								9/12/2018 1545	-3.10	693.10	0.00	693.10	
SG								11/13/2018 0931	-3.26	693.26	0.00	693.26	
SG								12/20/2018 1140	-3.24	693.24	0.00	693.24	
WW-01	1073676.903	1115710.476	NM	NM	684.02	NA	1						
MH								9/12/2018 1440	-4.0	688.02	0.00	688.02	
MH								11/13/2018 0700	-4.0	688.02	0.00	688.02	
MH								12/20/2018 1030	-4.0	688.02	0.00	688.02	
WW-02	1073684.724	1116792.311	NM	NM	684.18	NA	1						
MH								9/12/2018 1440	-4.6	688.78	0.00	688.78	
MH								11/13/2018 0700	-4.7	688.88	0.00	688.88	
MH								12/20/2018 1030	-4.7	688.88	0.00	688.88	
WW-03	1073140.339	1117618.499	NM	NM	683.80	NA	1						
MH								9/12/2018 1554	-4.75	688.55	0.00	688.55	
MH								11/13/2018 0700	-4.85	688.65	0.00	688.65	
MH								12/20/2018 1030	-4.97	688.77	0.00	688.77	
WW-04	1072057.563	1117610.508	NM	NM	676.62	NA	1						
MH								9/12/2018 1440	-6.9	683.52	0.00	683.52	
MH								11/13/2018 0700	-6.9	683.52	0.00	683.52	
MH								12/20/2018 1030	-6.6	683.22	0.00	683.22	
WW-05	1071661.368	1116370.876	NM	NM	676.14	NA	1						
MH								9/12/2018 1440	-6.3	682.44	0.00	682.44	
MH								11/13/2018 0700	-5.8	681.94	0.00	681.94	
MH								12/20/2018 1030	-7.2	683.34	0.00	683.34	

NM - No Measurement

The value noted in the column labeled Specific Gravity is an assumed value for free product, if found.

Type:

MH	Manhole Monitoring Point
MNW	Monitoring Well
SG	Staff Gauge

TABLE C-1
PFOHL BROTHERS LANDFILL SITE
GROUNDWATER ELEVATIONS
JULY - DECEMBER 2018

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
WW-06	1072988.420	1114811.518	NM	NM	681.89	NA	1						
MH								9/12/2018 1440	-5.8	687.69	0.00	687.69	
MH								11/13/2018 0700	-6.8	688.69	0.00	688.69	
MH								12/20/2018 1030	-6.1	687.99	0.00	687.99	

NM - No Measurement

The value noted in the column labeled Specific Gravity is an assumed value for free product, if found.

Type:

MH	Manhole Monitoring Point
MNW	Monitoring Well
SG	Staff Gauge

TABLE C-2
PFOHL BROTHERS LANDFILL SITE
OVERBURDEN HYDRAULIC GRADIENT

WELL PAIR:	WW-1	*	Level	WW-2	GW-8SR	Level	SG-02	Level
	Water Level	Water Level	Difference	Water Level	Water Level	Difference	Water Level	Difference
DATE	(ft amsl)	(ft amsl)	(ft)	(ft amsl)	(ft amsl)	(ft)	(ft amsl)	(ft)
9/12/2018	688.02	---	---	688.78	692.19	3.41	693.10	4.32
11/13/2018	688.02	---	---	688.88	692.40	3.52	693.26	4.38
12/20/2018	688.02	---	---	688.88	692.36	3.48	693.24	4.36

WELL PAIR:	WW-3	GW-28S	Level	WW-4	*	Level
	Water Level	Water Level	Difference	Water Level	Water Level	Difference
DATE	(ft amsl)	(ft amsl)	(ft)	(ft amsl)	(ft amsl)	(ft)
9/12/2018	688.55	689.80	1.25	683.52	---	---
11/13/2018	688.65	692.44	3.79	683.52	---	---
12/20/2018	688.77	692.27	3.50	683.52	---	---

WELL PAIR:	WW-5	GW-32S	Level	WW-6	GW-34S	Level
	Water Level	Water Level	Difference	Water Level	Water Level	Difference
DATE	(ft amsl)	(ft amsl)	(ft)	(ft amsl)	(ft amsl)	(ft)
9/12/2018	682.44	691.08	8.64	687.69	685.91	-1.78
11/13/2018	681.94	695.72	13.78	688.69	692.27	3.58
12/20/2018	683.34	695.83	12.49	687.99	692.36	4.37

WELL PAIR:	MH-1	SG-1	Level	MH-15	GW-29S	Level
	Water Level	Water Level	Difference	Water Level	Water Level	Difference
DATE	(ft amsl)	(ft amsl)	(ft)	(ft amsl)	(ft amsl)	(ft)
9/12/2018	687.45	DRY	NA	684.21	689.24	5.03
11/13/2018	688.20	690.66	2.46	684.09	692.92	8.83
12/20/2018	687.30	690.72	3.42	684.04	692.27	8.23

WELL PAIR:	MH-16	GW-30S	Level	MH-17	GW-31S	Level
	Water Level	Water Level	Difference	Water Level	Water Level	Difference
DATE	(ft amsl)	(ft amsl)	(ft)	(ft amsl)	(ft amsl)	(ft)
9/12/2018	684.02	688.45	4.43	684.00	690.35	6.35
11/13/2018	684.02	688.76	4.74	684.01	695.94	11.93
12/20/2018	683.92	688.81	4.89	683.94	696.02	12.08

WELL PAIR:	MH-20	GW-35S	Level	MH-22	GW-33S	Level
	Water Level	Water Level	Difference	Water Level	Water Level	Difference
DATE	(ft amsl)	(ft amsl)	(ft)	(ft amsl)	(ft amsl)	(ft)
9/12/2018	686.48	690.59	4.11	689.04	DRY	NA
11/13/2018	686.45	692.98	6.53	689.05	694.29	5.24
12/20/2018	686.45	694.11	7.66	689.05	694.19	5.14

Notes:

* = No corresponding monitoring well.

NA = Not applicable

APPENDIX D

GROUNDWATER PURGE AND SAMPLE COLLECTION LOGS

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-01S

Date: 11/13/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 3.55' Depth to Well Bottom: 14.94' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 7.0 Estimated Purge Volume (liters): 11.3

Sample ID: GW-01S Sample Time: 11:28 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information: Riser pipe is bulged inwards, could not remove stainless steel bailer from within well, sampled around it.

PURGE PARAMETERS

TIME	pH	TEMP (^{0}C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
10:43	6.83	11.52	1.12	3.36	484	-93	350	3.55
10:48	6.77	11.55	1.12	3.01	352	-84	300	4.65
10:53	6.84	11.33	1.12	1.42	223	-81	230	4.60
10:58	6.76	11.33	1.12	1.17	178	-90	230	4.58
11:03	6.65	11.44	1.13	0.97	128	-96	230	4.61
11:08	6.58	11.47	1.12	0.88	107	-95	230	4.60
11:13	6.53	11.41	1.13	0.82	77.6	-95	230	4.60
11:18	6.48	11.42	1.14	0.76	51.6	-95	230	4.67
11:23	6.48	11.48	1.14	0.72	36.9	-95	230	4.68
11:28	6.48	11.41	1.13	0.70	21.1	-96	230	4.70
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-01D

Date: 11/13/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 2.67' Depth to Well Bottom: 39.65' Well Diameter: 4" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 91.3 Estimated Purge Volume (liters): 80.0

Sample ID: GW-01D Sample Time: 13:00 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
11:40	7.17	10.74	1.11	5.25	0.5	-85	1000	2.67
11:45	7.07	10.84	1.11	2.09	0.1	-90	1000	2.72
11:50	7.01	10.94	1.11	0.70	0.0	-96	1000	2.72
11:55	7.03	11.00	1.11	0.62	0.0	-100	1000	2.72
12:00	7.06	11.05	1.11	0.57	0.0	-108	1000	2.72
12:05	7.10	11.08	1.11	0.54	0.0	-114	1000	2.72
12:10	7.14	11.16	1.11	0.53	0.0	-124	1000	2.73
12:15	7.14	11.25	1.11	0.51	0.0	-144	1000	2.74
12:20	7.14	11.29	1.11	0.50	0.0	-164	1000	2.75
12:25	7.17	11.34	1.11	0.49	0.0	-184	1000	2.75
12:30	7.15	11.37	1.11	0.49	0.0	-191	1000	2.75
12:35	7.20	11.35	1.11	0.50	0.0	-199	1000	2.75
12:40	7.25	11.38	1.11	0.49	0.0	-210	1000	2.75
12:45	7.30	11.42	1.11	0.49	0.0	-219	1000	2.75
12:50	7.31	11.39	1.11	0.48	0.0	-227	1000	2.75
12:55	7.33	11.37	1.11	0.47	0.0	-232	1000	2.75
13:00	7.34	11.39	1.11	0.46	0.0	-237	1000	2.75
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-03S

Date: 11/15/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/ Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: Dry Depth to Well Bottom: 13.22' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): Estimated Purge Volume (liters):

Sample ID: GW-03S Sample Time: N/A QA/QC:

Sample Parameters:

Other Information: Well was dry and could not be sampled.

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
Tolerance:	0.1	---	3%	10%	10%	+ or - 10	---	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-03D

Date: 11/15/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 1.93' Depth to Well Bottom: 35.70' Well Diameter: 4" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 83.4 Estimated Purge Volume (liters): 60.0

Sample ID: GW-03D Sample Time: 9:50 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (^{0}C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
8:50	7.76	5.60	1.36	9.03	34.8	-73	1000	1.93
8:55	7.75	6.20	1.38	5.40	30.2	-95	1000	1.93
9:00	7.49	6.75	1.40	1.40	28.2	-110	1000	1.93
9:05	7.47	7.18	1.33	1.02	0.0	-115	1000	1.93
9:10	7.46	7.34	1.33	0.97	0.0	-116	1000	1.93
9:15	7.48	7.40	1.32	0.90	0.0	-118	1000	1.93
9:20	7.49	7.45	1.32	0.84	0.0	-121	1000	1.93
9:25	7.48	7.50	1.32	0.80	0.0	-122	1000	1.93
9:30	7.47	7.55	1.32	0.75	0.0	-123	1000	1.93
9:35	7.47	7.58	1.32	0.69	0.0	-123	1000	1.93
9:40	7.46	7.61	1.32	0.66	0.0	-123	1000	1.93
9:45	7.47	7.66	1.31	0.62	0.0	-124	1000	1.93
9:50	7.45	7.70	1.31	0.61	0.0	-124	1000	1.93
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-04S

Date: 11/14/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 4.45' Depth to Well Bottom: 16.23' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 7.3 Estimated Purge Volume (liters): 9.5

Sample ID: GW-04S Sample Time: 1525 (VOCs) & 1705 (VOCs & metals) QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information: Placed passive diffusion bag (PDB) in well 9/12/18, sampled VOCs from PDB at 1525 on 11/14/18. Well historically goes dry at very low purge rates (<75ml/min). Bailed dry and sampled for SVOCs and Metals after recovery at 1705

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
15:35	8.92	8.15	0.497	8.85	29.0	-10	initial	
15:37	8.97	9.50	0.489	7.43	60.9	-12	0.5 gal	
15:38	8.91	10.38	0.489	6.81	98.6	-12	1.0 gal	
15:40	8.85	10.86	0.477	7.45	195	-12	1.5 gal	
15:41	8.82	11.05	0.474	14.20	344	-37	2.0 gal	
15:42	8.68	11.27	0.471	6.95	643	-94	2.5 gal	dry
17:05	8.32	9.00	0.520	3.23	111.0	-246		12.29
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-04D

Date: 11/14/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/ Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 13.08' Depth to Well Bottom: 45.57' Well Diameter: 4" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 80.3 Estimated Purge Volume (liters): 12.0

Sample ID: GW-04D Sample Time: 16:55 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
15:55	8.08	8.53	1.96	3.57	0.0	-163	200	13.08
16:00	7.55	9.22	1.98	1.75	0.0	-208	200	13.42
16:05	7.63	9.29	1.98	1.21	0.0	-250	200	13.80
16:10	7.60	9.17	2.00	1.00	0.0	-262	200	14.00
16:15	7.60	9.15	1.98	0.87	0.0	-271	200	14.17
16:20	7.57	9.12	1.96	0.76	0.0	-276	200	14.36
16:25	7.57	9.24	1.96	0.72	0.0	-282	200	14.48
16:30	7.57	9.38	1.96	0.68	0.0	-292	200	14.60
16:35	7.56	9.07	1.96	0.65	0.0	-296	200	14.70
16:40	7.57	9.43	1.94	0.62	0.0	-300	200	14.78
16:45	7.57	9.62	1.93	0.59	0.0	-303	200	14.84
16:50	7.52	9.38	1.94	0.57	0.0	-305	200	14.96
16:55	7.55	9.34	1.95	0.56	0.0	-310	200	15.03
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

WELL PURGING LOG

URS Corporation

SITE NAME: Pfohl Brothers Landfill WELL NO.: GW-07S

PROJECT NO.: 60411174

STAFF: Rob Murphy, Tom Urban

DATE(S): 11/13/18, 11/14/18

			WELL ID.	VOL. (GAL/FT)
1. TOTAL CASING AND SCREEN LENGTH (FT.)	=	35.33	1"	0.040
2. WATER LEVEL BELOW TOP OF CASING (FT.)	=	5.20	2"	0.17
3. NUMBER OF FEET STANDING WATER (#1 - #2)	=	30.13	3"	0.38
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	=	0.17	4"	0.66
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	=	5.12	5"	1.04
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x 3)	=		6"	1.50
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	=		8"	2.60

$V=0.0408 \times (\text{CASING DIAMETER [INCHES]})^2$

	ACCUMULATED VOLUME PURGED (GALLONS)										
PARAMETERS	Initial	2	4	6	8	Sample					
pH	8.14	7.88	8.14	8.08	8.11	7.92					
SPEC. COND. (mS/cm)	0.686	0.672	0.671	0.667	0.661	0.746					
DO (mg/l)	6.56	10.21	12.31	8.26	6.84	13.73					
TEMPERATURE (^{0}C)	8.67	10.36	10.60	10.05	9.74	9.31					
TURBIDITY (NTU)	0.0	0.0	5.0	50.8	313	4.0					
ORP (millivolts)	-77	-68	-65	-42	-50	-4					
TIME	14:58	15:05	15:08	15:15	15:20	11/14/18 14:50					

COMMENTS: 13:50 - Fill VOCs from passive diffusion bag (PDB), PDB was installed on 9/12/18
- Begin hand bailing well.
- Well dry after removing 7 gallons.

11/14/2018 14:48 - Return to well, depth to water = 5.45 feet.
14:50 - Collect sample for SVOCs and Metals.

WELL PURGING LOG

URS Corporation

SITE NAME: Pfohl Brothers Landfill WELL NO.: GW-07D

PROJECT NO.: 60411174

STAFF: Rob Murphy, Tom Urban

DATE(S): 11/13/18, 11/14/18

			WELL ID.	VOL. (GAL/FT)
1. TOTAL CASING AND SCREEN LENGTH (FT.)	=	60.83	1"	0.040
2. WATER LEVEL BELOW TOP OF CASING (FT.)	=	45.54	2"	0.17
3. NUMBER OF FEET STANDING WATER (#1 - #2)	=	15.29	3"	0.38
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	=	0.66	4"	0.66
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	=	10.09	5"	1.04
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x 3)	=		6"	1.50
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	=		8"	2.60

$V=0.0408 \times (\text{CASING DIAMETER [INCHES]})^2$

	ACCUMULATED VOLUME PURGED (GALLONS)										
PARAMETERS	Init	2.5	5	7	10.1	Sample					
pH	7.70	7.73	7.80	7.98	8.24	N/A					
SPEC. COND. (mS/cm)	0.790	0.766	0.820	0.822	0.857	N/A					
DO (mg/l)	1.91	4.61	12.10	7.26	7.69	N/A					
TEMPERATURE (^{0}C)	9.70	9.71	10.16	9.47	8.22	N/A					
TURBIDITY (NTU)	47.1	9.4	11.7	38.6	157.0	N/A					
ORP (millivolts)	-210	-177	-199	-183	-121	N/A					
TIME	14:10	14:18	14:26	14:40	14:48	11/14/18 14:30					

COMMENTS: 13:45 - Fill VOCs from passive diffusion bag (PDB), PDB was installed on 9/12/18
- Begin hand bailing well.
- Well dry after removing 10.1 gallons

11/14/2018 14:25 - return to well, depth to water = 60.15 feet.
14:30 - Collect sample for SVOCs and Metals.

Strong Sulfur Odor
Not enough water to get parameters (well dry after grabbing samples)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-08SR

Date: 11/14/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/ Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 5.16' Depth to Well Bottom: 13.02' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 4.8 Estimated Purge Volume (liters): 15.0

Sample ID: GW-8SR Sample Time: 9:25 QA/QC:

Sample Parameters: VOCs, SVOCs, TAL Metals, PFCs, and 1,4-Dioxane

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
8:10	7.06	8.77	1.15	2.12	180	-37	200	5.16
8:20	7.17	8.78	1.15	1.71	142	-48	200	7.11
8:30	7.14	8.82	1.17	1.24	67.9	-51	200	7.60
8:40	7.12	8.80	1.41	1.02	34.5	-75	200	7.75
8:50	7.05	8.81	1.57	0.87	20.8	-91	200	7.75
9:00	7.01	8.61	1.76	0.76	8.70	-101	200	7.75
9:10	7.01	8.88	1.92	0.71	0.9	-107	200	7.85
9:15	6.92	9.09	1.97	0.71	1.2	-103	200	7.86
9:20	6.98	9.47	1.98	0.67	0.0	-108	200	7.86
9:25	6.97	9.37	2.04	0.64	0.0	-110	200	7.86
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-08D

Date: 11/14/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/Sampling Device: Waterra, Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 5.85' Depth to Well Bottom: 36.54' Well Diameter: 4" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 75.8 Estimated Purge Volume (liters): 268.5

Sample ID: GW-8D Sample Time: 10:20 QA/QC: MS/MSD

Sample Parameters: VOCs, SVOCs, TAL Metals, PFCs, and 1,4-Dioxane

Other Information: Begin purge with Waterra pump; after 65 gallon purge with Waterra; switch to Geopump 2 and continue with low flow sampling.

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)	Gallons Purged
8:35	7.02	8.84	2.33	11.83	80.2	-166	-	5.85	
8:40	6.87	7.59	0.003	6.07	39.6	-28	-	5.85	10
8:50	6.92	9.11	1.63	2.19	12.1	20	-	5.85	20
9:00	6.91	9.42	1.65	2.78	3.9	49	-	5.85	30
9:10	6.90	8.53	1.68	2.61	5.7	56	-	5.85	40
9:25	6.91	9.41	1.64	1.71	12.0	61	-	5.85	50
9:35	6.90	9.30	1.65	2.91	0.5	68	-	5.85	60
9:40	6.91	9.52	1.66	2.56	9.6	71	-	5.85	65
	Switch from Waterra to low flow sampling after 65 gallons (246 liters) removed								
9:55	7.46	10.16	1.78	2.05	27.4	-71	900	5.85	
10:00	7.35	10.51	1.74	0.92	20.5	-35	900	5.85	
10:05	7.36	10.66	1.74	0.65	0.0	-10	900	5.85	
10:10	7.29	10.70	1.75	0.57	0.0	7	900	5.85	
10:15	7.33	10.64	1.75	0.59	0.0	12	900	5.85	
10:20	7.40	10.71	1.74	0.56	0.0	14	900	5.85	
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**		

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-26D

Date: 11/14/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/ Sampling Device: Waterra, Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 6.70' Depth to Well Bottom: 40.70' Well Diameter: 4" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 84.0 Estimated Purge Volume (liters): 287.5

Sample ID: GW-26D Sample Time: 13:43 QA/QC: FD-111418

Sample Parameters: VOCs, SVOCs, TAL Metals, PFCs, and 1,4-Dioxane

Other Information: Begin purge with Waterra pump; after 70 gallon purge with Waterra; switch to Geopump 2 and continue with low flow sampling.

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)	Gallons Purged
11:55	6.85	8.20	2.37	13.80	60.6	-60	-	6.70	
12:05	6.86	9.58	2.34	6.03	38.3	-57	-	6.70	10
12:14	6.88	10.11	2.33	6.02	9.1	-56	-	6.70	20
12:23	6.87	10.58	2.32	3.40	0.0	-54	-	6.70	30
12:36	6.87	10.48	2.33	2.05	0.0	-56	-	6.70	40
12:43	6.87	10.30	2.33	2.73	0.0	-56	-	6.70	50
12:53	6.88	10.15	2.31	3.02	0.0	-54	-	6.70	60
13:03	6.88	10.41	2.31	2.44	0.0	-53	-	6.70	70
	Switch from Waterra to low flow sampling after 70 gallons (265 liters) removed								
13:18	7.19	10.94	2.65	1.80	19.4	-81	900	6.70	
13:23	7.18	10.98	2.61	1.04	0.0	-90	900	6.70	
13:28	7.17	10.93	2.59	0.71	0.0	-95	900	6.70	
13:33	7.21	11.04	2.62	0.60	0.0	-100	900	6.70	
13:38	7.25	11.13	2.61	0.56	0.0	-103	900	6.70	
13:43	7.26	11.13	2.61	0.54	0.0	-105	900	6.70	
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**		

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-28S

Date: 11/15/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/ Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 8.78' Depth to Well Bottom: 15.52' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 4.2 Estimated Purge Volume (liters): 5.0

Sample ID: GW-28S Sample Time: 10:35 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
10:10	7.81	6.85	0.586	8.10	14.00	-58	200	8.78
10:15	7.56	11.30	0..572	2.13	16.20	-27	200	9.80
10:20	7.53	11.13	0.567	1.20	2.10	-6	200	10.04
10:25	7.53	11.14	0.564	1.09	0.00	-2	200	10.14
10:30	7.52	11.27	0.568	0.98	0.00	3	200	10.25
10:35	7.53	11.28	0.567	0.91	0.00	6	200	10.31
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-29S

Date: 11/15/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 7.43' Depth to Well Bottom: 20.04' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 7.8 Estimated Purge Volume (liters): 11.0

Sample ID: GW-29S Sample Time: 11:42 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
10:56	7.63	8.20	1.07	3.94	190.00	-89	240	7.43
11:01	7.42	9.02	1.04	2.71	113.00	-99	240	8.48
11:06	7.27	9.78	1.01	1.99	48.80	-107	240	9.56
11:11	7.37	9.83	1.01	2.40	35.50	-98	240	10.05
11:16	7.37	10.75	0.998	1.89	36.70	-101	240	10.45
11:21	7.34	11.06	1.00	1.59	33.40	-104	240	10.68
11:26	7.33	10.83	1.03	1.38	24.80	-108	240	10.86
11:31	7.28	10.91	1.04	1.17	21.30	-108	240	11.00
11:36	7.28	10.66	1.05	1.00	151.70	-110	240	11.06
11:39	7.28	10.59	1.06	0.94	12.60	-112	240	11.10
11:42	7.29	10.64	1.06	0.90	12.0	-113	240	11.13
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-30S

Date: 11/15/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 7.88' Depth to Well Bottom: 17.97' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 6.2 Estimated Purge Volume (liters): 13.3

Sample ID: GW-30S Sample Time: 12:30 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information: Orange particulates at start

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
11:55	7.34	8.79	5.61	5.60	244.00	-120	380	7.88
12:00	7.20	10.37	5.68	1.63	140.00	-116	380	7.91
12:05	7.20	10.68	5.66	1.12	101.00	-122	380	7.92
12:10	7.19	10.94	5.65	0.81	0.00	-128	380	7.93
12:15	7.18	10.99	5.63	0.73	0.00	-130	380	7.93
12:20	7.20	11.18	5.55	0.64	0.00	-132	380	7.93
12:25	7.18	11.01	5.52	0.65	0.0	-132	380	7.93
12:30	7.18	11.04	5.45	0.64	0.0	-133	380	7.93
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-31S

Date: 11/15/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 2.72' Depth to Well Bottom: 9.57' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 4.2 Estimated Purge Volume (liters): 6.0

Sample ID: GW-31S Sample Time: 13:27 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
12:52	7.41	8.13	0.878	3.18	1.90	-38	170	2.72
12:57	7.39	8.07	0.887	1.89	6.60	-19	170	3.75
13:02	7.35	8.05	0.894	1.38	3.40	-17	170	4.07
13:07	7.30	8.07	0.913	1.05	4.30	-33	170	4.33
13:12	7.28	8.90	0.927	0.87	1.50	-45	170	4.54
13:17	7.26	8.26	0.933	0.79	0.30	-52	170	4.63
13:22	7.25	8.28	0.938	0.75	0.00	-54	170	4.71
13:27	7.24	8.36	0.943	0.71	0.00	-58	170	4.80
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-32S

Date: 11/15/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 2.80' Depth to Well Bottom: 9.93' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 4.4 Estimated Purge Volume (liters): 7.6

Sample ID: GW-32S Sample Time: 14:19 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
13:44	7.70	7.85	0.606	5.82	12.30	-65	260	2.80
13:49	7.71	8.09	0.598	4.17	0.00	-31	210	3.37
13:54	7.70	8.20	0.594	3.13	0.00	-18	210	3.37
13:59	7.69	8.35	0.590	2.38	0.00	-4	210	3.37
14:04	7.77	8.76	0.580	1.95	0.00	-3	210	3.42
14:09	7.75	8.99	0.573	1.72	0.00	2	210	3.47
14:14	7.73	9.37	0.567	1.70	0.00	7	210	3.50
14:19	7.69	9.52	0.568	1.68	0.0	11	210	3.53
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-33S

Date: 11/15/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/ Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 4.12' Depth to Well Bottom: 8.21' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 2.5 Estimated Purge Volume (liters): 4.5

Sample ID: GW-33S Sample Time: 15:04 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
14:38	7.57	7.83	1.00	4.88	32.00	35	190	4.12
14:43	7.50	8.05	1.01	4.21	0.40	40	170	5.22
14:48	7.51	8.19	1.03	3.38	0.00	49	170	5.90
14:53	7.48	8.30	1.03	3.18	0.00	53	170	6.02
14:58	7.48	8.46	1.03	2.92	0.00	56	170	6.20
15:01	7.47	8.51	1.02	2.85	0.00	57	170	6.25
15:04	7.44	8.45	1.01	2.75	0.00	59	170	6.31
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-34S

Date: 11/15/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/ Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 2.86' Depth to Well Bottom: 10.01' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 4.4 Estimated Purge Volume (liters): 5.7

Sample ID: GW-34S Sample Time: 8:20 QA/QC:

Sample Parameters: VOCs, SVOCs, and TAL Metals

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
7:50	7.55	8.86	0.812	8.61	0.00	-9	270	2.86
7:55	7.49	8.23	0.806	8.06	0.00	16	190	4.05
8:00	7.62	8.01	0.802	7.82	0.00	28	190	4.10
8:05	7.78	7.80	0.798	7.52	0.00	40	160	4.15
8:10	7.48	7.81	0.799	7.31	0.00	46	160	4.20
8:15	7.44	7.80	0.785	7.34	0.00	53	160	4.25
8:20	7.44	7.87	0.779	7.22	0.00	55	160	4.29
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

Project: 60411174 Site: Pfohl Brothers Well I.D.: GW-35S

Date: 11/14/2018 Sampling Personnel: Rob Murphy, Tom Urban Company: URS Corporation

Purging/ Sampling Device: Geopump 2 Tubing Type: HDPE/Silicone Pump/Tubing Inlet Location: Screen midpoint

Measuring Point: Below Top of Riser Initial Depth to Water: 4.35' Depth to Well Bottom: 7.46' Well Diameter: 2" Screen Length:

Casing Type: Stainless Steel Volume in 1 Well Casing (liters): 1.9 Estimated Purge Volume (liters): 8.0

Sample ID: GW-35S Sample Time: 12:40 QA/QC:

Sample Parameters: VOCs, SVOCs, TAL Metals, PFCs, and 1,4-Dioxane

Other Information:

PURGE PARAMETERS

TIME	pH	TEMP (°C)	COND. (mS/cm)	DISS. O_2 (mg/l)	TURB. (NTU)	ORP (mV)	FLOW RATE (ml/min.)	DEPTH TO WATER (btor)
11:50	7.47	8.37	0.736	6.34	9.10	15	160	4.35
12:00	7.44	8.26	0.741	4.63	0.00	32	160	4.75
12:10	7.37	8.53	0.739	3.32	0.00	43	160	4.80
12:20	7.36	8.65	0.739	3.66	0.00	52	160	4.80
12:30	7.37	8.51	0.737	2.65	0.00	53	160	4.80
12:35	7.33	8.69	0.740	2.38	0.00	59	160	4.80
12:40	7.35	8.98	0.742	2.35	0.00	55	160	4.80
Tolerance:	**0.1**	**---**	**3%**	**10%**	**10%**	**+ or - 10**	**---**	

Information: WATER VOLUMES--0.75 inch diameter well = 87 ml/ft.; 1 inch diameter well = 154 ml/ft.; 2 inch diameter well = 617 ml/ft.; 4 inch diameter well = 2470 ml/ft. ($vol_{cyl} = \pi r^2 h$)

GROUNDWATER SAMPLING - SAMPLE COLLECTION DATA SHEET

Project Name: *Pfohl Brothers Landfill* Project Number: *60411174*

Sampling Crew Members: *R. Murphy, T. Urban* Supervisor: *R. Murphy*

Date of Sampling: *November 13, 2018*

Sample I.D. Number	***Well Number***	***Well Volume (liters)***	***Volume Purged (liters)***	***Sample Time***	***Sample Description***	***Analysis Required***	***Chain-of-Custody Number***
GW-01S	GW-01S	7.0	11.3	11:28	Groundwater	VOCs/SVOCs/ Metals	Not Applicable
GW-01D	GW-01D	91.3	80.0	13:00	Groundwater		Not Applicable
GW-07D	GW-07D	38.2	38.2	13:45	Groundwater	VOCs	Not Applicable
GW-07S	GW-07S	19.4	26.5	13:50	Groundwater		Not Applicable

Additional Comments: All wells were purged using low flow methods until parameter stabilization with the exception of wells GW-7D and GW-7S that were sampled for VOCs using passive diffusion bags (PDBs). GW-7D and GW-7S were then purged dry.

GROUNDWATER SAMPLING - SAMPLE COLLECTION DATA SHEET

Project Name: *Pfohl Brothers Landfill* Project Number: *60411174*

Sampling Crew Members: *R. Murphy, T. Urban* Supervisor: *R. Murphy*

Date of Sampling: *November 14, 2018*

Sample I.D. Number	***Well Number***	***Well Volume (liters)***	***Volume Purged (liters)***	***Sample Time***	***Sample Description***	***Analysis Required***	***Chain-of-Custody Number***
GW-08SR	GW-08SR	4.8	15.0	9:25	Groundwater	VOCs/SVOCs/ Metals/PFCs/1,4-Dioxane	Not Applicable
GW-08D	GW-08D	75.8	268.5	10:20	Groundwater		Not Applicable
GW-08D-MS	GW-08D	75.8	268.5	10:20	Groundwater		Not Applicable
GW-08D-MSD	GW-08D	75.8	268.5	10:20	Groundwater		Not Applicable
GW-35S	GW-35S	1.9	8.0	11:50	Groundwater		Not Applicable
FB-111418	N/A	-	-	11:00	Field Blank	PFCs	Not Applicable
EB-111418	N/A	-	-	11:05	Equipment Blank	1,4-Dioxane	Not Applicable

Additional Comments: All wells were purged using low flow methods until parameter stabilization. Field blank was created by pouring lab provided PFC free water directly into sample containers in the work area. Equipment blank was created by pumping lab provided water through new tubing into sample containers.

GROUNDWATER SAMPLING - SAMPLE COLLECTION DATA SHEET

Project Name: *Pfohl Brothers Landfill* Project Number: *60411174*

Sampling Crew Members: *R. Murphy, T. Urban* Supervisor: *R. Murphy*

Date of Sampling: *November 14, 2018*

Sample I.D. Number	***Well Number***	***Well Volume (liters)***	***Volume Purged (liters)***	***Sample Time***	***Sample Description***	***Analysis Required***	***Chain-of-Custody Number***
GW-26D	GW-26D	84.0	287.5	13:43	Groundwater	VOCs/SVOCs/ Metals/PFCs/1,4-Dioxane	Not Applicable
FD-111418	GW-26D	84.0	287.5	-	Groundwater		Not Applicable
GW-07D	GW-07D	38.2	38.2	14:30	Groundwater	SVOCs/Metals	Not Applicable
GW-07S	GW-07S	19.4	26.5	14:50	Groundwater		Not Applicable
GW-04S	GW-04S	7.3	9.5	15:25 & 17:05	Groundwater	VOCs/SVOCs/ Metals	Not Applicable
GW-04D	GW-04D	80.3	12.0	16:55	Groundwater		Not Applicable
TB-1113+1114	-	-	-	-	Trip Blank	VOCs	Not Applicable

Additional Comments: GW-04S was sampled for VOCs using a PDB. GW-04S was then purged dry and remaining parameters were collected after recovery. GW-07D and GW-07S were sampled for SVOCs and Metals after recharging overnight. All other wells were purged using low flow methods until parameter stabilization.

GROUNDWATER SAMPLING - SAMPLE COLLECTION DATA SHEET

Project Name: *Pfohl Brothers Landfill* Project Number: *60411174*

Sampling Crew Members: *R. Murphy, T. Urban* Supervisor: *R. Murphy*

Date of Sampling: *November 15, 2018*

Sample I.D. Number	***Well Number***	***Well Volume (liters)***	***Volume Purged (liters)***	***Sample Time***	***Sample Description***	***Analysis Required***	***Chain-of-Custody Number***
GW-34S	GW-34S	4.4	5.7	8:20	Groundwater	VOCs/SVOCs/ Metals	Not Applicable
GW-03D	GW-03D	83.4	60.0	9:50	Groundwater		Not Applicable
GW-28S	GW-28S	4.2	5.0	10:35	Groundwater		Not Applicable
GW-29S	GW-29S	7.8	11.0	11:42	Groundwater		Not Applicable
GW-30S	GW-30S	6.2	13.3	12:30	Groundwater		Not Applicable
GW-31S	GW-31S	4.2	6.0	13:27	Groundwater		Not Applicable
GW-32S	GW-32S	4.4	7.6	14:19	Groundwater		

Additional Comments: All wells were purged using low flow methods until parameter stabilization.

GROUNDWATER SAMPLING - SAMPLE COLLECTION DATA SHEET

Project Name: *Pfohl Brothers Landfill* Project Number: *60411174*

Sampling Crew Members: *R. Murphy, T. Urban* Supervisor: *R. Murphy*

Date of Sampling: *November 15, 2018*

Sample I.D. Number	***Well Number***	***Well Volume (liters)***	***Volume Purged (liters)***	***Sample Time***	***Sample Description***	***Analysis Required***	***Chain-of-Custody Number***
GW-33S	GW-33S	2.5	4.5	15:04	Groundwater	VOCs/SVOCs/Metals	Not Applicable
TB-111518	-	-	-	-	Trip Blank	VOCs	Not Applicable

Additional Comments: All wells were purged using low flow methods until parameter stabilization.

APPENDIX E

GROUNDWATER TREND ANALYSIS

FIGURE E-1
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-01D

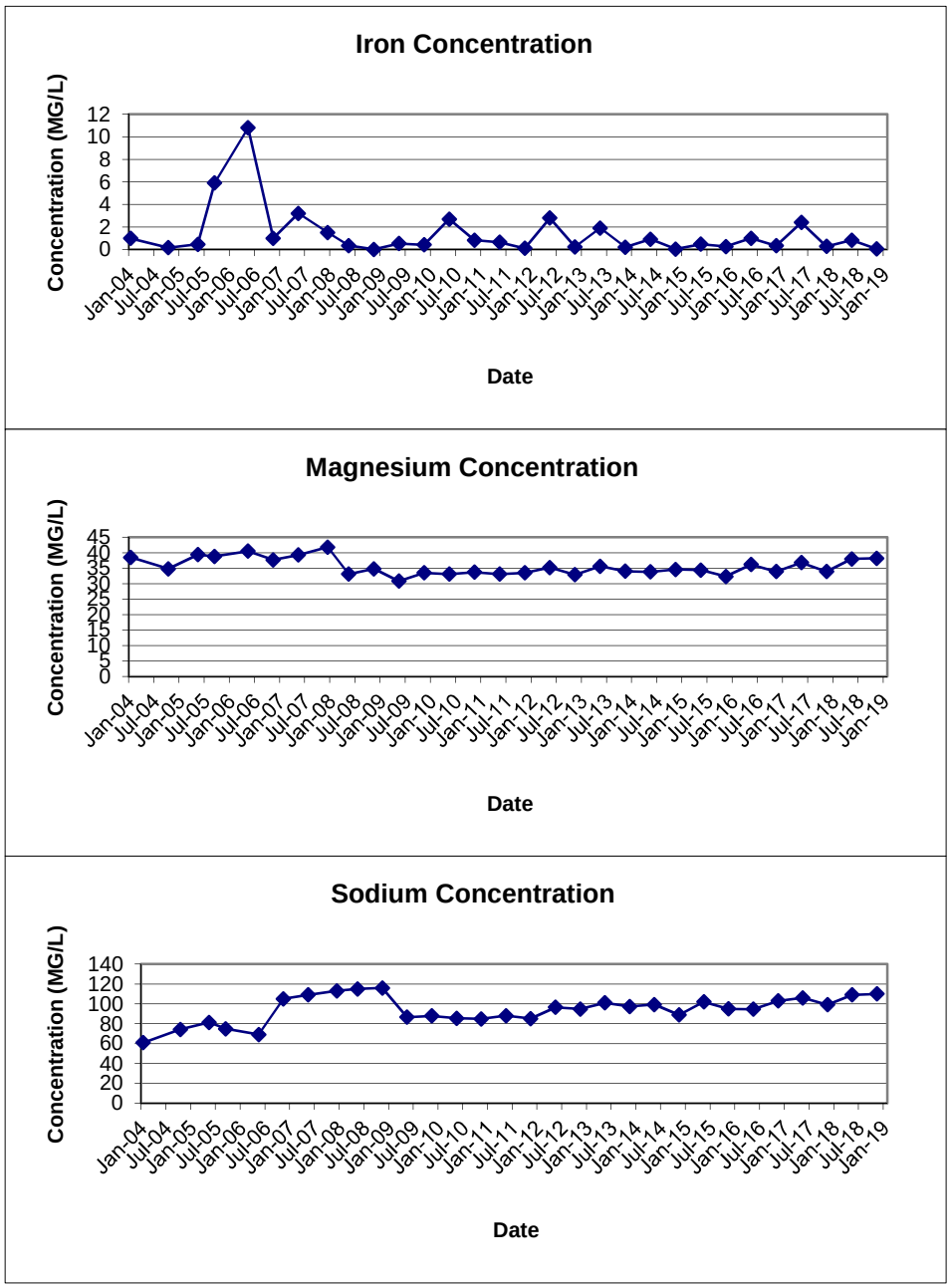


FIGURE E-2
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-01S

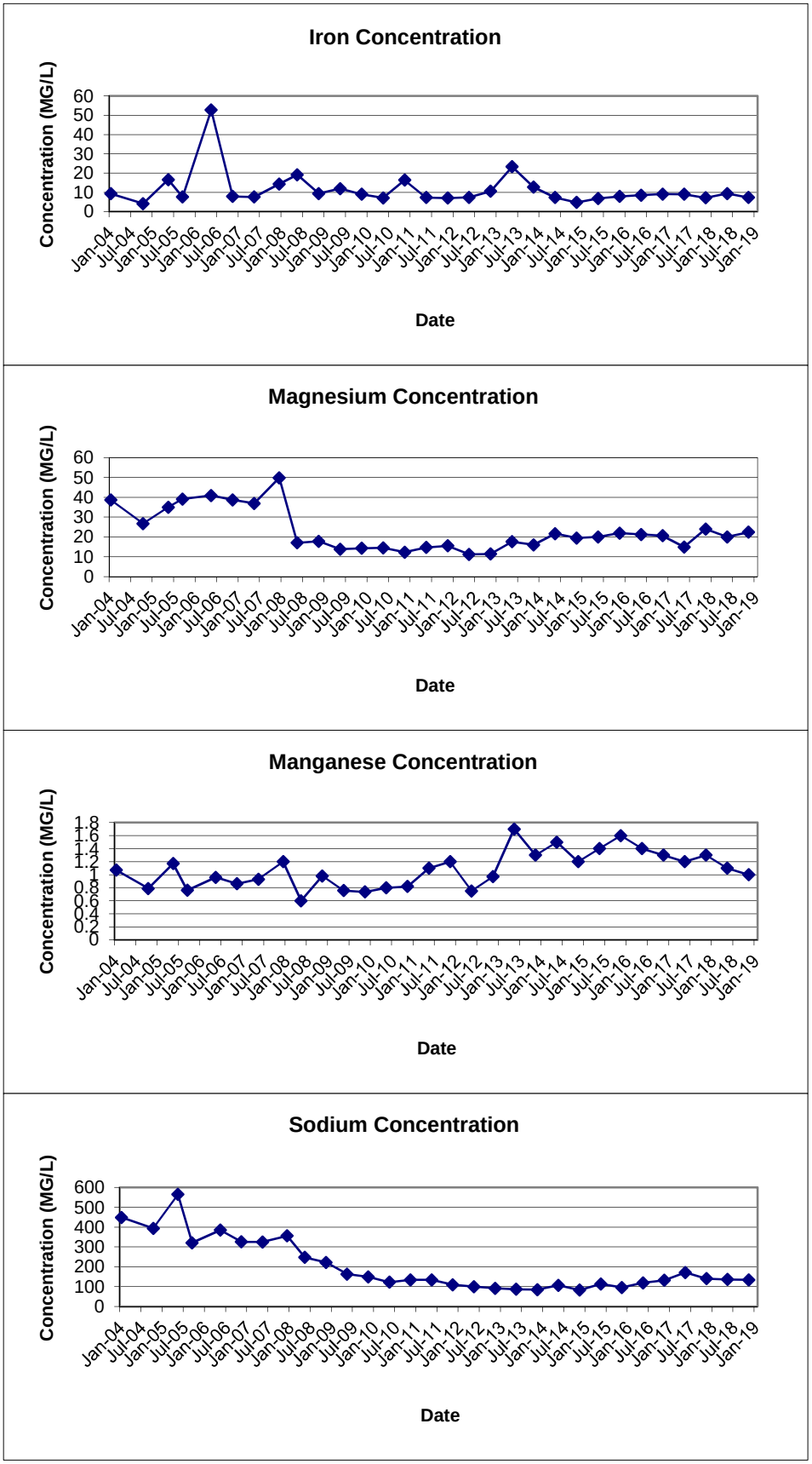


FIGURE E-3
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-03D

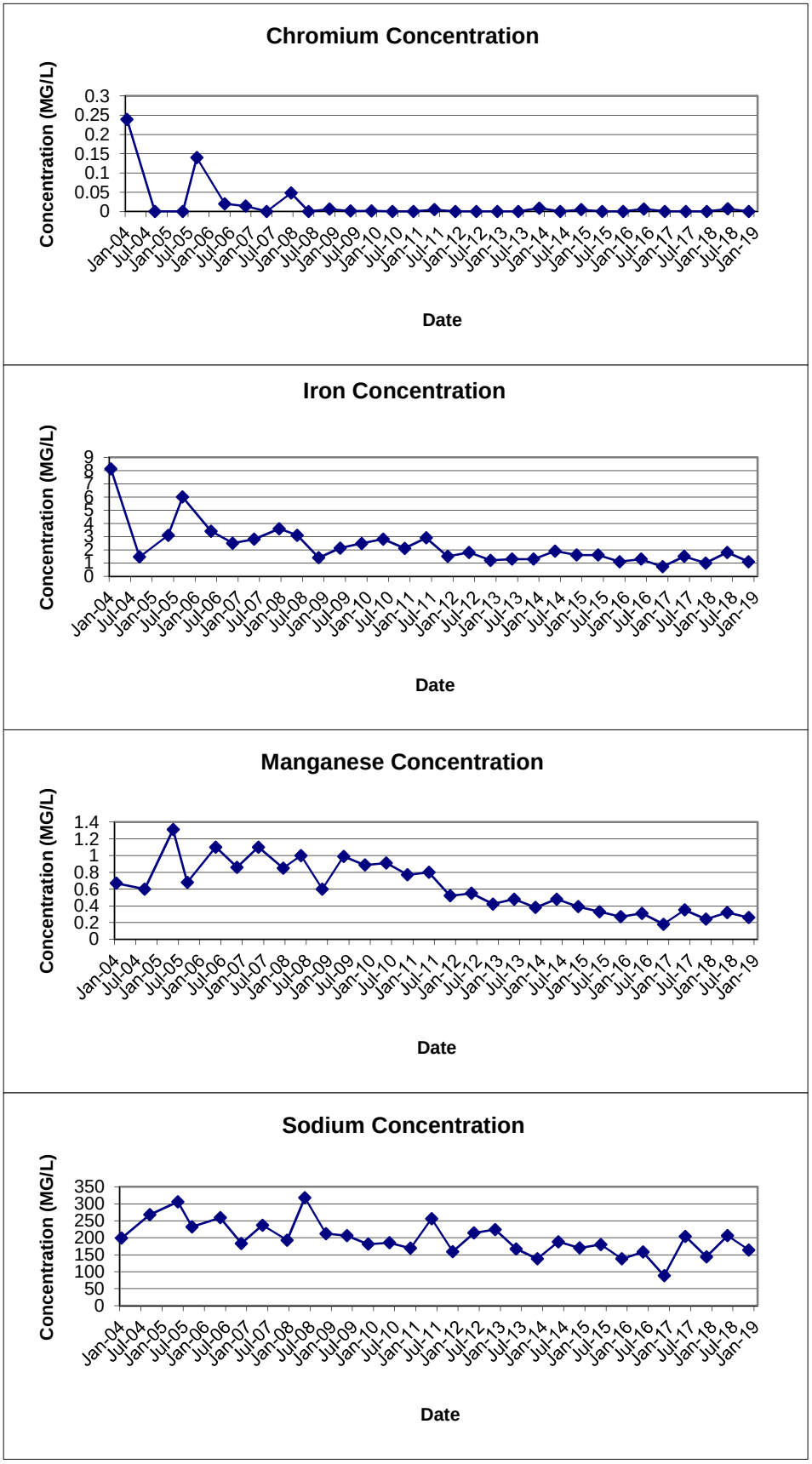
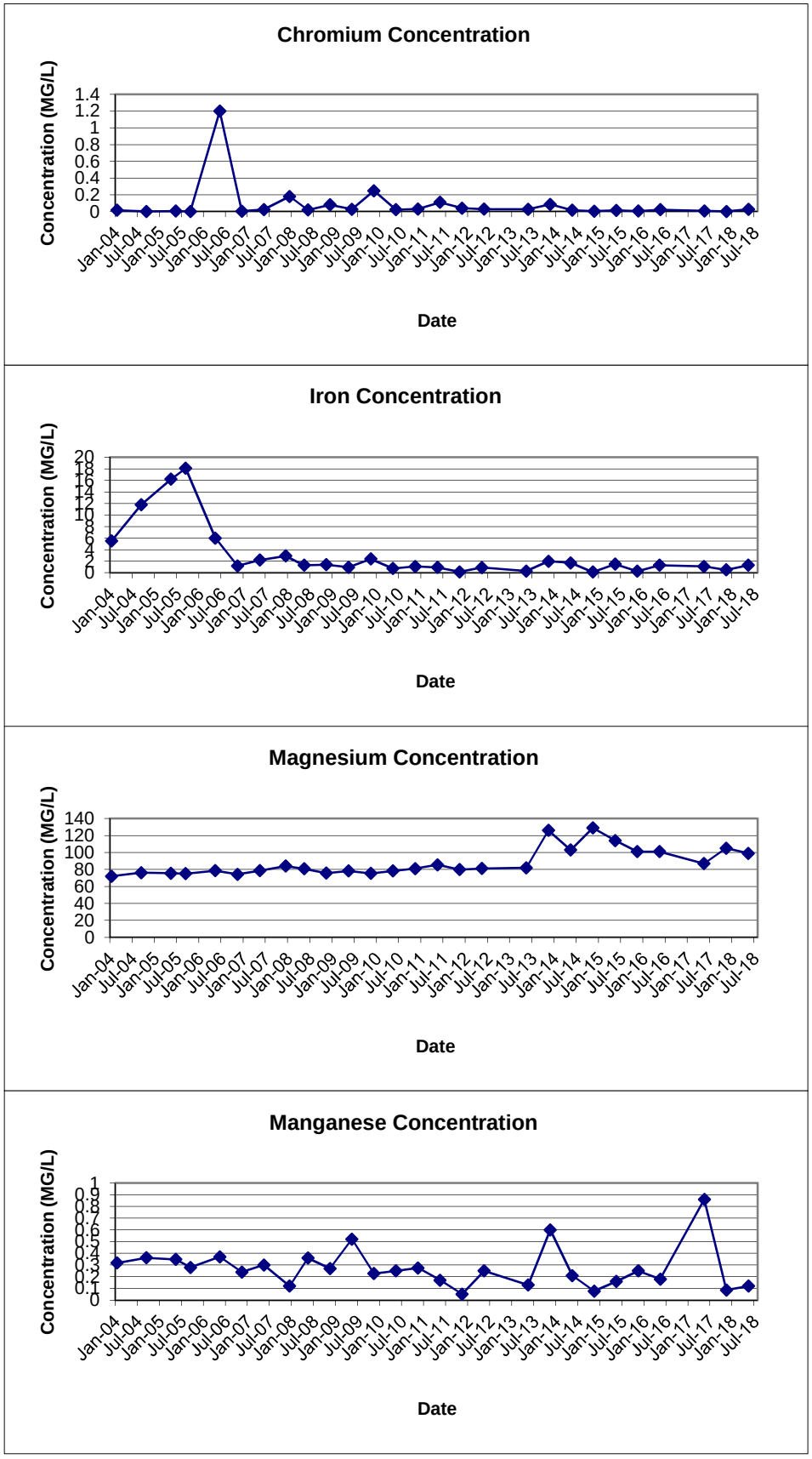
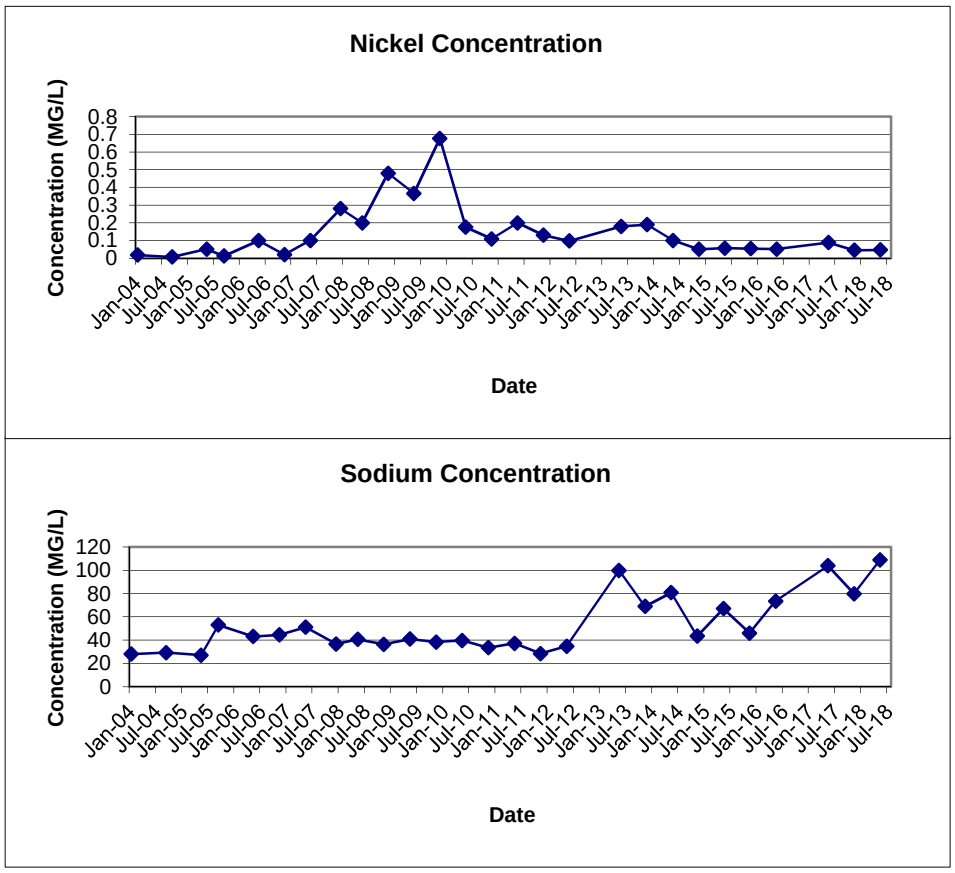


FIGURE E-4
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-03S



Well was Dry and was not sampled in November 2016

FIGURE E-4
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-03S



Well was Dry and was not sampled in November 2016

FIGURE E-5
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-04D

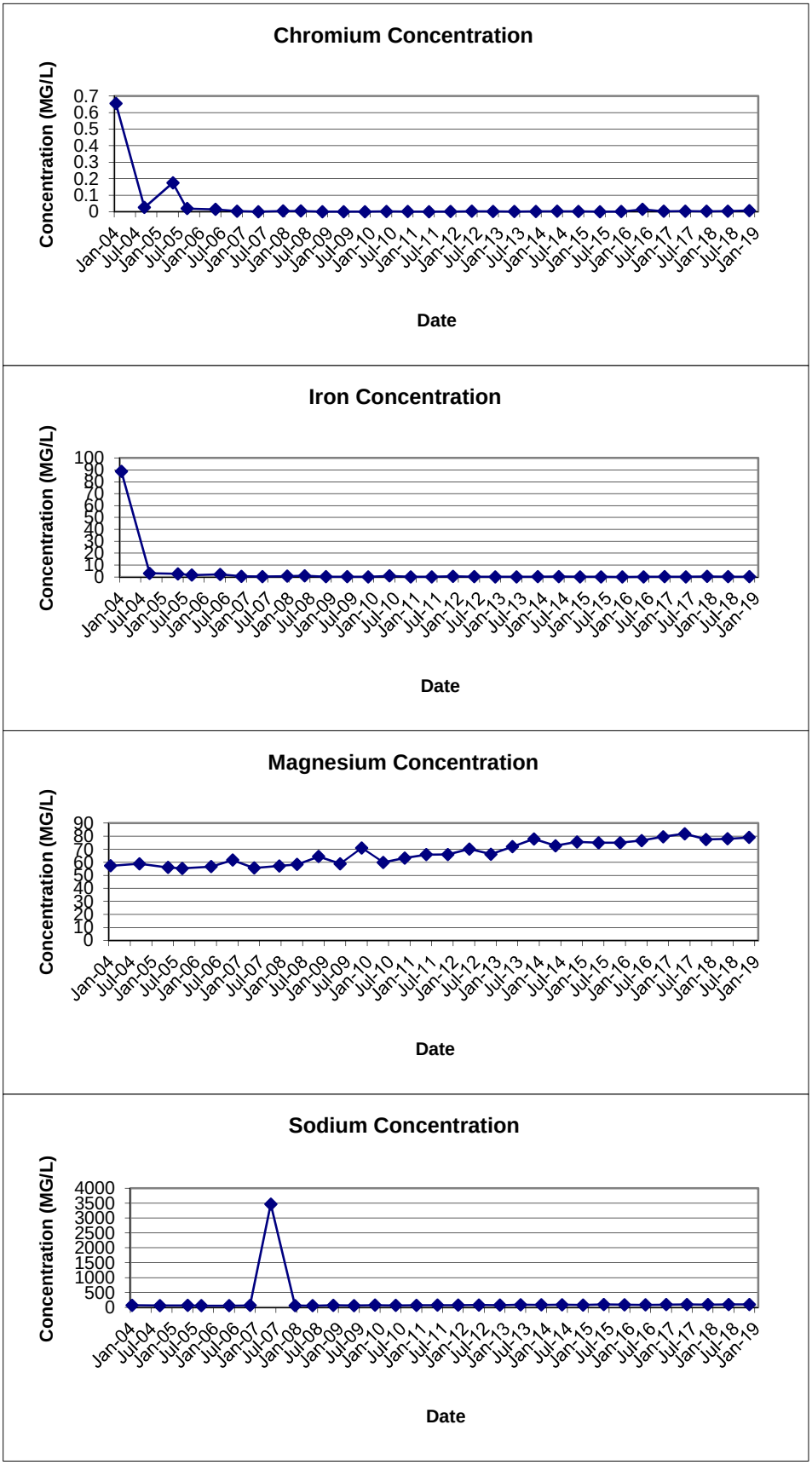


FIGURE E-6
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-04S

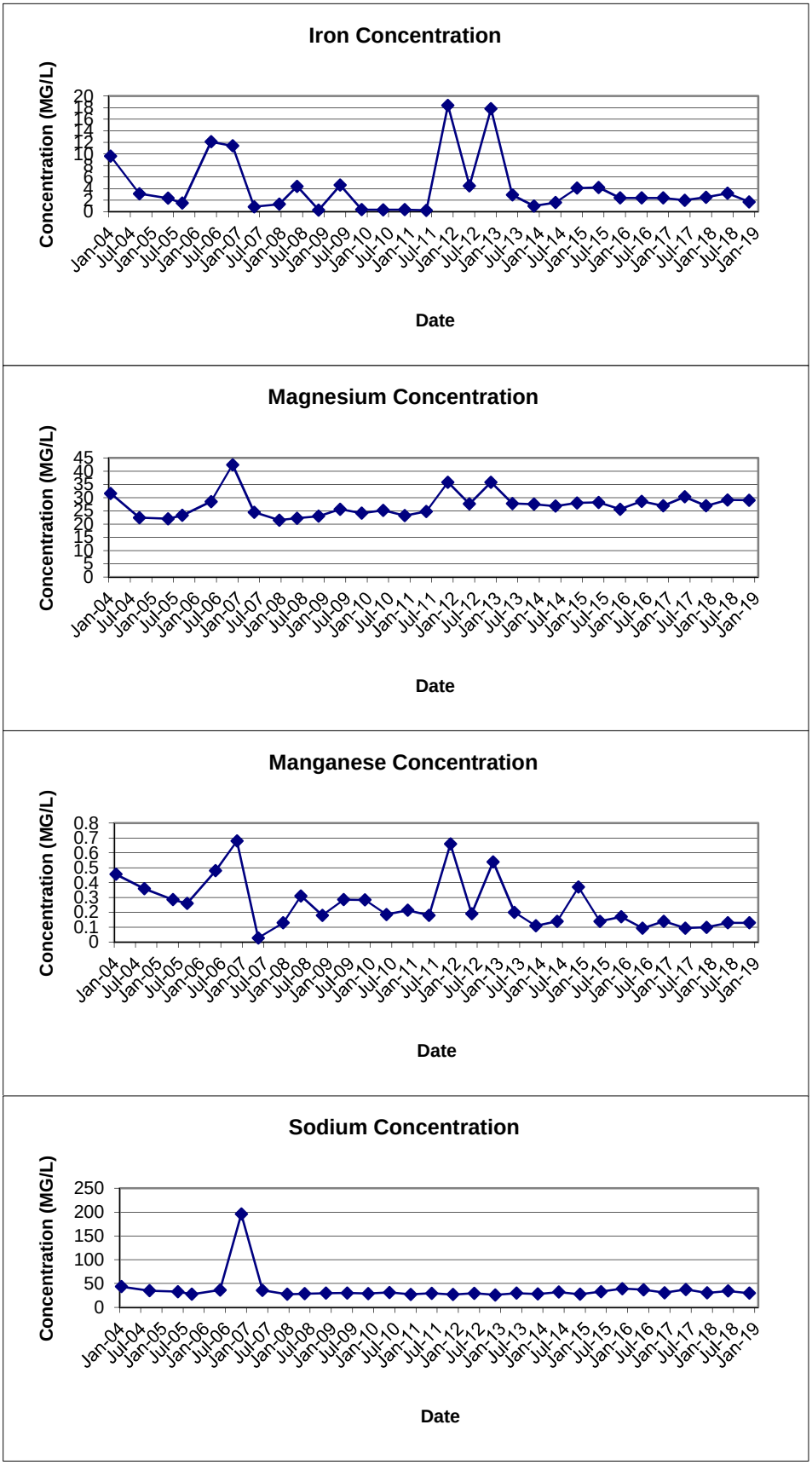


FIGURE E-7
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-07D

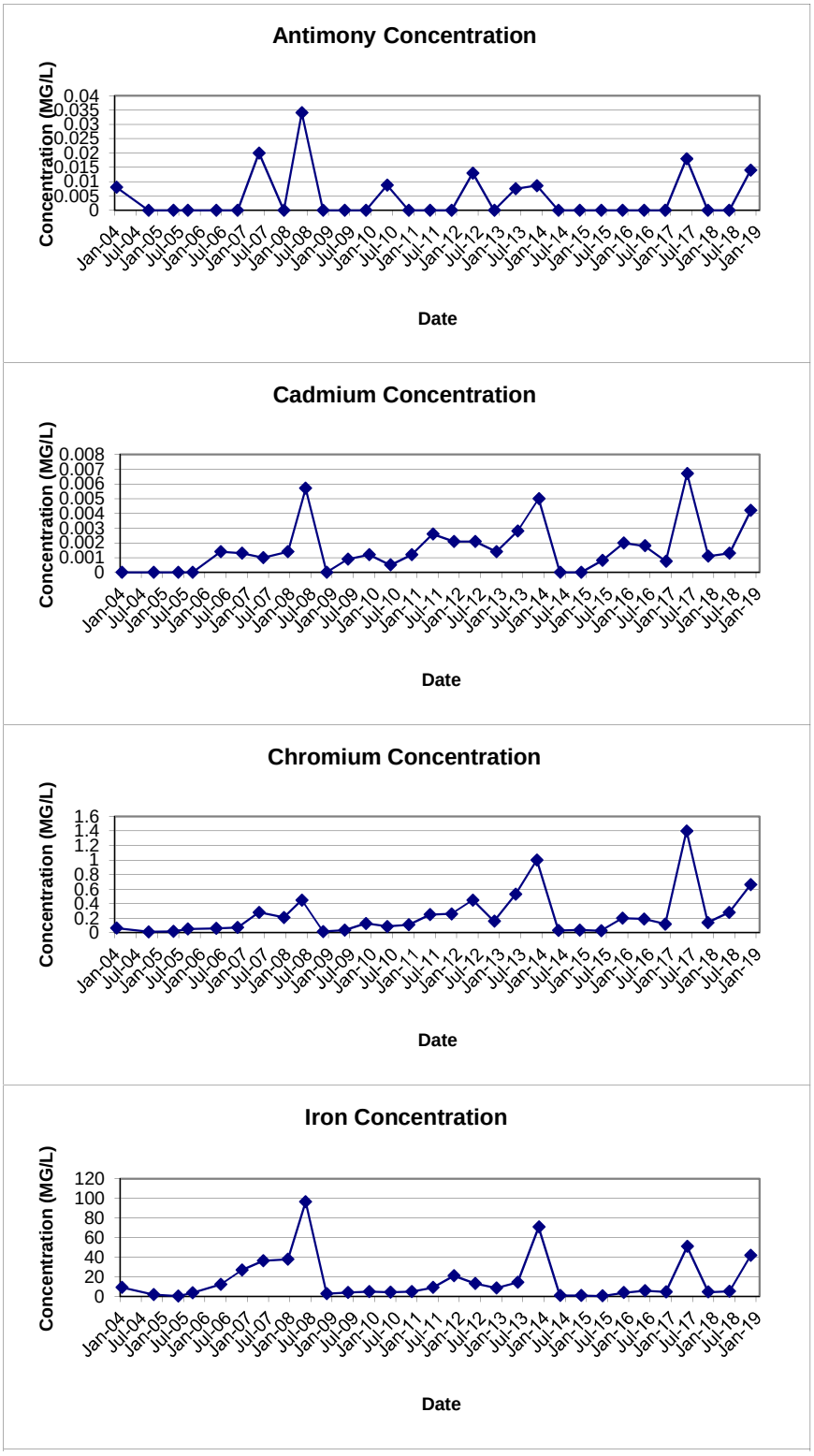


FIGURE E-7
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-07D

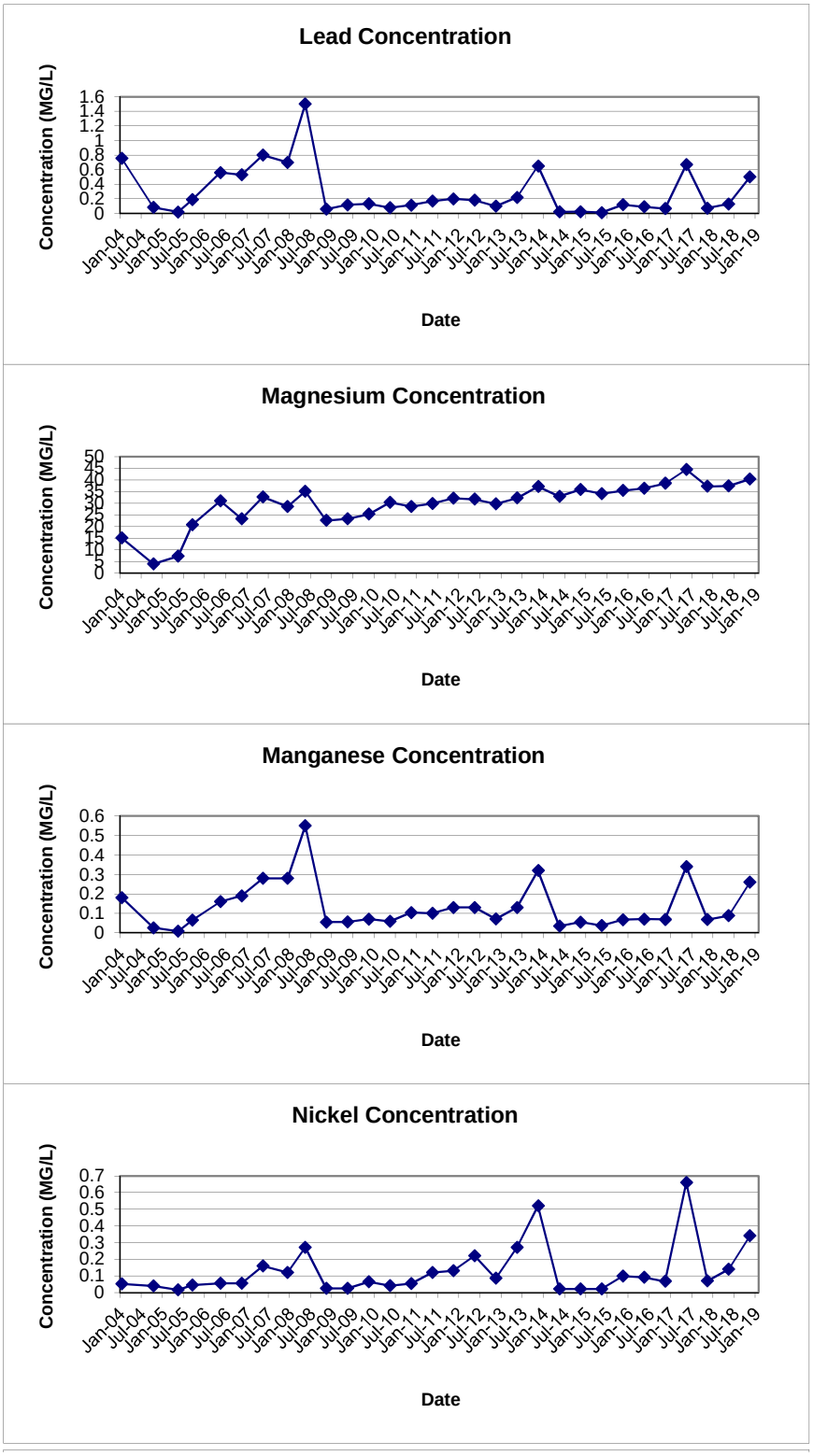


FIGURE E-7
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-07D

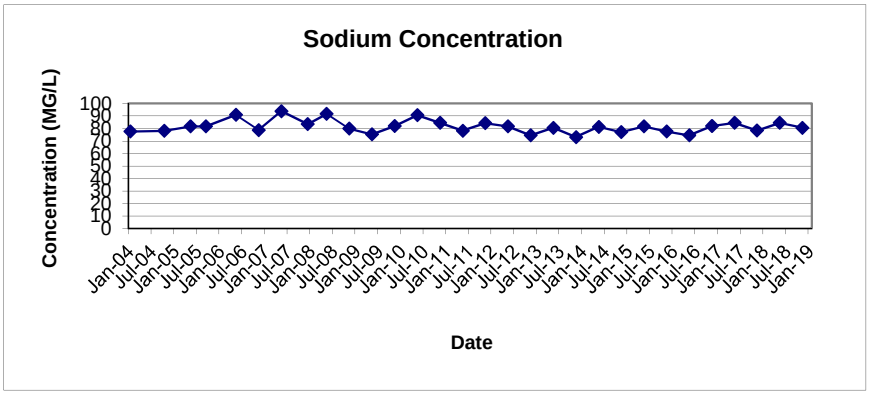


FIGURE E-8
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-07S

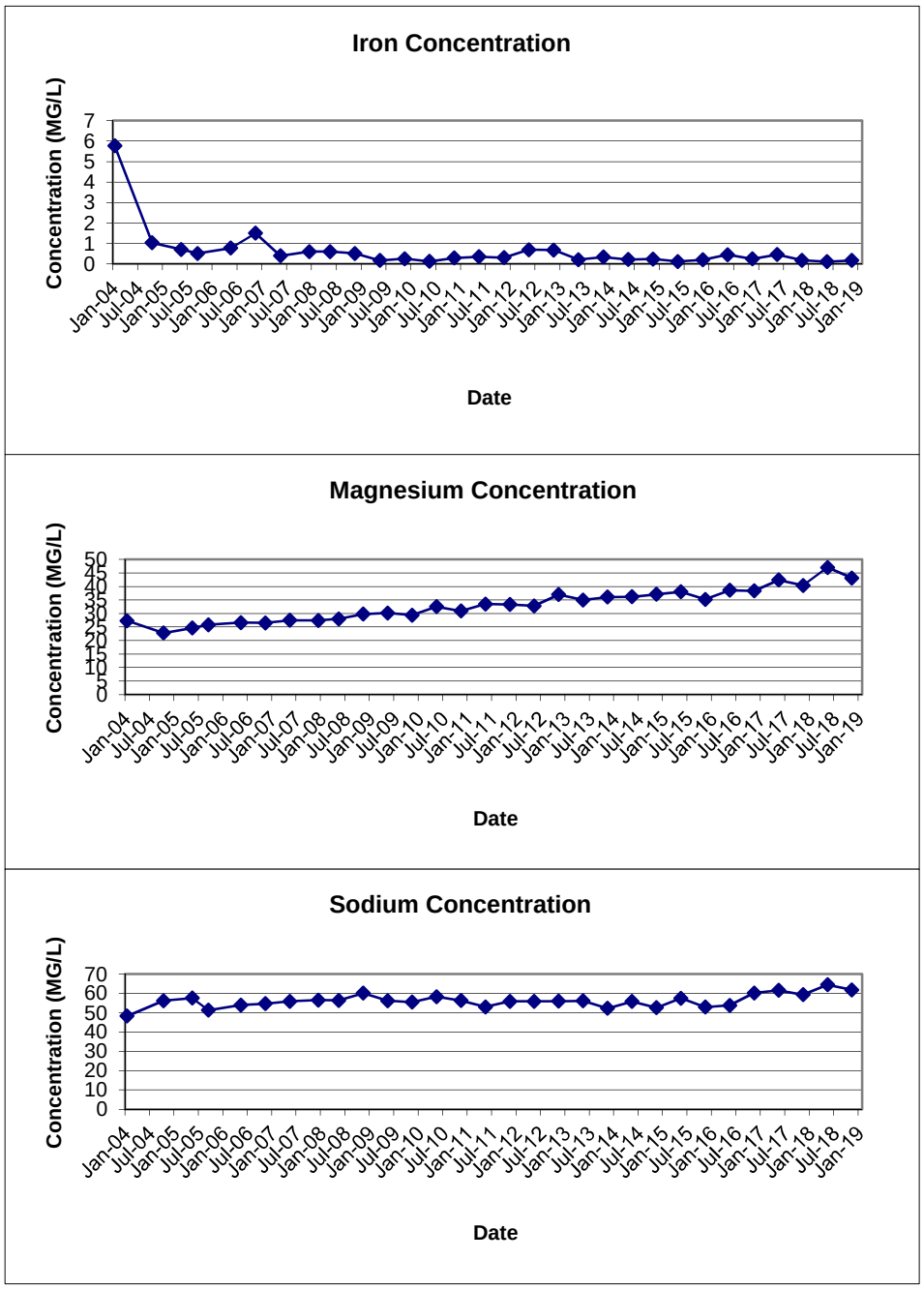


FIGURE E-9
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-08D

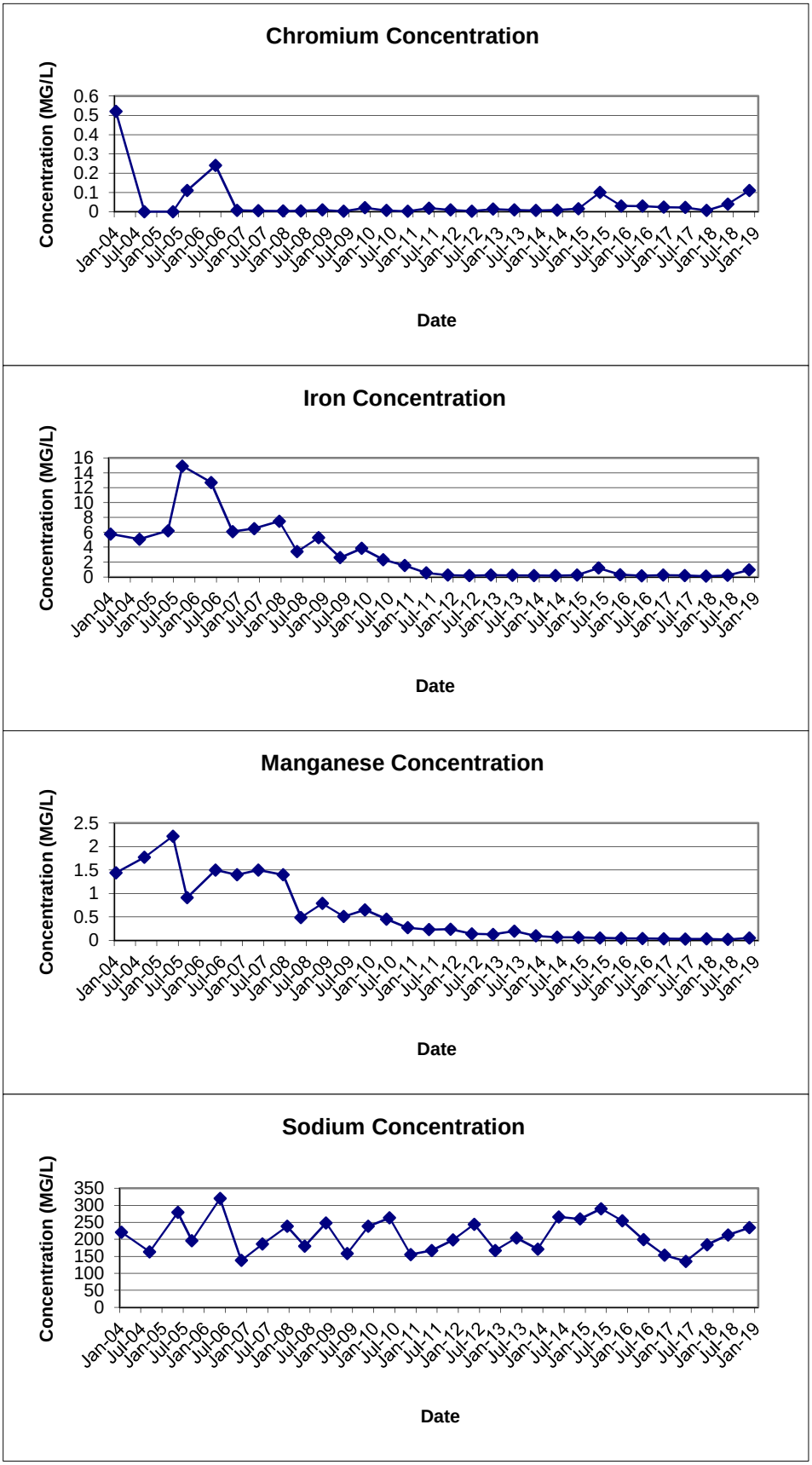


FIGURE E-10
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-08SR

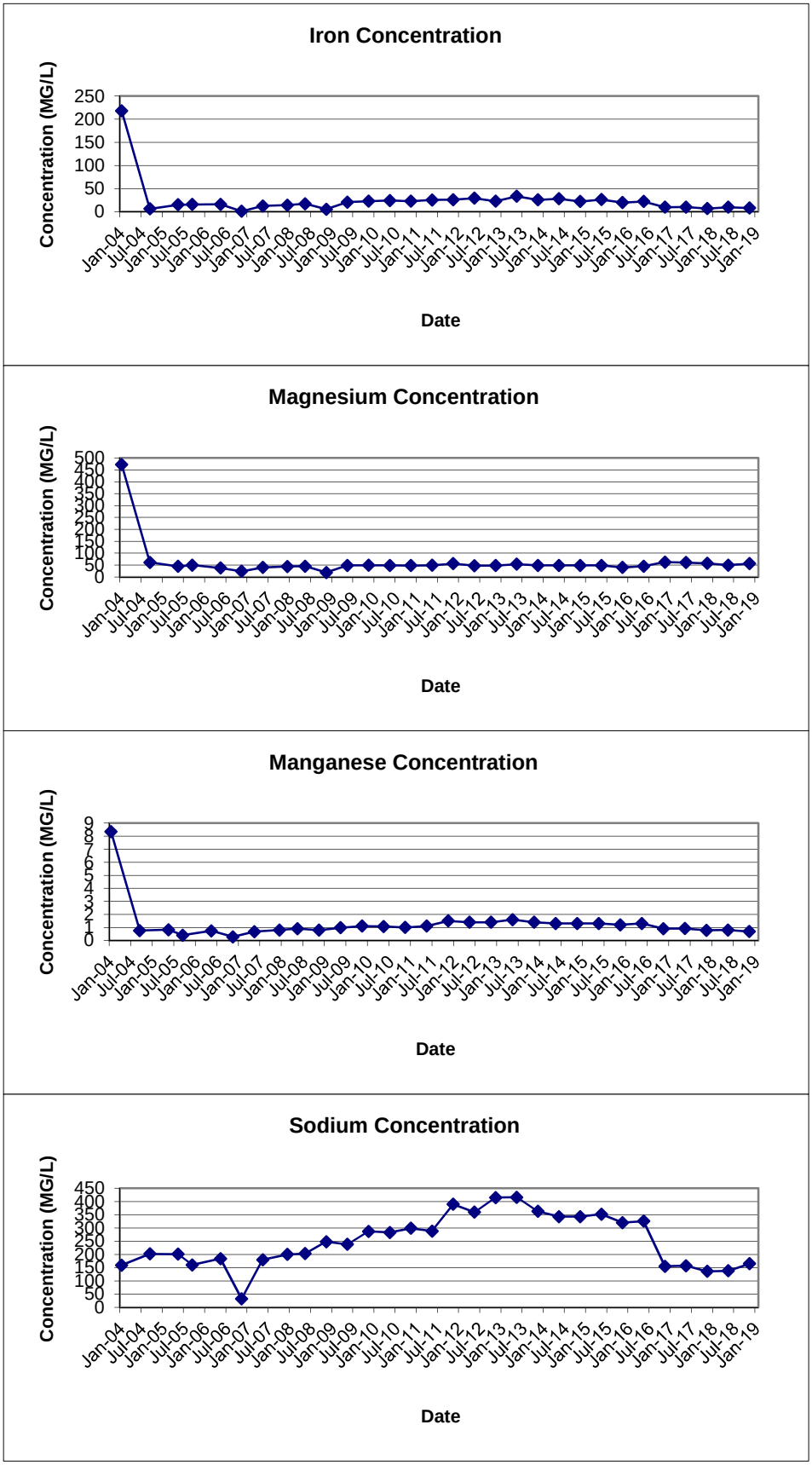


FIGURE E-11
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-26D

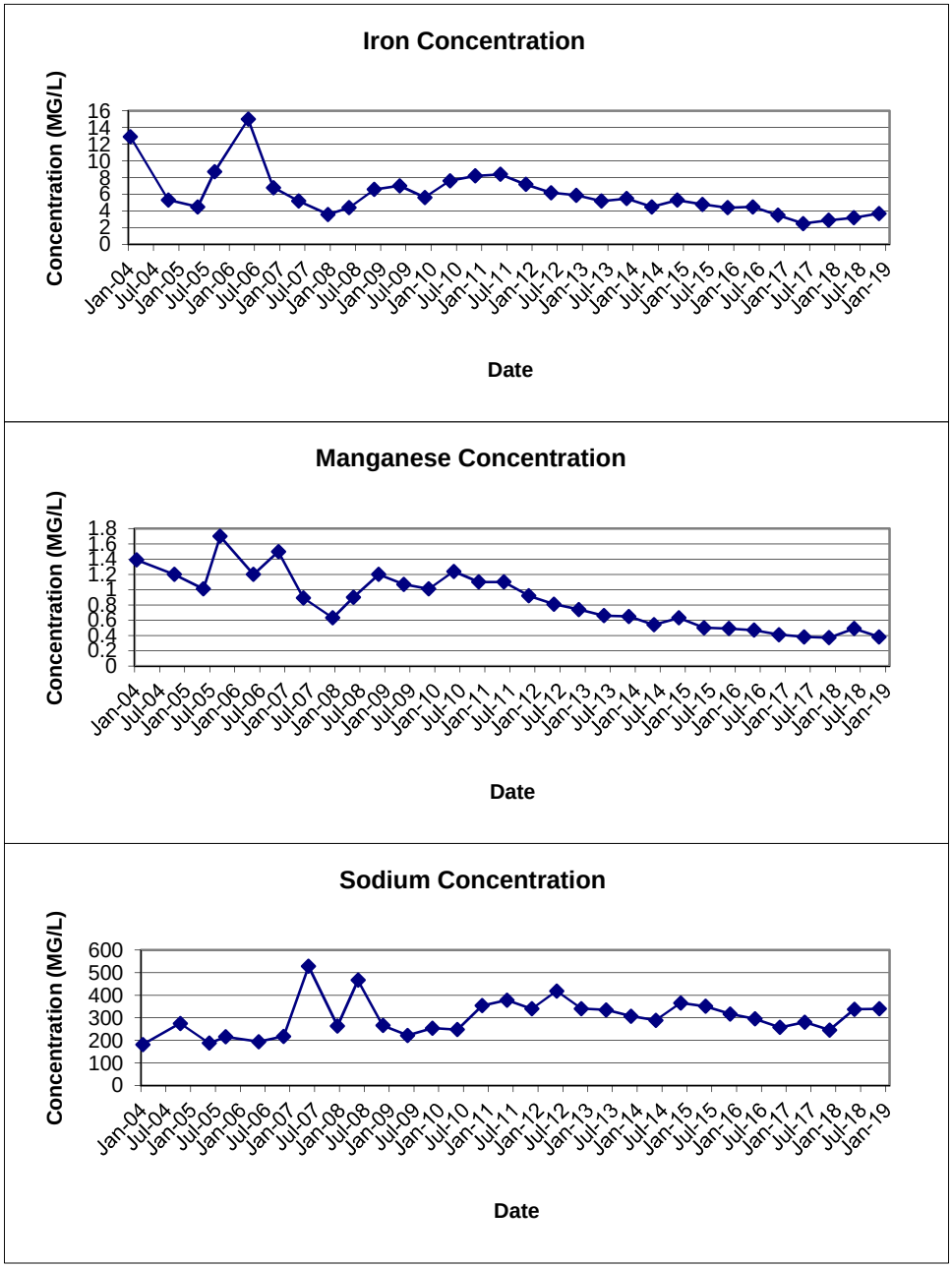


FIGURE E-12
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-28S

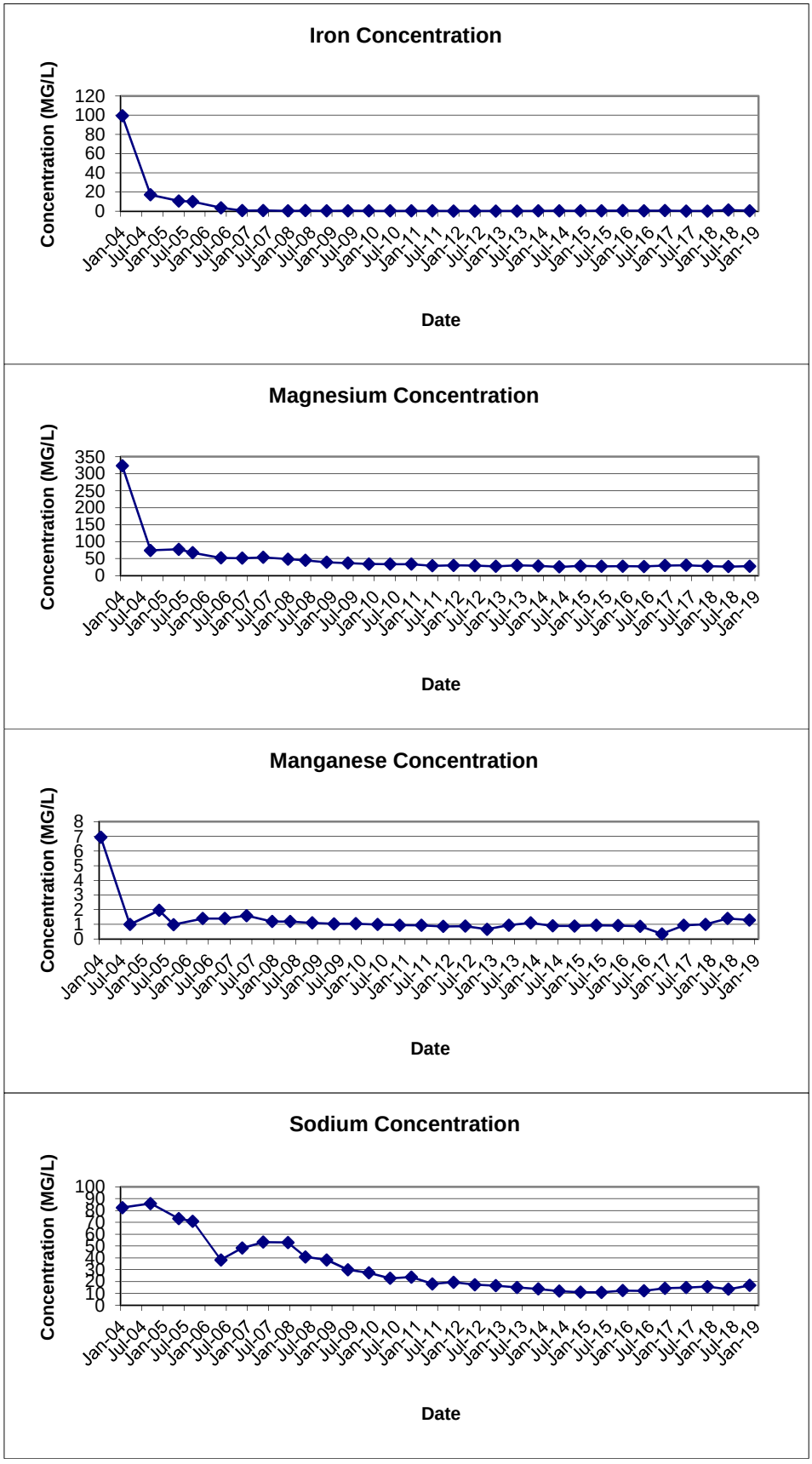


FIGURE E-13
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-29S

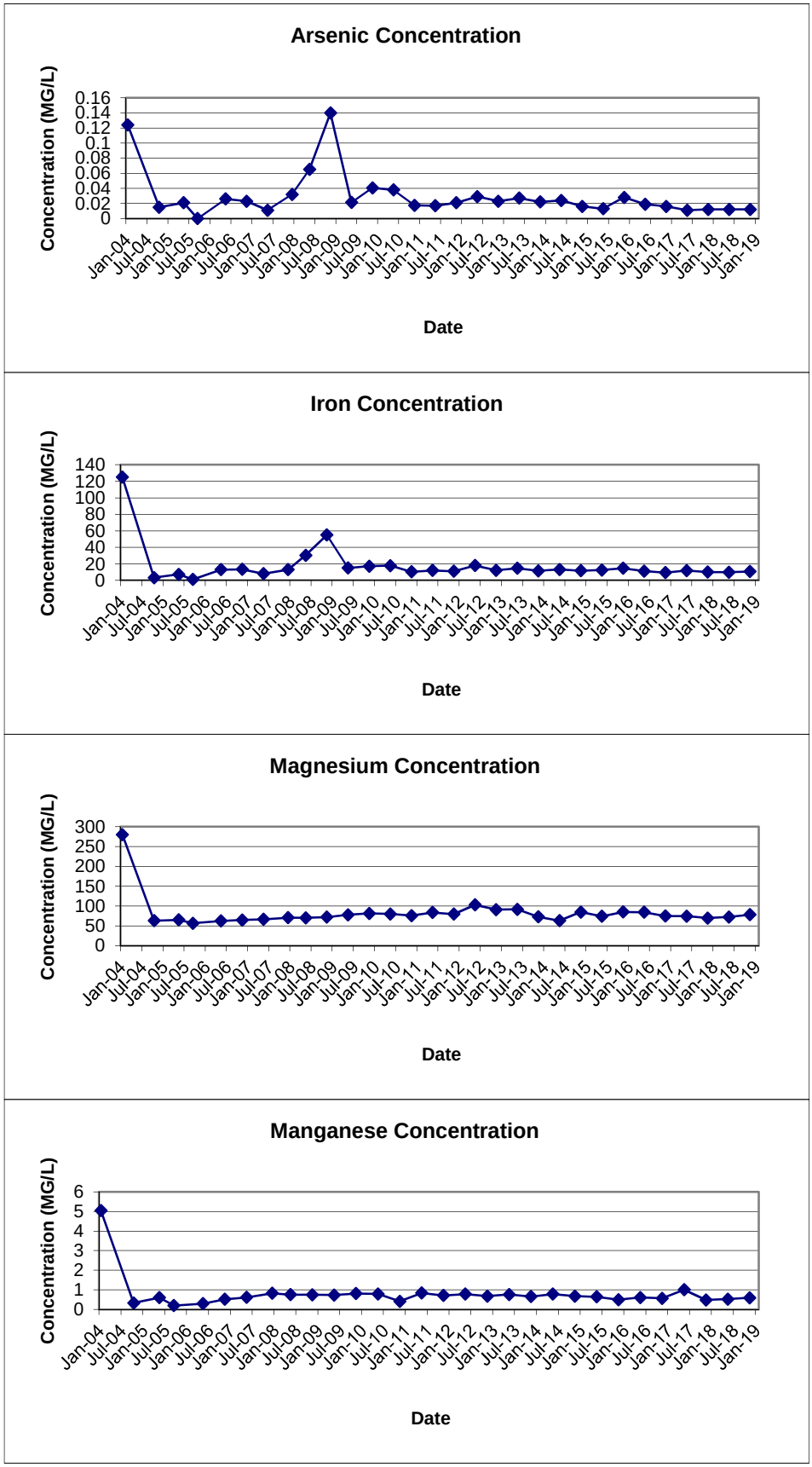


FIGURE E-13
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-29S

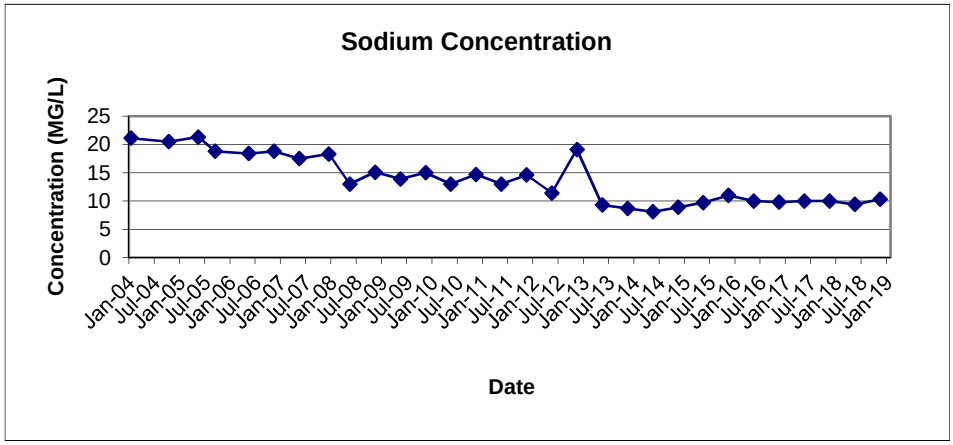


FIGURE E-14
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-30S

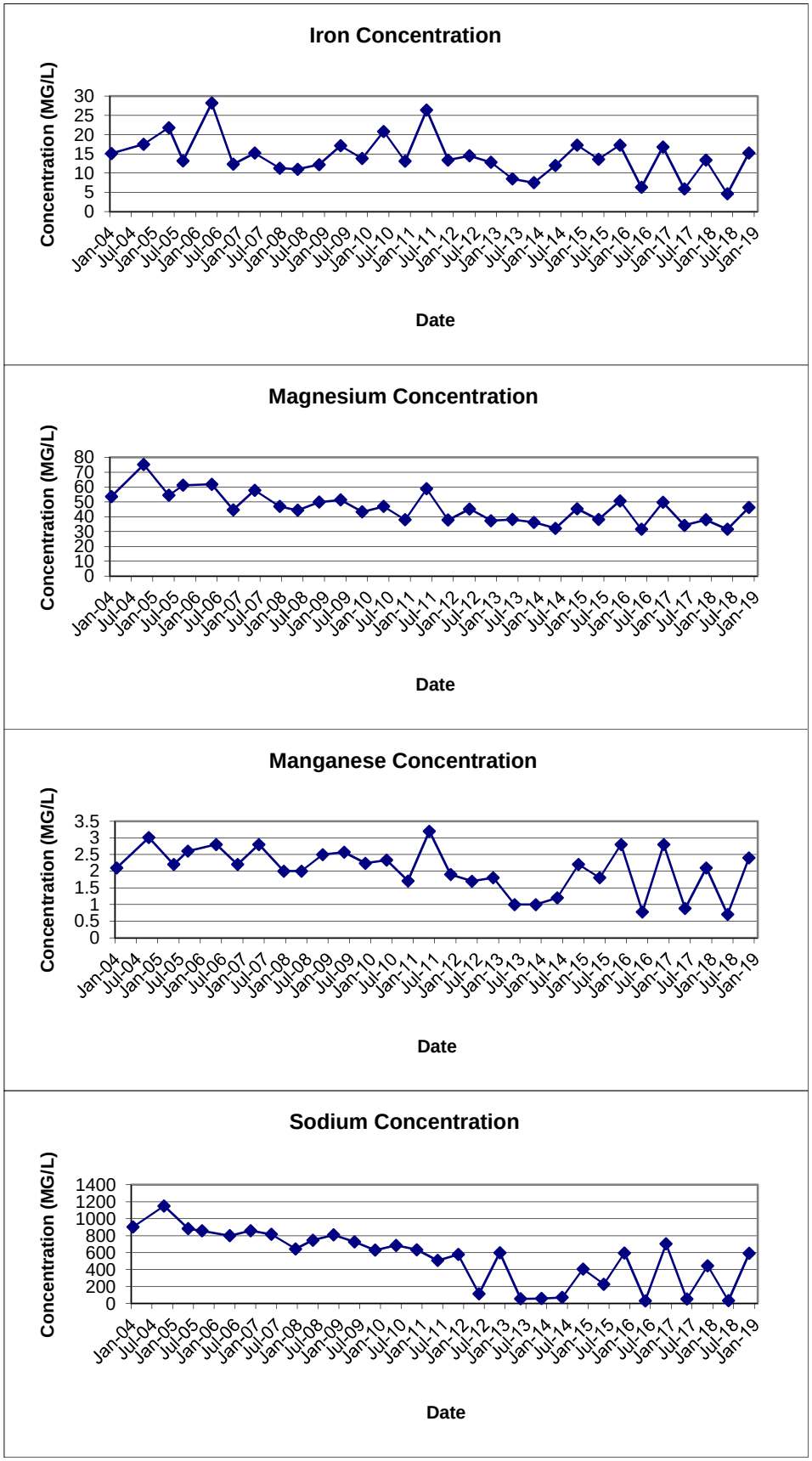


FIGURE E-15
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-31S

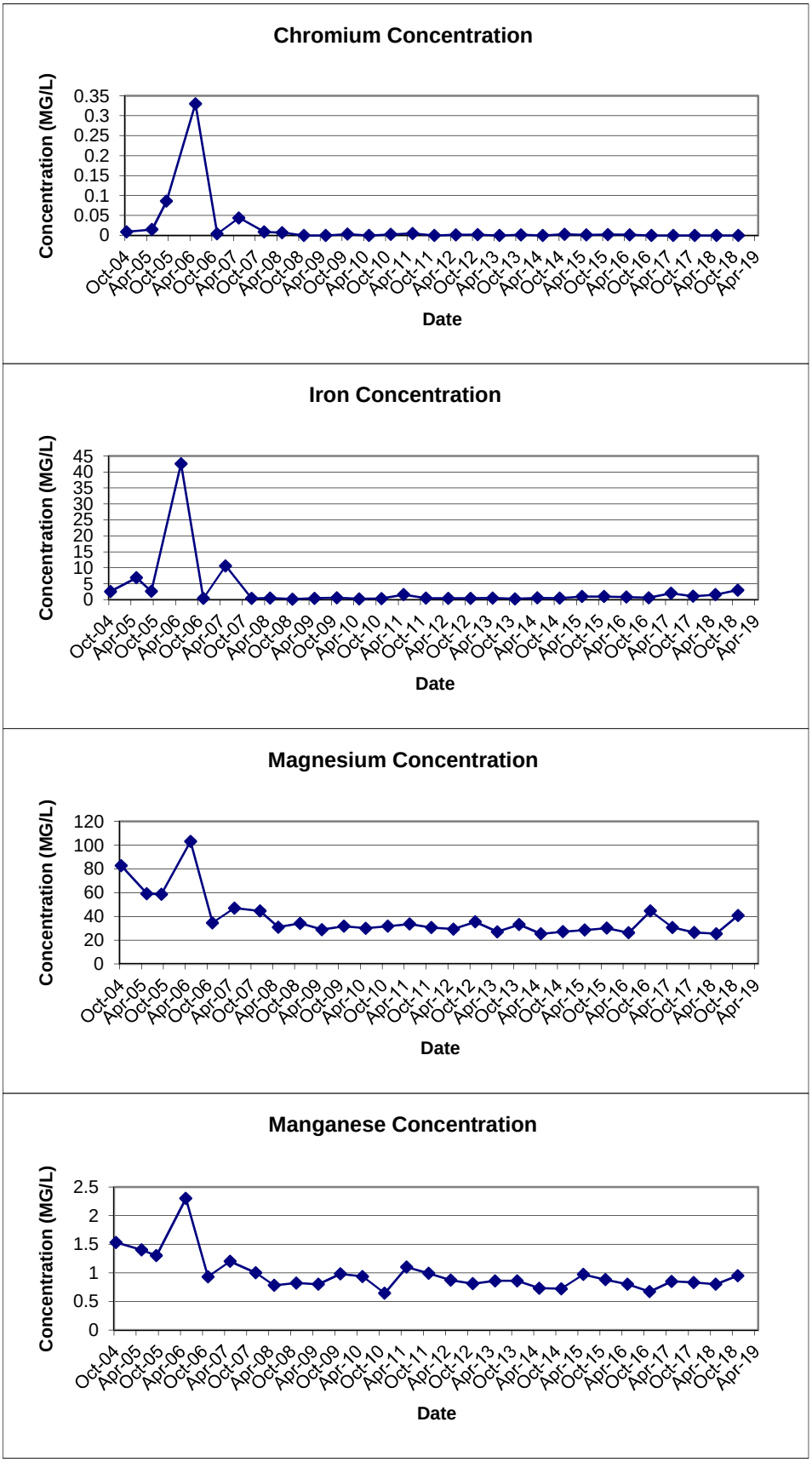


FIGURE E-16
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-32S

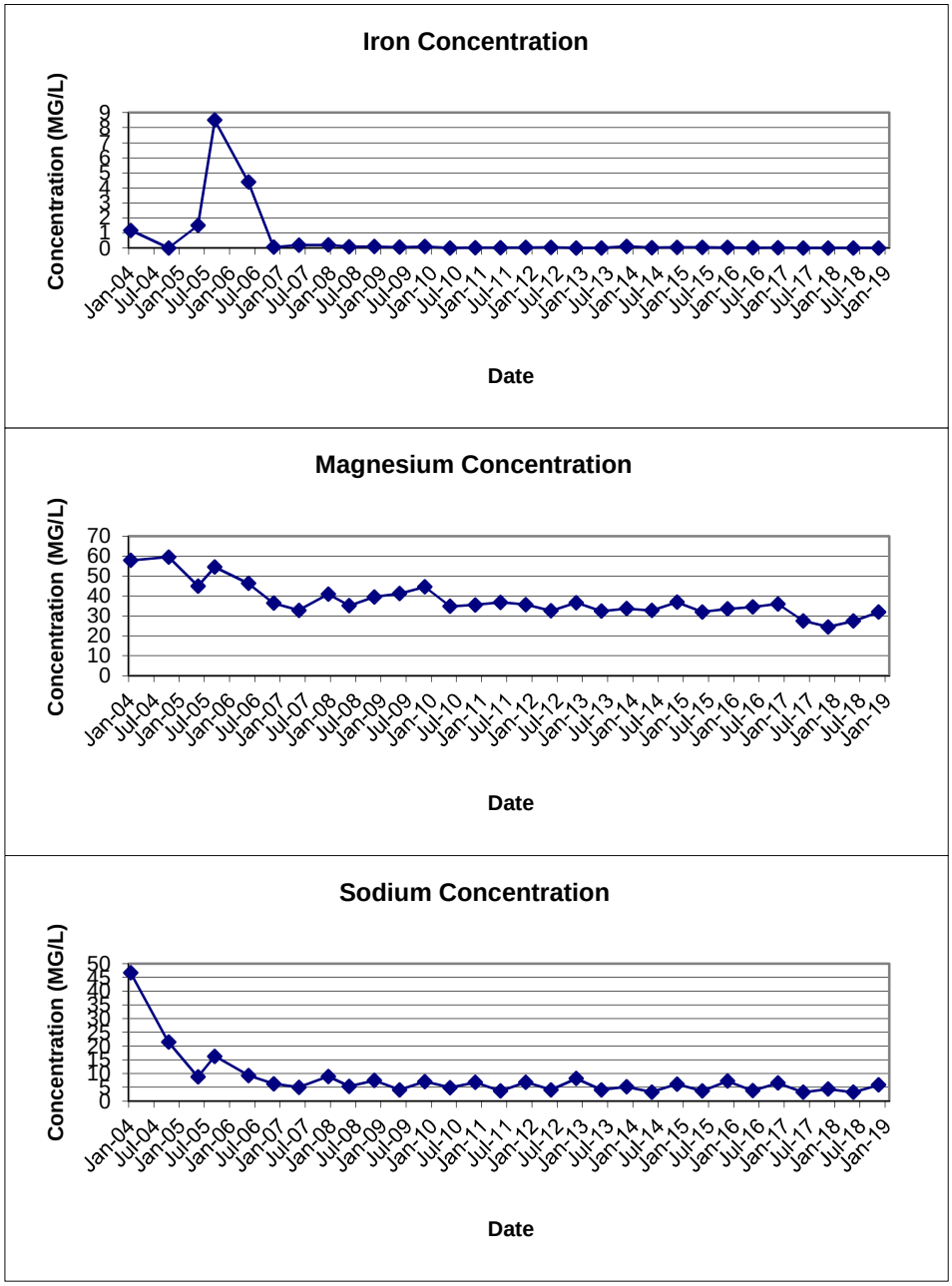


FIGURE E-17
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-33S

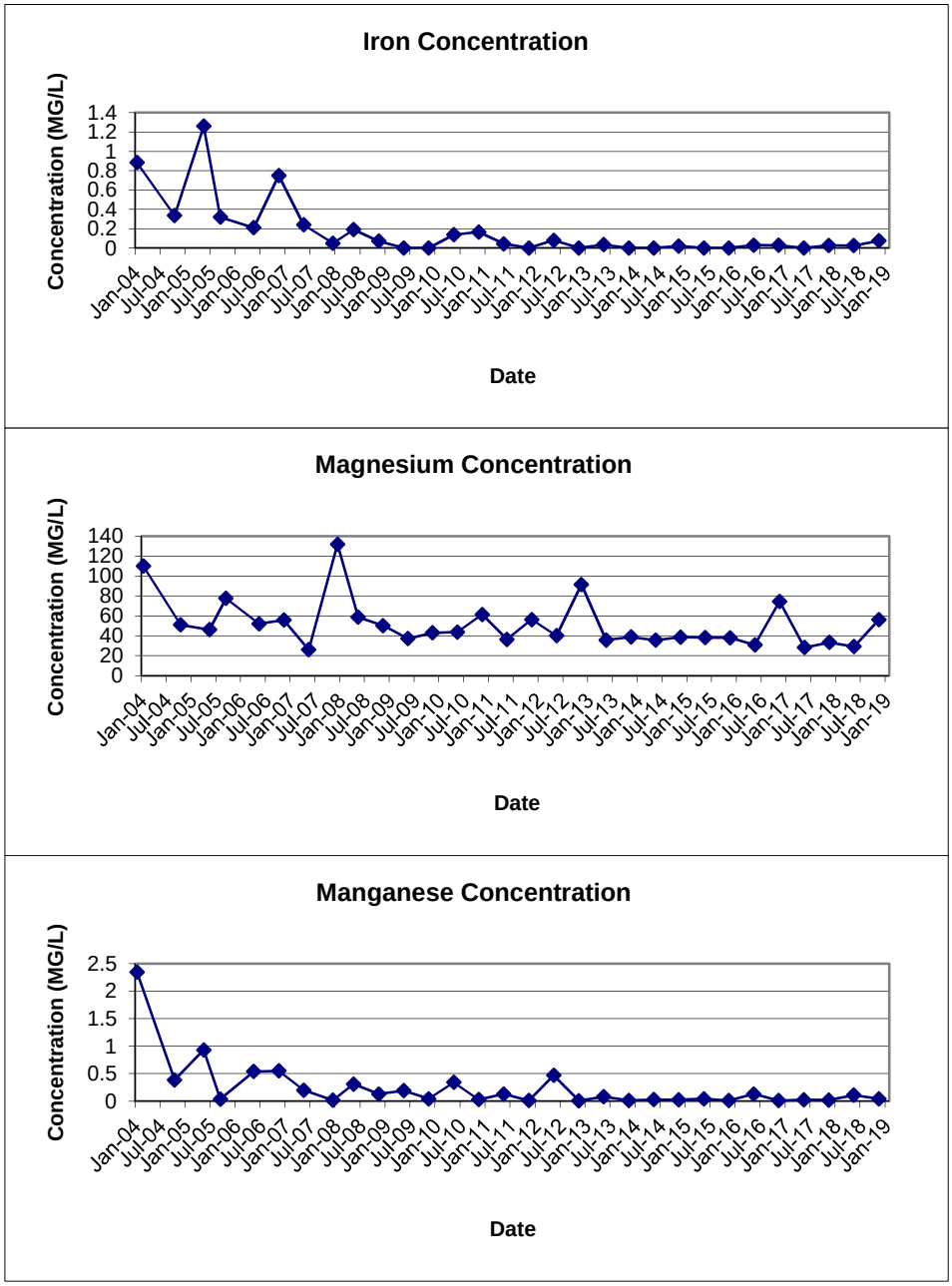


FIGURE E-18
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-34S

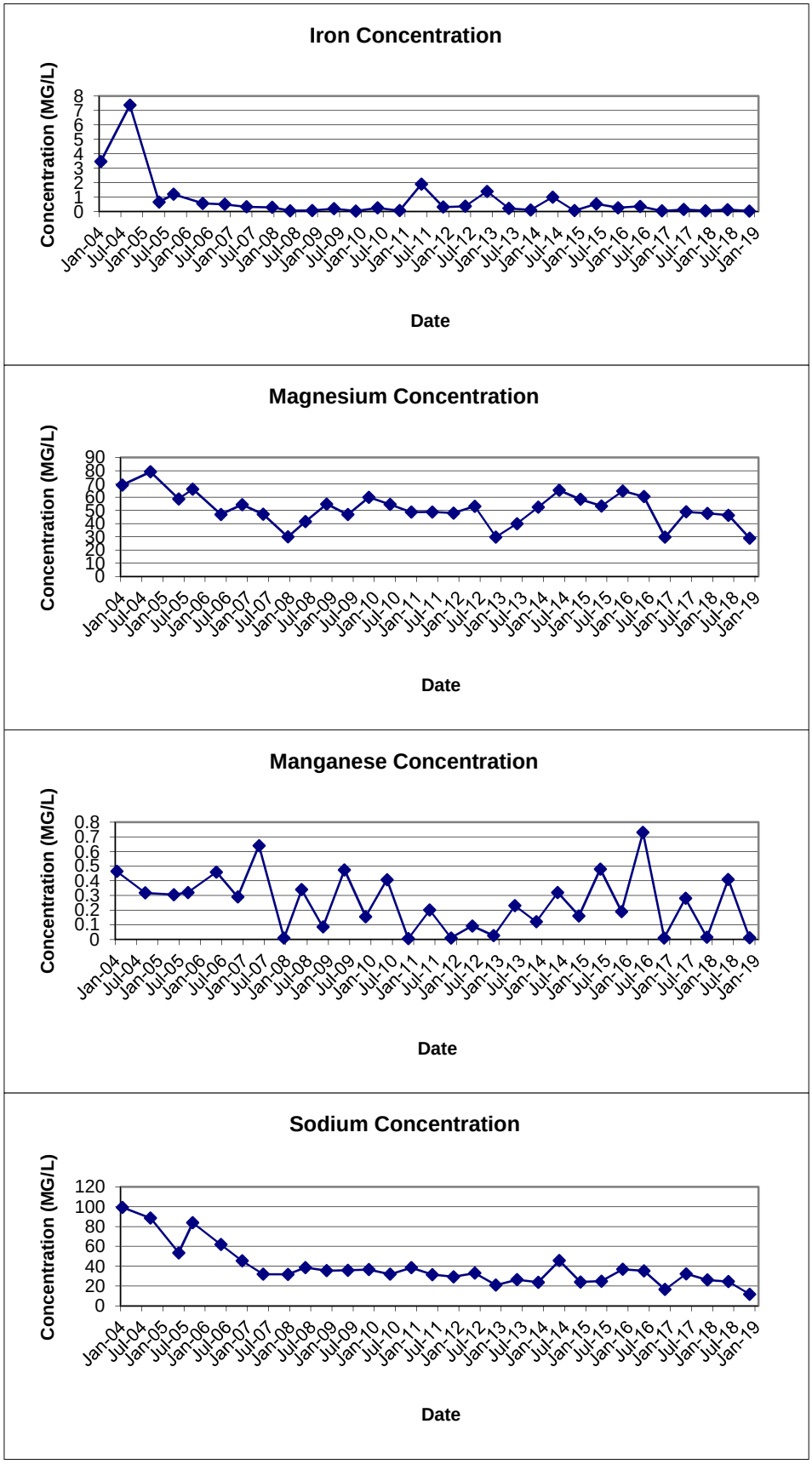
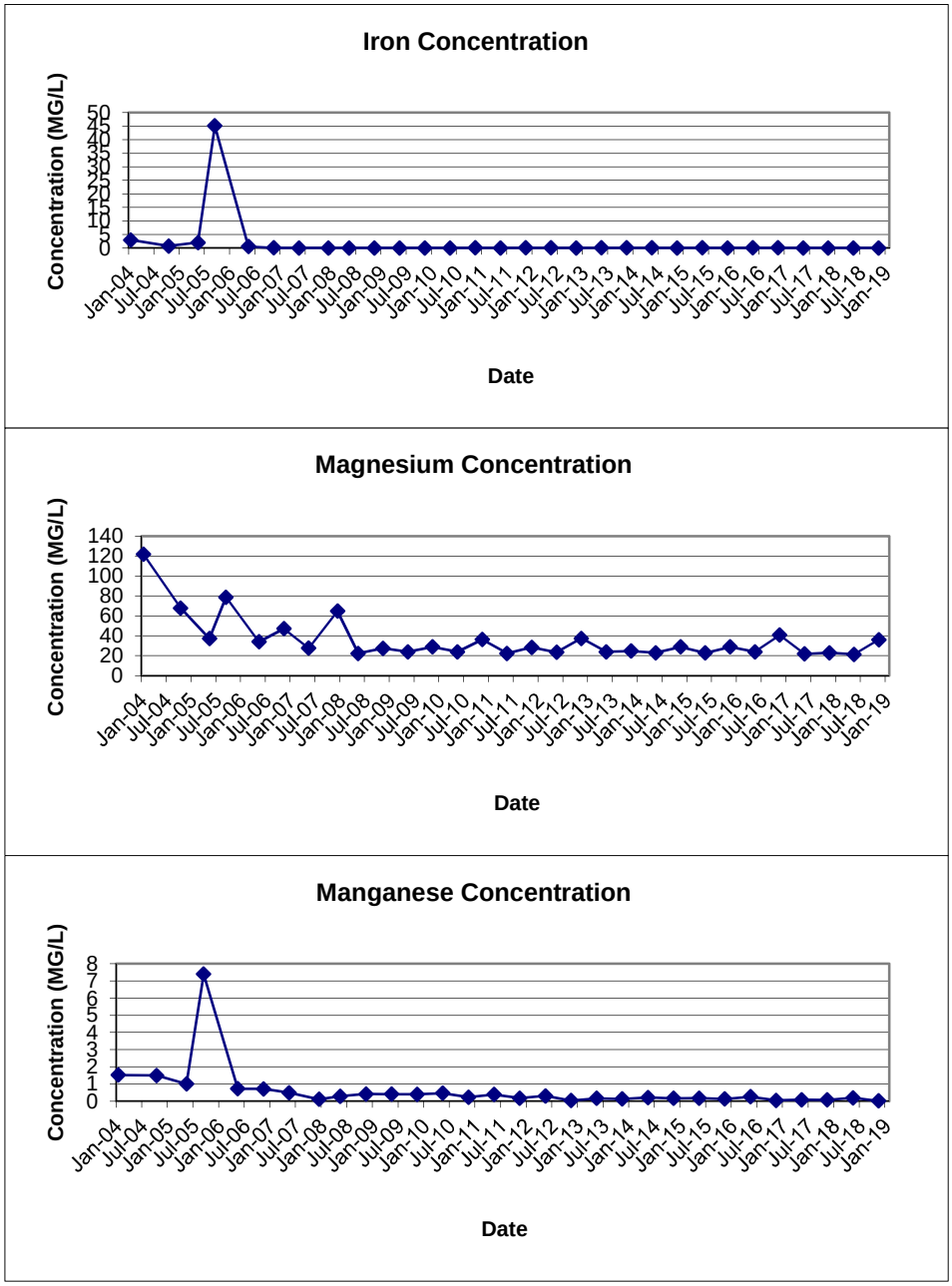


FIGURE E-19
TRENDS OF PARAMETERS ROUTINELY EXCEEDING GROUNDWATER STANDARDS
IN MONITORING WELL GW-35S



APPENDIX F

BSA PERMIT NO. 16-04-CH016

AUTHORIZATION TO DISCHARGE UNDER THE BUFFALO POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT NO. 16-04-CH016
USEPA Category 40 CFR Part 403

In accordance with the provisions of the Federal Water Pollution Control Act, as amended, and the Sewer Regulations of the Buffalo Sewer Authority, authorization is hereby granted to:

THE TOWN OF CHEEKTOWAGA

to discharge wastewater from a facility located at:

PFOHL BROTHERS LANDFILL REMEDIATION SITE
1000 AERO DRIVE
CHEEKTOWAGA, NEW YORK 14225

The wastewater permitted herein shall be discharged to the Town of Cheektowaga sewer system, which is connected to the Buffalo Municipal Sewer System and Treatment facilities, and which wastewater will be treated at the Buffalo Sewer Authority's Treatment Plant.

Issuance of this permit is based upon a permit application filed on **July 6, 2016** analytical data. This permit is granted in accordance with discharge limitations, monitoring requirements and other conditions set forth in Parts I and II hereof.

Effective this 1st day of April, 2016

To Expire the 31st day of March, 2019

General Manager

Signed this 11th **day of** July **, 2016**

PART I: SPECIFIC CONDITIONS

A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS

During the period beginning the effective date of this Permit and lasting until the expiration date, discharge from the permitted facility outfall (see attached map) shall be limited and monitored **quarterly** by the permittee as specified below.

Sample Point	Parameter	Discharge Limitations[1] Daily Max	Sampling Requirements Period	Type
001	pH	5.0 – 12.0 S.U.	1 day	Composite[2]
	Total Cadmium	1.17 lbs.	1 day	Composite[2]
	Total Chromium	1.17 lbs.	1 day	Composite[2]
	Total Copper	3.74 lbs.	1 day	Composite[2]
	Total Lead	1.17 lbs.	1 day	Composite[2]
	Total Nickel	3.27 lbs.	1 day	Composite[2]
	Total Zinc	5.84 lbs.	1 day	Composite[2]
	Total Barium	2.34 lbs.	1 day	Composite[2]
	Total Suspended Solids[5]	250 mg/l	1 day	Composite[2]
	Total Flow	140,100 gallons[6]	1 day	Discharge meter reading

Footnotes are explained on page 5.

PART I: SPECIFIC CONDITIONS

A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS

During the period beginning the effective date of this Permit and lasting until the expiration date, discharge from the permitted facility outfall (see attached map) shall be limited and monitored **once** by the permittee as specified below.

Sample		Discharge Limitations[1]	Sampling Requirements	
Point	**Parameter**	**Daily Max**	**Period**	**Type**
001	Total Mercury	0.001 lbs.	1 day	Composite[2]
	USEPA Test Method 608[4]	To be monitored	1 day	Grab[3]
	USEPA Test Method 624[4]	To be monitored	1 day	Grab[3]
	USEPA Test Method 625[4]	To be monitored	1 day	Grab[3]

Footnotes are explained on page 5.

PART I: SPECIFIC CONDITIONS

B. DISCHARGE MONITORING REPORTING REQUIREMENTS

During the period beginning the effective date of this permit and lasting until the expiration date, discharge monitoring results shall be summarized and reported **quarterly** by the permittee on the days specified below:

Sample		**Reporting Requirements**	
Point	**Parameter**	**Initial Report**	**Subsequent Reports**
001	All except USEPA Test Methods 608, 624, 625 & T Mercury	June 30, 2016	Every March 31st, June 30th, September 30th and December 31st
	USEPA Test Methods 608, 624 and 625 & T Mercury	June 30, 2016	

* Please submit new discharge application 6 months prior to the expiration of this permit*

PART I: SPECIFIC CONDITIONS

C. SPECIAL REQUIREMENTS

1. Mass limits based on an average discharge of 140,100 gpd.

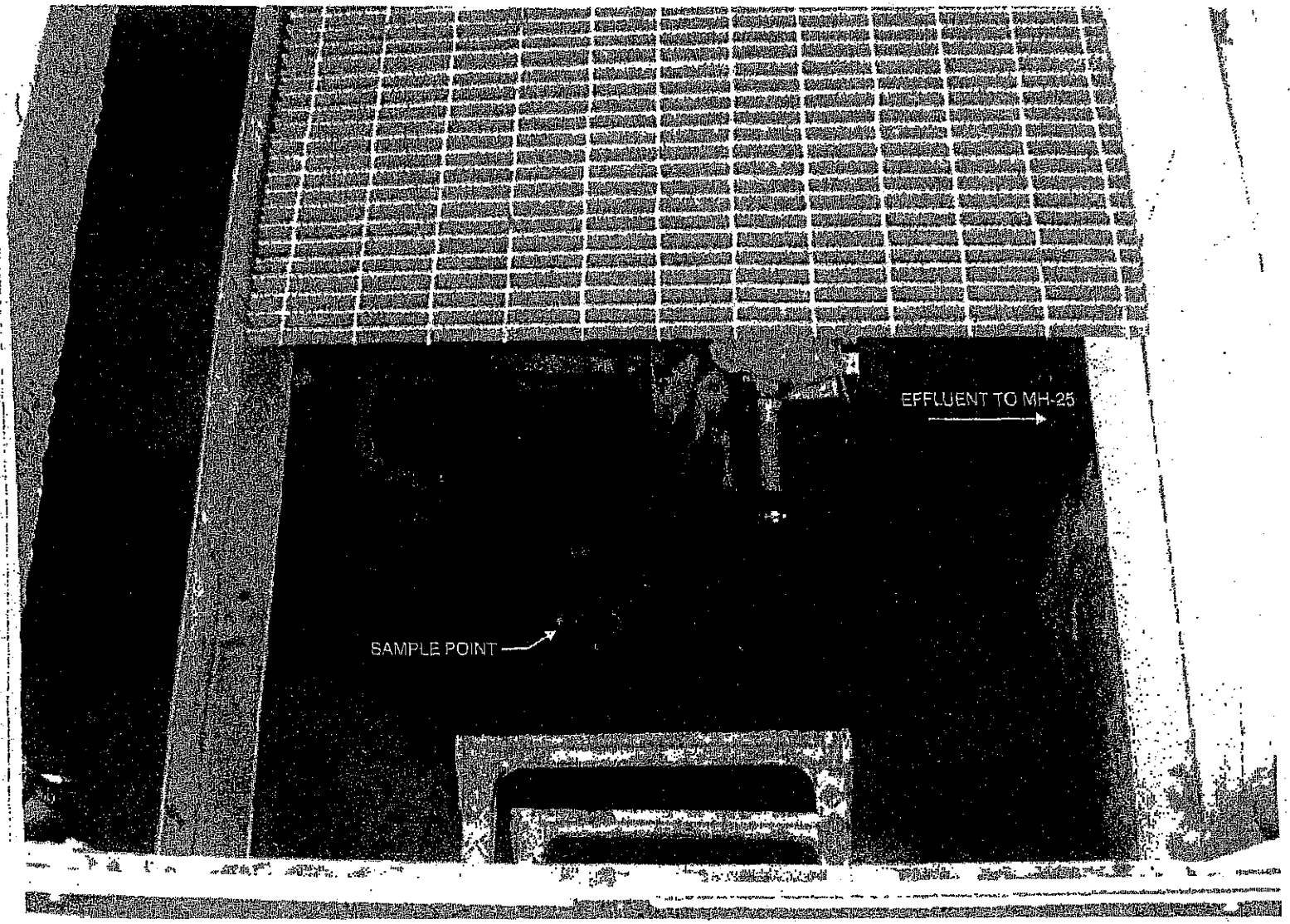
2. Composite samples may be time proportioned.

3. Four grab samples must be collected at equally spaced intervals throughout the sample day. The four (4) grab samples must be composited by a NYSDOH certified laboratory prior to analysis.

4. The permittee must report any compound whose concentration is equal to or greater than 0.01 mg/L. The permittee is not authorized to discharge any of the parameters evaluated by these test procedures which may cause or contribute to a violation of water quality standards or harm the sewerage system. Any parameter detected may, at the discretion of the BSA, be specifically limited and incorporated in this permit.

5. Surchargeable over 250 mg/L.

6. Flow is an action level only. If the permittee consistently exceeds this level, the BSA must be notified so that this permit can be modified.



URS

PFOHL BROTHERS LANDFILL
EFFLUENT SAMPLE POINT

FIGURE 1

PART II GENERAL CONDITIONS

A. MONITORING AND REPORTING

1. Local Limits

Except as otherwise specified in this permit, the permit holder shall comply with all specific prohibitions, limits on pollutants or pollutant parameters set forth in the Buffalo Sewer Authority Sewer Use Regulations, as amended from time to time, and such prohibitions, limits and parameters shall be deemed pretreatment standards for purposes of the Clean Water Act

2. Definitions

Definitions of terms contained in this permit are as defined in the Town of Cheektowaga Local Law No. 2 and the Buffalo Sewer Authority Sewer Use Regulations.

3. Discharge Sampling Analysis

All Wastewater discharge samples and analyses and flow measurements shall be representative of the volume and character of the monitored discharge. Methods employed for flow measurements and sample collections and analyses shall conform to the Buffalo Sewer Authority "Sampling Measurement and Analytical Guidelines Sheet."

4. Recording of Results

For each measurement or sample taken pursuant to the requirements of the permit, the Permittee shall record the information as required in the "Sampling Measurement and Analytical Guidelines Sheet."

5. Additional Monitoring by Permittee

If the Permittee monitors any pollutants at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified in 40 CFR Part 136 the results of such monitoring shall be included in the calculation and reporting of values required under Part I, B. Such increased frequency shall also be indicated.

6. Reporting

All reports prepared in accordance with this Permit shall be submitted to:

PAT BOWEN
Town Engineer
275 Alexander Ave.
Cheektowaga, New York, 14211

All self-monitoring reports shall be prepared in accordance with the BSA "Sampling Measurement and Analytical Guidelines Sheet." These reporting requirements shall not relieve the Permittee of any other reports, which may be required by the

Measurement and Analytical Guidelines Sheet." These reporting requirements shall not relieve the Permittee of any other reports, which may be required by the N.Y.S.D.E.C. or the U.S.E.P.A.

7. Certification Statement

All self-monitoring reports shall include the following certification statement, signed by the preparer of the report:

"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 systems, or those persons directly responsible for gathering the information, the information submitted 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

B. PERMITTEE REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit and with the information contained in the TC/BPDES Permit Application on which basis this permit is granted. In the event of any facility expansions, production increases, process modifications or the installation, modification or repair of any pretreatment equipment which may result in new, different or increased discharges of pollutants, a new TC/BPDES Permit Application must be submitted prior to any change. Following receipt of an amended application, the BSA may modify this permit to specify and limit any pollutants not previously limited. In the event that the proposed change will be covered under an applicable Categorical Standard, a Baseline Monitoring Report must be submitted at least ninety (90) days prior to any discharge.

2. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed, calibration and maintenance of instrumentation, and recordings from continuous monitoring instrumentation shall be retained at this facility for a minimum of three (3) years, or longer if requested by the General Manager and/or Town Engineer.

3. Slug Control Plan

Upon written notification by the BSA that a slug control plan is necessary for the permittee, the plan shall be prepared in accordance with the BSA "Sampling Measurement and Analytical Guidelines" sheet. Within 90 days of the BSA notification, the permittee must implement the slug control plan

4. Notification of Slug, Accidental Discharge or Spill

In the event that a slug, accidental discharge or any spill occurs at the facility for which this permit is issued, it is the responsibility of the Permittee to immediately notify the B.S.A. Treatment Plant of the quantity and character of such discharge. During normal business hours, Monday- Friday, 7:30 AM – 3:00 PM call 716-851-4664, ext 5374. After normal business hours call 716-851-4664, ext 600. For all slug discharges, and when requested by the B.S.A. following an accidental discharge or spill, within five (5) days following all such discharges, the Permittee shall submit a report describing the character and duration of the discharge, the cause of the discharge, and measures taken or that will be taken to prevent a recurrence of such discharge.

5. Noncompliance Notification

If, for any reason, the Permittee does not comply with or will be unable to comply with any discharge limitation specified in this permit, the Permittee or their assigns must verbally notify the Industrial Waste Section at 716-851-4664 ext. 5374 within twenty-four (24) hours of becoming aware of the violation. The Permittee shall provide the Industrial Waste Section with the following information, in writing, within five (5) days of becoming aware of such condition:

a. a description of the discharge and cause of noncompliance and;

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

Additionally, the permittee shall repeat the sampling and analysis and sumbit these results of the report analysis to the Industrial Waste Section within 30 days after becoming aware of these violations

6. Adverse Impact

The Permittee shall take all reasonable steps to minimize any adverse impact to the Buffalo and Town Sewerage System resulting from noncompliance with any discharge limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

7. Waste Residuals

Solids, sludges, filter backwash or other pollutants removed in the course of treatment or control of wastewaters and/or the treatment of intake waters, shall be disposed of in a manner such as to prevent any pollutant from such materials from entering the Buffalo or Town Sewer System.

8. Power Failures

In order to maintain compliance with the discharge limitations and prohibitions of

this permit, the Permittee shall provide an alternative power source sufficient to operate the wastewater control facilities; or, if such alternative power source is not provided the Permittee shall halt, reduce or otherwise control production and/or controlled discharges upon the loss of power to the wastewater control facilities.

9. Treatment Upsets

a. Any industrial user which experiences an upset in operations that places it in a temporary state of noncompliance, which is not the result of operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation, shall inform the Industrial Waste Section immediately upon becoming aware of the upset. Where such information is given verbally, a written report shall be filed by the user within five (5) days. The report shall contain:

(i) A description of the upset, its cause(s) and impact on the discharger's compliance status.

(ii) The duration of noncompliance, including exact dates and times of noncompliance, and if the noncompliance is continuing, the time by which compliance is reasonably expected to be restored

(iii) All steps taken or planned to reduce, eliminate, and prevent recurrence of such an upset.

b. An industrial user which complies with the notification provisions of this Section in a timely manner shall have an affirmative defense to any enforcement action brought by the Industrial Waste Section/Town Engineer for any noncompliance of the limits in this permit, which arises out of violations attributable to and alleged to have occurred during the period of the documented and verified upset.

10. Treatment Bypasses

a. A bypass of the treatment system is prohibited unless the following conditions are met:

(i) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; or

(ii) There was no feasible alternative to the bypass, including the use of auxiliary treatment or retention of the wastewater; and

(iii) The industrial user properly notified the Industrial Waste Section as described in paragraph b. below.

b. Industrial users must provide immediate notice to the Industrial Waste Section upon delivery of an unanticipated bypass. If necessary, the Industrial Waste Section may require the industrial user to submit a written report explaining the cause(s), nature, and duration of the bypass, and the steps being taken to prevent its recurrence.

c. An industrial user may allow a bypass to occur which does not cause

pretreatment standards or requirements to be violated, but only if it is for essential maintenance to ensure efficient operation of the treatment system. Industrial users anticipating a bypass must submit notice to the Industrial Waste Section at least ten (10) days in advance. The Industrial Waste Section may only approve the anticipated bypass if the circumstances satisfy those set forth in paragraph a. above.

C. PERMITTEE RESPONSIBILITIES

1. Permit Availability

The originally signed permit must be available upon request at all times for review at the address stated on the first page of this permit.

2. Inspections

The Permittee shall allow the representatives of the Buffalo Sewer Authority or Town of Cheektowaga upon the presentation of credentials and during normal working hours or at any other reasonable times, to have access to and copy any records required in this permit; and to sample any discharge of pollutants.

3. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities for which this permit has been issued the permit shall become null and void. The succeeding owner shall submit a completed Town of Cheektowaga/ Buffalo Sewer Authority permit application prior to discharge to the sewer system.

D. PERMITTEE LIABILITIES

1. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to the following:

a. Violation of any terms or conditions of this permit,

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts,

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

2. Imminent Danger

In the event there exists an imminent danger to health or property, the permitter reserves the right to take immediate action to halt the permitted discharge to the sewerage works.

3. Civil and Criminal Liability

Nothing in this permit shall relieve the Permittee from any requirements, liabilities, or penalties under provisions of the Town of Cheektowaga Local Law No. 2, the "Sewer Regulations of the Buffalo Sewer Authority" or any Federal, State and/or local laws or regulations.

E. NATIONAL PRETREATMENT STANDARDS

If a pretreatment standard or prohibition (including any Schedule of Compliance specified in such pretreatment standard or prohibition) is established under Section 307 (b) of the Act for a pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with such pretreatment standard or prohibition.

F. PLANT CLOSURE

In the event of plant closure, the Permittee is required to notify the Industrial Waste Section/Town Engineer in writing as soon as an anticipated closure date is determined, but in no case later than five (5) days of the actual closure.

G. CONFIDENTIALITY

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Buffalo Sewer Authority or Town Engineer of the Town of Cheektowaga. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

H. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

Revised March 17, 2014 by LS

APPENDIX G

DISCHARGE REPORT SUMMARY TABLES

SAMPLING FIELD SHEET

Client Name: Pfohl Brothers Landfill

Address: Aero Drive, Cheektowaga, NY

Contact: Patrick T. Bowen, P.E. Phone: 716-897-7288

Installation:

Sample Point: SP-001

Sample Location: Meter Chamber - ball valve on 6" HDPE forcemain

Date: 9/11/18 Crew: R. Murphy, K. McGovern, T. Raby

Weather: 70° F, Cloudy

Sampling Device: NA

Time of Installation: 14:48 Type of Sample: Composite

Sample Interval: NA Sample Volume: NA

Comments and Observations: Well WW-06 was running at the time of sample set-up.
PLC display volumes: WW-01 (150,446 gals), WW-02 (0 gals), WW-03 (0 gals),
WW-04 (36,991 gals), WW-05 (685,371 gals), WW-06 (274,882 gals) & MH-25 (1,147,677 gals).

Date: 9/12/18 Crew: R. Murphy, K. McGovern, T. Raby

Weather: 81° F, Partly Cloudy

Time of Collection: 14:48

Field Measurements:

14:48/RJM
(time/initial)

pH Calibration: Buffer 7- 7 Buffer 4- 4 Buffer 10- 10

pH Measurement: 6.53

Temperature: 19.0°C

Identification: EFF-091218

Physical Observations:

Laboratory: TestAmerica, Buffalo, NY

Comments: No wells were running at the time of sample collection.
PLC display volumes: WW-01 (150,448 gals), WW-02 (0 gals), WW-03 (0 gals),
WW-04 (36,991 gals), WW-05 (695,908 gals), WW-06 (349,062 gals) & MH-25 (1,231,949 gals).

Reviewed By: Robert J Murphy Date: 9/18/18
(Supervisor)

TABLE 1

PFOHL BROTHERS LANDFILL - EFFLUENT MONITORING ANALYTICAL RESULTS, TOTAL FLOW, AND MASS LOADINGS SEPTEMBER 2018

Sample ID	EFF-091218			
Matrix	Effluent Water			
Date Sampled	9/12/2018			
Parameter	**Result**	**Mass Loading**	**Discharge Limitation**	**Violations**
	(mg/L)	**(lbs/day)**	**(lbs/day)**	**(Y/N)**
Total Barium	0.30	0.21	2.34	No
Total Cadmuim	<(1) 0.0005	< 0.0004	1.17	No
Total Chromium	< 0.0010	< 0.00070	1.17	No
Total Copper	< 0.0016	< 0.001	3.74	No
Total Lead	< 0.0030	< 0.002	1.17	No
Total Nickel	0.0037	0.003	3.27	No
Total Zinc	0.0095	0.007	5.84	No
Total Suspended Solids	12.4	NA(2)	250 (3)	No
pH (4)	6.53	NA	5.0 - 12.0	No
Total Flow (5)		84,272	140,100	No

Notes:

(1) < = Compound not detected, method detection limit shown
(2) NA = Not Applicable
(3) Discharge Limitation in units of mg/L
(4) pH measurement and Discharge Limitation in Standard Units
(5) Total Flow reported in gallons, sample was collected over a 24 hour period

Calculation: $\left(\frac{x\ mg}{L}\right)\left(\frac{y\ gal}{day}\right)\left(\frac{1\ lb}{453{,}600\ mg}\right)\left(\frac{3.785\,L}{gal}\right) = \frac{x \times y}{119{,}841}\ \frac{lb}{day}$

SAMPLING FIELD SHEET

Client Name: Pfohl Brothers Landfill

Address: Aero Drive, Cheektowaga, NY

Contact: Patrick T. Bowen, P.E. Phone: 716-897-7288

Installation:

Sample Point: SP-001

Sample Location: Meter Chamber - ball valve on 6" HDPE forcemain

Date: 12/19/18 Crew: R. Murphy, K. McGovern, T. Urban

Weather: 37° F, Partly Cloudy

Sampling Device: NA

Time of Installation: 10:15 Type of Sample: Composite

Sample Interval: NA Sample Volume: NA

Comments and Observations: Well WW-06 was running at the time of sample set-up.
PLC display volumes: WW-01 (790,502 gals), WW-02 (0 gals), WW-03 (0 gals),
WW-04 (315,452 gals), WW-05 (1,863,490 gals), WW-06 (2,464,787 gals) & MH-25 (5,473,096 gals).

Date: 12/20/18 Crew: R. Murphy, K. McGovern, T. Urban

Weather: 81° F, Partly Cloudy

Time of Collection: 10:15

Field Measurements:

10:45/RJM
(time/initial)

pH Calibration: Buffer 7- 7 Buffer 4- 4 Buffer 10- 10

pH Measurement: 7.34

Temperature: 8.0°C

Identification: EFF-122018

Physical Observations:

Laboratory: TestAmerica, Buffalo, NY

Comments: No wells were running at the time of sample collection.
PLC display volumes: WW-01 (790,502 gals), WW-02 (0 gals), WW-03 (0 gals),
WW-04 (344,429 gals), WW-05 (1,863,490 gals), WW-06 (2,502,708 gals) & MH-25 (5,539,864 gals).

Reviewed By: Robert J Murphy Date: 12/20/18
(Supervisor)

TABLE 1

PFOHL BROTHERS LANDFILL - EFFLUENT MONITORING ANALYTICAL RESULTS, TOTAL FLOW, AND MASS LOADINGS DECEMBER 2018

Sample ID	EFF-122018			
Matrix	Effluent Water			
Date Sampled	12/20/2018			
Parameter	**Result**	**Mass Loading**	**Discharge Limitation**	**Violations**
	(mg/L)	**(lbs/day)**	**(lbs/day)**	**(Y/N)**
Total Barium	0.22	0.12	2.34	No
Total Cadmuim	<(1) 0.0005	< 0.0003	1.17	No
Total Chromium	< 0.0010	< 0.00056	1.17	No
Total Copper	0.0021	0.001	3.74	No
Total Lead	< 0.0030	< 0.002	1.17	No
Total Nickel	0.0026	0.001	3.27	No
Total Zinc	0.0083	0.005	5.84	No
Total Suspended Solids	16.0	NA(2)	250 (3)	No
pH (4)	7.34	NA	5.0 - 12.0	No
Total Flow (5)		66,768	140,100	No

Notes:

(1) < = Compound not detected, method detection limit shown
(2) NA = Not Applicable
(3) Discharge Limitation in units of mg/L
(4) pH measurement and Discharge Limitation in Standard Units
(5) Total Flow reported in gallons, sample was collected over a 24 hour period

Calculation: $\left(\frac{x\ mg}{L}\right)\left(\frac{y\ gal}{day}\right)\left(\frac{1\ lb}{453{,}600\ mg}\right)\left(\frac{3.785\,L}{gal}\right) = \frac{x \times y}{119{,}841}\ \frac{lb}{day}$

APPENDIX H

MONITORING WELL INSPECTION LOGS

WELL INSPECTION SUMMARY

Project Name: *Pfohl Brothers Landfill* Project Number: *60411174*

Inspection Crew Members: *R. Murphy, T. Urban* Supervisor: *R. Murphy*

Date(s) of Inspection: *November 13. 2018*

Well I.D. Number	*Lock*	*Surface Seal*	*Protective Casing*	*Riser*	*Water Level (ft. BTOC)*	*Well Depth (ft. BTOC)*	*Other Comments*
GW-01S	OK	OK	OK	Bulged	3.55	14.94	
GW-01D	OK	OK	OK	Bulged	2.67	39.65	
GW-03S	OK	OK	OK	OK	DRY	13.22	
GW-03D	OK	OK	OK	OK	1.78	35.70	
GW-04S	OK	OK	OK	OK	4.27	16.23	
GW-04D	OK	OK	OK	OK	12.65	45.57	
GW-07S	OK	OK	OK	OK	5.20	35.33	
GW-07D	OK	OK	OK	Damaged	45.54	60.83	

Additional Comments:

WELL INSPECTION SUMMARY

Project Name: *Pfohl Brothers Landfill* Project Number: *60411174*

Inspection Crew Members: *R. Murphy, T. Urban* Supervisor: *R. Murphy*

Date(s) of Inspection: *November 13. 2018*

Well I.D. Number	*Lock*	*Surface Seal*	*Protective Casing*	*Riser*	*Water Level (ft. BTOC)*	*Well Depth (ft. BTOC)*	*Other Comments*
GW-08SR	OK	OK	OK	OK	5.10	13.02	
GW-08D	OK	OK	OK	OK	5.73	36.54	
GW-26D	OK	OK	OK	OK	6.58	40.70	
GW-28S	OK	OK	OK	OK	8.51	15.52	
GW-29S	OK	OK	OK	OK	6.71	20.04	
GW-30S	OK	OK	OK	OK	7.82	17.97	
GW-31S	OK	OK	OK	OK	2.68	9.57	
GW-32S	OK	OK	OK	OK	2.65	9.93	

Additional Comments:

WELL INSPECTION SUMMARY

Project Name: *Pfohl Brothers Landfill* Project Number: *60411174*

Inspection Crew Members: *R. Murphy, T. Urban* Supervisor: *R. Murphy*

Date(s) of Inspection: *November 13. 2018*

Well I.D. Number	***Lock***	***Surface Seal***	***Protective Casing***	***Riser***	***Water Level (ft. BTOC)***	***Well Depth (ft. BTOC)***	***Other Comments***
GW-33S	OK	OK	OK	OK	3.95	8.21	
GW-34S	OK	OK	OK	OK	2.5	10.01	
GW-35S	OK	OK	OK	OK	4.41	7.46	

Additional Comments: _____

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