ARCADIS Design & Consultancy for natural and built assets

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Subject:
June 2017 Monthly Report
Site Management/RSO
Fort Edward Landfill
NYSDEC Site No. 558001
Contract No. D007618-39

Date:
July 28, 2017

Contact:
Andy Vitolins

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Our ref:
00266434.0000

Dear Mr. Long:

Arcadis CE, Inc. (Arcadis) has prepared this letter report to summarize the leachate collection and treatment system operation, maintenance, and monitoring (OM&M) activities completed during the June 2017 reporting period.

Leachate Collection and Treatment System Operation and Maintenance

The leachate collection system operated with no downtime during the June 2017 operating period. Approximately 443,073 gallons of leachate were collected and treated through the system during June 2017. The corresponding average leachate recovery rate for the month was approximately 10.3 gallons per minute (gpm).

The following O&M activities were completed during the June 2017 operating period:

- Iron and solids sludge processing was performed throughout the month. In total, five 55-gallon drums of sludge were generated during June 2017;
- Sediment and woody vegetation in an approximately 40-foot section of the southern midcap swale were excavated and removed. The excavated material was placed in the Treatment Cell 1 drying bed due to iron staining. The swale was regraded to improve drainage;
- Cleanout CO FD-2 (Figure 1) was inspected and rip-rap stone that was identified in the riser pipe was partially removed. Upon inspection, the boot

where the cleanout riser penetrates the landfill liner was found to be torn due to the deflection in the riser pipe. Since the cleanout is along the perimeter of the landfill cell, no liner repair attempt was made. Approximately four-feet of standing rip-rap stone was removed from the cleanout, however the remaining rip-rap within the piping could not be reached for removal. Arcadis will attempt to remove the remaining rip-rap during pipe jetting activities that will be performed later in the year.

- Crushed stone was placed in certain areas around the perimeter of the treatment building and access roads to fill low-lying areas prone to ponding.
- Mowing was performed in select areas of the cap for wild parsnip control.
- Dewatering activities for Unnamed Pond were initiated in accordance with the proposed dewatering memo dated June 6, 2017. However, due to the volume of water in the pond, and with approval from NYSDEC, the water was pumped to the Treatment Cell 1 drying bed instead of being directed through the treatment system. Dewatering was later suspended due to persistent rain events and will be resumed in July and/or August 2017;
- The pump in extraction well EW-4 was removed, cleaned, and replaced on June 26, 2017 due to a reduction in flow.

System Optimization

Arcadis is currently in the process of upgrading the treatment system as described in the Fort Edward WA 2015 Work Scope, and as outlined in the Remedial System Optimization (HRP, 2015). The first and second phases of upgrades have been completed. These elements were summarized in the previous Monthly Reports (Arcadis 2016 and 2017), respectively. The third phase of remedial system optimization upgrades completed in June 2017 included the following:

- An air agitation line was installed in the sludge thickener tank to dislodge sludge that routinely adheres to the sidewall of the tank.
- The flocculant dose was increased in late June to respond to increased iron concentrations in the May Influent sample.

System Sampling

The monthly samples were collected on June 28, 2017 from the following locations:

- Treatment System Influent (i.e. combined flow from extraction wells EW-1, EW-2, EW-3, and EW-4);
- Clarifier Catch Tank discharge;
- Cell 3 (i.e. treatment cell discharge into the Cell 2/3 bypass pipe);
- Cell 2 (i.e. treatment cell discharge into the effluent collection chamber); and
- Polishing Pond Effluent.

Extraction wells EW-1, EW-2, EW-3, and EW-4 were not sampled this month as they will be sampled in July 2017 as part of the annual monitoring event. Moving forward, the extraction wells will be sampled on a quarterly basis.

The monthly routine samples were submitted to Con-Test Analytical for analysis of volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), metals, total dissolved solids (TDS), and total suspended solids (TSS).

The analytical results are discussed in the sections below and have been summarized in Table 1. The laboratory analytical data will be submitted to NYSDEC's EIMS Administrator in the required EQuIS EDD format.

Analytical Results

VOCs

As shown in Table 1, VOCs were detected in the Influent and Clarifier Catch Tank discharge at concentrations that exceeded the NYSDEC Class GA Groundwater Standards. The Influent sample contained one VOC and the Clarifier Catch tank discharge contained two VOCs at concentrations greater than the respective NYSDEC Standards. The sample collected from the Influent contained vinyl chloride at 3.0 micrograms per liter (µg/L). The Clarifier Catch sample concentrations of cis-1,2-dichloroethylene and vinyl chloride were 8.8 µg/L and 7.6 µg/L, respectively. Table 1 shows that VOCs were detected at estimated concentrations and did not exceed NYSDEC Standards in the treatment cell samples (Cell 2 and Cell 3). As shown in Table 1, no VOCs were detected at concentrations greater than the respective quantitation limits in the Effluent sample from the Polishing Pond.

PCBs

PCB-1016 was the only PCB Aroclor detected in the samples collected from Influent, Clarifier Catch Tank, and Cell 3 bypass at concentrations greater than the NYSDEC Class GA Groundwater Standard. PCBs were not detected in the effluent collection chamber sample at Cell 2 or the Polishing Pond Effluent sample during the June 2017 sampling event (Table 1). During monthly sampling events since July 2016, PCB Aroclor 1221, 1232, or 1242 have generally been detected in the Influent or Clarifier Catch Tank samples. However, the concentration of Aroclor 1016 in the June 2017 sample from the Influent (80 µg/L) is significantly greater than these previous results.

Metals

Aluminum was detected at 3.0 milligrams per liter (mg/L) in the Cell 3 sample, which is greater than the respective NYSDEC Class GA GW Effluent Limitation. Iron and manganese were detected at all the sample locations at concentrations greater than the corresponding NYSDEC Class GA Groundwater Standard and Effluent Limitation of 0.3 mg/L and 0.6 mg/L, respectively. The highest concentration of iron was detected in the sample from the Influent (39 mg/L). The highest concentration of manganese was detected in the sample from Cell 3 (1.9 mg/L). As shown in Table 1, the Effluent samples also contained iron and manganese concentrations (4.4 mg/L and 1.7 mg/L, respectively) above the respective NYSDEC Class GA Groundwater Standard and/or Effluent Limitations. Table 1 also shows that the concentration of iron increased by an order of magnitude after being discharged from the treatment plant and flowing through the treatment cells.

TDS and TSS

The concentrations of TDS and TSS continue to fluctuate between sampling events. During the June sampling event, TDS concentrations ranged between 320 mg/L and 620 mg/L; TSS concentrations ranged from non-detect and 80 mg/L. These data are consistent with the results from previous sampling events. Since September 2016, TDS and TSS have ranged from 210 to 1,300 mg/L and 0 to 120 mg/L, respectively.

Next Reporting Period Planned Activities

The following activities are anticipated for July 2017:

- Brush cutting and clearing along the landfill drainage swales, the perimeter of the treatment cells, and near well vaults and other structures;
- Continued dewatering and monitoring of Unnamed Pond;
- Continuation of iron and solids treatment and processing;
- Offsite transport and disposal of containerized Filter Press Filter Sludge; and
- Annual groundwater sampling event and monthly treatment system sampling.

If you have any questions, please do not hesitate to contact me or Jeremy Wyckoff.

Sincerely,

Arcadis CE, Inc.

On behalf of

Andy Vitolins
Associate Vice President

Copies:
Jeremy Wyckoff, Arcadis
File

Enclosures:
Table
1 June Treatment System Analytical Data

Table 1. June Treatment System Analytical Data, Fort Edward Landfill Fort Edward, New York. NYSDEC Site No. 558001

Chemical Name	NYSDEC Class GA GW Standard	NYSDEC Class GA GW Effluent Limitation	INFLUENT 6/28/2017	CLARIFIER CATCH 6/28/2017	CELL 3 6/28/2017	CELL 2 6/28/2017	EFFLUENT 6/28/2017
Volatile Organic Compounds (ug/L)							
ACETONE	50	50	50.0 U	5.6 J	50.0 U	50.0 U	50.0 U
BENZENE	1	1	0.19 J	0.31 J	1.00 U	1.00 U	1.00 U
BROMOCHLOROMETHANE	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
BROMODICHLOROMETHANE	50	50	0.5 U	0.38 J	0.5 U	0.5 U	0.5 U
BROMOFORM	50	50	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
BROMOMETHANE	5	5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-BUTANONE (MEK)	50	50	20 U	3.5 J	20 U	20 U	20 U
CARBON DISULFIDE	60	60	2.5 J	2.5 J	2.6 J	2.7 J	2.6 J
CARBON TETRACHLORIDE	5	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CHLOROBENZENE	5	5	0.23 J	0.32 J	1.00 U	1.00 U	1.00 U
CHLORODIBROMOMETHANE	50	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROETHANE	5	5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
CYCLOHEXANE	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-DIBROMO-3-CHLOROPROPANE	0.04	0.04	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	0.0006	0.0006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROBENZENE	3	3	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-DICHLOROBENZENE	3	3	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-DICHLOROBENZENE	3	3	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
DICHLORODIFLUOROMETHANE	5	5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1-DICHLOROETHANE	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CIS-1,2-DICHLOROETHYLENE	5	5	2.60	**8.80**	3.20	2.30	0.16 J
TRANS-1,2-DICHLOROETHYLENE	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-DICHLOROETHANE	0.6	0.6	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-DICHLOROETHYLENE	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-DICHLOROPROPANE	1	1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CIS-1,3-DICHLOROPROPENE	0.4	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,3-DICHLOROPROPENE	0.4	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-DIOXANE	--	--	50 U	50 U	50 U	50 U	50 U
ETHYLBENZENE	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-HEXANONE	50	50	10 U	10 U	10 U	10 U	10 U
ISOPROPYLBENZENE (CUMENE)	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
METHYL ACETATE	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
METHYL TERT-BUTYL ETHER (MTBE)	10	10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
METHYL CYCLOHEXANE	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
METHYLENE CHLORIDE	5	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	--	--	10 U	10 U	10 U	10 U	10 U
STYRENE	5	930	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1,2-TETRACHLOROETHANE	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TETRACHLOROETHYLENE (PCE)	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TOLUENE	5	5	1.00 U	0.29 J	0.23 J	1.00 U	1.20
1,2,3-TRICHLOROBENZENE	5	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-TRICHLOROBENZENE	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-TRICHLOROETHANE	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-TRICHLOROETHANE	1	1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TRICHLOROETHYLENE (TCE)	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TRICHLOROFLUOROMETHANE	5	5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
VINYL CHLORIDE	2	2	**3.0**	**7.6**	2.0 U	2.0 U	2.0 U
M,P-XYLENES	5	5	2.0 U	0.5 J	2.0 U	2.0 U	2.0 U
O-XYLENE (1,2-DIMETHYLBENZENE)	5	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
XYLENES, TOTAL	5	5	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U

Notes:
Constitutents detected above the NYSDEC Class GA GW Standard are in **bold**.
Constitutents detected above the NYSDEC Class GA GW Effluent Limitation are highlighted in yellow.

Definitions:
NYSDEC Class GA GW Standard - New York State Department of Environmental Conservation Groundwater Standard and Guidance Value.
NYSDEC Class GA GW Effluent Limitation - New York State Department of Environmental Conservation Effluent Limitation.
U - The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
J - The concentration is an approximate value.
mg/L - milligrams per liter
ug/L - micrograms per liter
NS - Not Sampled

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Polychlorinated Biphenyls (ug/L)							
PCB-1016 (AROCLOR 1016)	*	*	**80.00**	**7.90**	**0.44**	0.20 U	0.19 U
PCB-1221 (AROCLOR 1221)	*	*	1.0 U	1.0 U	0.2 U	0.2 U	0.19 U
PCB-1232 (AROCLOR 1232)	*	*	1.0 U	1.0 U	0.2 U	0.2 U	0.19 U
PCB-1242 (AROCLOR 1242)	*	*	1.0 U	1.0 U	0.2 U	0.2 U	0.19 U
PCB-1248 (AROCLOR 1248)	*	*	1.0 U	1.0 U	0.2 U	0.2 U	0.19 U
PCB-1254 (AROCLOR 1254)	*	*	1.0 U	1.0 U	0.2 U	0.2 U	0.19 U
PCB-1260 (AROCLOR 1260)	*	*	1.0 U	1.0 U	0.2 U	0.2 U	0.19 U
PCB-1262 (AROCLOR 1262)	*	*	1.0 U	1.0 U	0.2 U	0.2 U	0.19 U
PCB-1268 (AROCLOR 1268)	*	*	1.0 U	1.0 U	0.2 U	0.2 U	0.19 U
Metals (mg/L)							
ALUMINUM	--	2	0.09	0.35	3.00	0.077	0.27
ANTIMONY	0.003	0.006	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ARSENIC	0.025	0.05	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
BARIUM	1	2	0.080	0.056	0.110	0.067	0.056
BERYLLIUM	0.003	0.003	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
CADMIUM	0.005	0.01	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
CALCIUM	--	--	100	100	120	100	86
CHROMIUM, TOTAL	0.05	0.1	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
COBALT	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
COPPER	0.2	1	0.01 U	0.19	0.01 U	0.01 U	0.01 U
IRON	0.3	0.6	**39.0**	**5.0**	**16.0**	**9.4**	**4.4**
LEAD	0.025	0.05	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
MAGNESIUM	35	35	26	26	26	19	18
MANGANESE	0.3	0.6	**1.8**	**1.8**	**1.9**	**1.5**	**1.7**
MERCURY	0.0007	0.0014	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
NICKEL	0.1	0.2	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
POTASSIUM	--	--	3.5	4.0	2.2	2.0 U	2.0 U
SELENIUM	0.01	0.02	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SILVER	0.05	0.1	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
SODIUM	--	--	180	58	64	51	38
THALLIUM	0.0005	0.0005	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
VANADIUM	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
ZINC	2	5	0.02 U	0.49	0.02 U	0.02 U	0.02 U
Conventional Chemistry (mg/L)							
TOTAL DISSOLVED SOLIDS	--	--	620	480	450	410	320
TOTAL SUSPENDED SOLIDS	--	--	80	5	10	5 U	42

Notes:
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* The NYSDEC Class GA GW Standard and Effluent Limitation for PCBs is 0.09 ug/L.

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