SME
Sevee & Maher Engineers, Inc.

ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

March 14, 2016

Ms. Stacy Ladner
Unit Manager
Division of Oil & Hazardous Waste Facility Regulation
Bureau of Remediation and Waste Management
Maine Department of Environmental Protection
17 State House Station
Augusta ME 04333

Subject: **Fourth Quarter 2015 Groundwater Monitoring Results**
Orrington Remediation Site
Orrington, Maine

Dear Ms. Ladner:

Enclosed for your information is a report of the **fourth quarter 2015** groundwater sampling data for the monitoring performed at the Orrington Remediation Site by Sevee & Maher Engineers, Inc. (SME). The groundwater monitoring was performed using the low flow sampling protocols described in the Work Plan submitted July 8, 2010.

This groundwater monitoring report includes data summary tables, a figure showing the well locations sampled, and field data sheets. Electronic data deliverables (EDDs) including field parameters and laboratory analytical reports will be submitted to MEDEP via email.

The **first quarter 2016** groundwater sampling event at the Site is scheduled for the week of March 14, 2016. If you have any questions please feel free to contact me at 314-281-5947.

Sincerely,

Kathy Zeigler

Kathy Zeigler
Director, Environmental Remediation

Cc: John Beane, DEP
Audrey Snowden, Town Librarian, Town of Orrington
Paul White, Town Manager, Town of Orrington

SME
Sevee & Maher Engineers, Inc.

ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

March 14, 2016

16034
2015Qtr4kz

Kathryn Zeigler
Director, Environmental Remediation
Mallinckrodt US LLC
444 McDonnell Boulevard
Hazelwood, Missouri 63042

Subject: Transmittal of the Fourth Quarter 2015 Groundwater Quality Sampling Results
Orrington Remediation Site, Orrington, Maine

Dear Ms. Zeigler:

Enclosed are the groundwater quality results from the December 2015 fourth quarter sampling event at the Orrington Remediation Site in Orrington, Maine (Site). Groundwater samples were obtained from 24 monitoring wells located in the vicinity of the southwestern portion of the Site (Ferry Road Area), the former Manufacturing Area, Landfill 1 Area, Landfill 3, Landfill 4 and Landfill 5. Monitoring well locations are shown in the attached Figure 1. Low-flow sampling protocols consistent with procedures requested by the Maine Department of Environmental Protection (MEDEP) in September 2010 were utilized to obtain unfiltered groundwater samples. Sevee & Maher Engineers, Inc. (SME) also obtained water samples from two domestic wells (Haseltine and Safian) on Ferry Road that are routinely analyzed as part of the quarterly sampling event. The water samples from the residential properties were obtained using the methods consistent with the previous quarterly sampling events. Two Site monitoring wells, MW-503-O1 and B-309-B1, could not be sampled during the December 2015 round. Monitoring well MW-503-O1 did not contain an adequate volume of groundwater from which to obtain a sample, and the well screen pipe in B-309-B1 was obstructed or damaged. An influent sample from the Landfill 1 Area interim groundwater extraction system was also obtained at the onsite water treatment plant for analysis.

Groundwater quality results are summarized in attached Tables 1 through 7. Alpha Analytical (Alpha) laboratory reports for the December 2015 sampling event are in the attachments to this letter report. Field data sheets completed at each well sampled are also included in the attachments to this transmittal.

4 Blanchard Road, PO Box 85A, Cumberland Center, Maine 04021 • Phone 207.829.5016 • Fax 207.829.5692 • www.smemaine.com

QUALITY CONTROL REVIEW

Case narratives summarizing laboratory quality control (QC) were provided by Alpha in each of their laboratory reports. Analytical results for parameters were quantified to the laboratory's method detection limit (MDL). Concentrations detected between the MDL and the laboratory's reporting limits were qualified by Alpha as estimated ("J") values. The QC data reviewed in the analytical laboratory reports was of acceptable quality for the December 2015 fourth quarter sampling round.

Groundwater analytical results were reviewed to ensure that they were representative of the area sampled using guidelines in the U.S.EPA *National Functional Guidelines* (NFG) *for Superfund Organic Methods*,[1] U.S.EPA *National Functional Guidelines for Inorganic Superfund Data Review* [2] and U.S.EPA *New England Environmental Data Review Supplement*.[3] Method blanks for volatile organic compounds (VOCs), metals and inorganics, laboratory control samples (LCS), matrix spikes (MS), matrix spike duplicates (MSD), laboratory duplicates, and VOC surrogate compound recoveries were evaluated. Except for estimated ("J") concentrations of sodium and manganese reported less than the laboratory's reporting limit that were detected in the method blanks associated with the Interim Extraction System (IES) influent sample, no other VOCs, metals or inorganic parameters were detected in the remaining method blanks. The manganese and sodium detected in the method blanks did not affect the data quality of IES influent sample. Manganese and sodium were both detected at concentrations greater than the laboratory's reporting limit and have been consistently in previous quarterly sampling rounds. Therefore, the manganese and sodium results for the IES influent sample were accepted as reported based on professional judgement, and no data qualification was warranted.

Laboratory spikes of tert-butyl alcohol and chloromethane were reported outside their respective laboratory recovery QC limits in three LCSs, but within the overall method allowances. There were no detections of tert-butyl alcohol or chloromethane in the associated groundwater samples. Therefore, the data quality of the groundwater samples was not affected by the biased high spiked recoveries in the LCSs. An MS recovery of sodium associated with the IES influent sample was outside the laboratory's acceptance criteria. However, the sodium concentration detected in the influent sample was greater than

---

[1] U.S.EPA, 2014. *National Functional Guidelines for Superfund Organic Methods Data Review*; Office of Superfund Remediation and Technology Innovation, U.S.EPA-540-R-014-002; Washington, DC; August 2014.

[2] U.S.EPA, 2014. *National Functional Guidelines for Inorganic Superfund Data Review*; Office of Superfund Remediation and Technology Innovation, U.S.EPA-540-R-013-001; Washington, DC; August 2014.

[3] U.S.EPA New England, 2013; *Environmental Data Review Supplement*, Quality Assurance Unit, U.S.EPA New England; April 22, 2013.

four times the concentration of the spike added to the influent sample. Under this scenario, the sample result was not qualified consistent with the NFG for inorganic methods.

Surrogate recoveries in groundwater samples analyzed for VOCs were within the laboratory's QC acceptance limits, except for the IES influent sample. The influent sample was diluted so it could be quantitated within the calibrated range of the instrumentation. As a result, the 1,1,1,2-tetrachloroethane surrogate for the EPA 8011 analysis was diluted to below the acceptance criteria.

The sampling process and field and sample transport conditions were evaluated in laboratory-supplied trip blanks, and in field blanks and in duplicate groundwater samples that were obtained in the field during the December 2015 sampling round. Toluene was detected in one trip blank (QCTB-58J in Table 7). Two groundwater samples associated with trip blank QCTB-58J: MW-410-B1 and the duplicate from MW-510-O1, had detectable concentrations of toluene estimated between the laboratory's MDL and reporting limit. The toluene results for MW-410-B1 and the duplicate MW-510-O1 samples were qualified as not detected at the value of the reporting limit. Three field blanks associated with the former Manufacturing Area, Landfill 1 Area, and Landfill 5 were prepared with laboratory-supplied deionized water and analyzed for the parameters tested in these areas. The field blank prepared in the Landfill 1 Area contained an estimated concentration of chloride less than the reporting limit. Concentrations of chloride detected in the associated groundwater samples were greater than the laboratory's reporting limit by more than three orders of magnitude, which is typical over the sampling history of these monitoring wells. The chloride results in the Landfill 1 Area were accepted as reported without qualification. Acetone and chloroform were detected at concentrations greater than the reporting limit in a field blank prepared near Landfill 5. No acetone was detected in the associated groundwater samples; therefore, no qualification to the laboratory results was required. Chloroform was detected in groundwater samples from B-306-B1 and B-306-B2 at concentrations consistent with their historical record. Therefore, the chloroform results from B-306-B1 and B-306-B2 were accepted as reported based on professional judgement. The absence of acetone and chloroform in the method blank suggests that the field blank sample from Landfill 5 may have been exposed to contamination related to the storage or transport of the samples from the Site to the analytical laboratory.

Sampling and analytical precision was evaluated in five duplicate groundwater sample pairs submitted for laboratory analysis. Relative percent differences (RPDs) were calculated in the duplicate sample pairs for detections of organic constituents that were equal to or greater than twice the sample quantitation limit, and for inorganic parameters equal to or exceeding

five times their sample quantitation limit. The duplicate groundwater sample pairs met acceptable RPD criteria of less than 30 percent for the detected parameters indicating satisfactory precision for the December 2015 fourth quarter sampling event.

LABORATORY ANALYTICAL RESULTS

Mercury concentrations greater than the laboratory reporting limit (0.0002 milligrams per liter [mg/L]) were detected in 12 of the 24 monitoring wells sampled at the Site during the December 2015 sampling round, a distribution typical for quarterly monitoring. The Site's Media Protection Standard (MPS) for mercury (0.002 mg/L) was exceeded in eight of the monitoring wells where the concentrations ranged between 0.0049 and 0.2758 mg/L. The remaining detections of mercury were less than the MPS, and varied between the Method Detection Limit (MDL) of 0.00006 mg/L to 0.00076 mg/L. Total mercury concentrations decreased in seven monitoring well locations between the third quarter and fourth quarter of 2015.

Mercury concentrations in the groundwater beneath the Landfill 1 Area continued to be highest in monitoring well MW-501-O1 (0.2758 mg/L) near the Lined Process Lagoon, and at the downgradient margin of the Landfill 1 Area in B-326-03 (0.1531 mg/L). Landfill 1 Area interim extraction wells EW-1 and MW-601 have captured groundwater with concentrations of mercury similar to B-326-03 based on a review of the 2015 monthly water quality results obtained from the IES.

Detections of mercury in the former Manufacturing Area that exceeded the MPS were limited to monitoring well MW-510-O1 (0.00584 mg/L), located downgradient from the former salt storage pad. The fourth quarter 2015 result was typical for the well, which normally has higher mercury concentrations than nearby monitoring wells MW-502-O1 and MW-503-O1. The concentration of mercury detected in MW-502-O1 (0.00062 mg/L) was less than the MPS, as it has been over more than the last five years of monitoring. Groundwater could not be obtained from MW-503-O1 during the fourth quarter 2015 sampling round because of a lack of a sufficient amount of water in the well for a representative sample. However, a review of the last five years of monitoring of MW-503-O1 indicated mercury concentrations typically less than the MPS.

The ridge area north of the former Manufacturing Area encompasses Landfills 3, 4 and 5. Ten wells were monitored under the current sampling program to evaluate the water quality associated with the three landfills. Mercury was detected beneath Landfill 4 in MW-506-B1 (0.0494 mg/L) at a concentration exceeding the MPS. This concentration is within the range

of mercury detections (0.0111 to 0.0707 mg/L) in the 2015 quarterly monitoring. Groundwater flow traveling downgradient from Landfill 3 and Landfill 4 contained less than MPS concentrations of mercury in monitoring wells MW-410-B1 (0.0006 mg/L) and P-2A (0.00076 mg/L). Detectable mercury in the northerly flowing groundwater downgradient of Landfill 3 was also less than the MPS in P-13 (0.0003 mg/L). Well B-309-B1, located north of Landfill 4, had an obstruction in the well screen that prevented a groundwater sample from being obtained. During excavation activities in the landfill ridge area, well B-309-B1 was partially abandoned and the area of B-309-B1 was inaccessible at the time of this reporting. An assessment will be made of the condition of B-309-B1 when access to this area is restored.

The laboratory reported a detection of mercury in B-306-B2, one of the six monitoring wells sampled around Landfill 5 during the fourth quarter December 2015 round. However, the detection (0.00006 mg/L) at a value equivalent to the laboratory's MDL was qualified as estimated ("J"), and is over 30 times less than the Site MPS for mercury. A review of the available historical record identified a very limited number of sporadic detections of mercury in B-306-B1 at concentrations less than the MPS. Detectable mercury was not found in the five other Landfill 5 monitoring wells during the fourth quarter December 2015 sampling round. Mercury was also not detected in the southwestern portion of the Site between the former Manufacturing Area and Ferry Road or in the two residential wells sample on Ferry Road, which is consistent with previous results for the water quality at these locations.

Chloropicrin was analyzed in groundwater from former Manufacturing Area monitoring wells MW-502-O1 and MW-510-O1, and in MW-501-O1 near the downgradient side of the Lined Process Lagoon in the Landfill 1 Area. Detectable concentrations at the laboratory reporting limit of 0.1 micrograms per liter (µg/L) were not present in these three wells during the December 2015 sampling round. Over the past several years of monitoring, concentrations of chloropicrin less than the MPS of 30 µg/L were intermittently detected in MW-510-O1, and seldom in MW-502-O1 and MW-501-O1.

Groundwater samples were obtained from monitoring wells in the former Manufacturing Area and around Landfills 3, 4 and 5 for analysis of VOCs. One or more of nine different VOCs were detected among 11 Site monitoring wells sampled in the quarterly monitoring program. Chloroform and carbon tetrachloride were detected in nine and six monitoring wells, respectively, followed by trichloroethene (TCE) in four monitoring wells. Detections of dichlorodifluoromethane, 1,1-dichloroethene, toluene, carbon disulfide, 1,1,1-trichloroethane and tetrachloroethene occurred in four or fewer monitoring wells. Exceedance of the Site MPS was limited to carbon tetrachloride detections in monitoring wells MW-506-B1, MW-410-B1, and P-2A. Carbon tetrachloride concentrations decreased in a downgradient

direction from MW-506-B1 (11 µg/L), which is screened beneath the middle of Landfill 4, to MW-410-B1 (7.8 µg/L) and P-2A (2.4 µg/L) downgradient of Landfills 3 and 4. The MPS for carbon tetrachloride is 3 µg/L.

An influent sample of groundwater from the combined flow from the Landfill 1 Area IES (MW-601, EW-1, EW-2, EW-3, and EW-4) was obtained at the Site treatment plant and submitted to the laboratory for analysis of a suite of parameters. Analytical results for the influent sample are summarized in Table 6. Mercury, VOCs, and chloropicrin concentrations in the influent sample were comparable with the historical ranges for these groundwater quality parameters detected in the Landfill 1 Area and in recent influent testing.

GROUNDWATER QUALITY SUMMARY

A comparison of the December 2015 fourth quarter sample results to the Site MPS for mercury and VOCs indicated the following groundwater quality:

- Landfill 1 Area – The MPS for mercury (0.002 mg/L) was exceeded in monitoring wells B-326-O2, B-326-O3, MW-402-O1, MW-501-O1, MW-512-O1 and MW-513-O1 (0.0049 to 0.2758 mg/L).

- Former Manufacturing Area – Mercury was detected in MW-510-O1 (0.00584 mg/L), a concentration similar to the August 2015 third quarter result. VOC detections did not exceed the MPS.

- Landfills 3 and 4 – Mercury was detected at concentrations greater than the MPS in the groundwater obtained from MW-506-B1 (0.0494 mg/L) at Landfill 4, but was less than the MPS in downgradient monitoring wells MW-410-B1 (0.0006 mg/L) and P-2A (0.00076) near Landfills 3 and 4. Carbon tetrachloride was detected in concentrations greater than the MPS of 3 µg/L in MW-506-B1 (11 µg/L), MW-410-B1 (7.8 µg/L) and P-2A (5.2 µg/L). These results were consistent with previous quarterly sampling rounds at the Site.

- Landfill 5 – No detections of mercury were found in groundwater from the Landfill 5 wells sampled with the exception of a trace concentration (0.00006 mg/L) in MW-307-B2, a value equal to the MDL that was qualified as estimated ("J") by the analytical laboratory. Detectable VOC concentrations were less than the MPS or Maine MEG.

- Ferry Road Area and Residential Wells – Mercury was not detected in the southwestern part of the Site or in the two residential wells sampled on Ferry Road.

WATER LEVEL MONITORING

Between the third quarter August 2015 sampling round and the fourth quarter December 2015, water levels in the wells monitored increased an average of about 1.8 feet across the Site. Greater increases in water level were associated with the monitoring wells located in the landfill ridge area, where the groundwater elevations averaged more than 2.5 feet higher than the previous quarter in August 2015. Less fluctuation in groundwater elevation between the August and December 2015 sampling rounds was found in the Landfill 1 Area wells, where water levels are affected by the time of day that the measurement is obtained during the daily tide cycle in the nearby Penobscot River. The majority of wells monitored had a seasonal water level high in the December sampling round and a low in September of 2015, a pattern consistent with the historical groundwater monitoring history of the Site.

The water levels in monitoring wells along the landfill ridge were lower in December 2015 compared to December 2014, averaging about a 1.4 feet difference. In contrast, water level elevations in the former Manufacturing Area and the southern portion of the Site exhibited less consistency; i.e., about half of the wells had higher groundwater elevations and the other half lower in a comparison of December 2014 to 2015. The groundwater elevation difference in the Landfill 1 Area was within the range of the daily tidally-induced fluctuation measured in the monitoring wells near the Penobscot River.

During the four months prior to the December 2015 sampling round, three months had below normal precipitation based on a review of data obtained from the on-site weather station and the Bangor International Airport station, located about 4 miles north of the Orrington Remediation Site.[4] However, an above normal rainfall total in September 2015 resulted in the Site receiving over 15 inches of rainfall since the third quarter August 2015 sampling round. Sufficient moisture accumulated by October 2015 to end the abnormally dry conditions that characterized the region since May 2015 (U.S. Drought Monitor.)[5] Together with the decreasing autumn temperatures, favorable groundwater recharge contributed to higher groundwater levels measured across the Site in December 2015.

SCHEDULE FOR FUTURE MONITORING

The first quarter 2016 groundwater sampling event at the Orrington Remediation Site is scheduled to start on March 14, 2016. In addition to the routine monitoring, groundwater

---

[4] *Record of Climatological Observations, Bangor International Airport, ME.* National Climatic Data Center Federal Building, Asheville, North Carolina, (http://www.ncdc.noaa.gov), accessed February 26, 2016.
[5] *U.S. Drought Monitor*, (http://droughtmonitor.unl.edu), accessed February 26, 2016.

samples will also be obtained from the five interim groundwater extraction wells that are operating in the Landfill 1 Area. At the request of MEDEP, based on conditional approval of the Ferry Road Current Conditions Work Plan, groundwater sampling procedures in the Ferry Road Area will be modified for the March 2016 round to include a low-flow purge of a full well screen volume not to exceed a rate of 200 milliliters per minute with few exceptions. MEDEP has been notified about the sampling schedule. If you have any questions concerning the December 2015 groundwater quality results, please do not hesitate to contact Bill Metzger or me.

Very truly yours,

SEVEE & MAHER ENGINEERS, INC.

for John Sevee

John E. Sevee, P.E., C.G.

Attachments:

- Figure 1 – Well Locations
- Groundwater Monitoring Results Summary - Tables 1 through 7
- Data Tables
- Relative Percent Difference for Duplicate Samples
- Field Data Sheets

WELL LOCATIONS
FIGURE 1

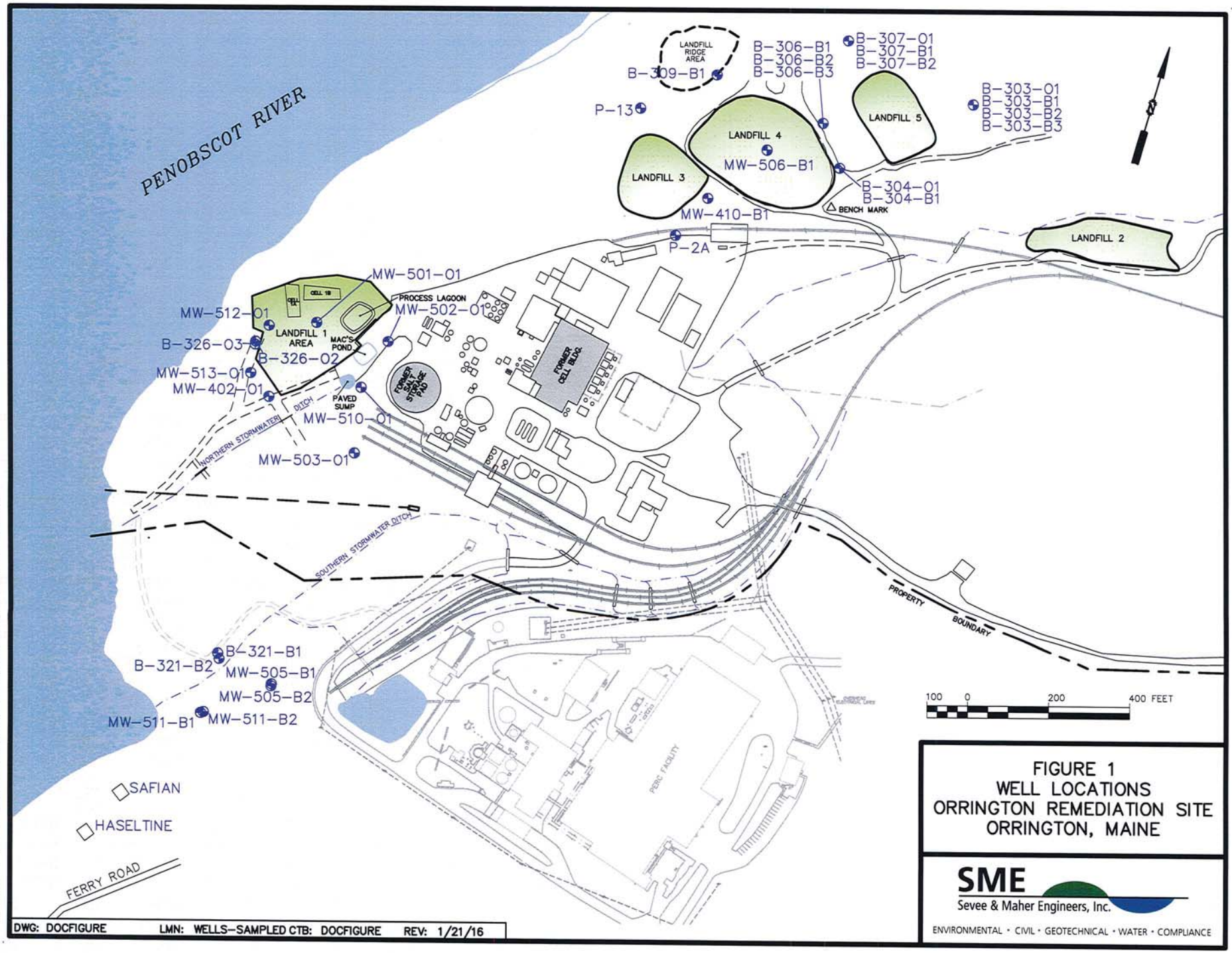

FIGURE 1
WELL LOCATIONS
ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

\\Nserver\cfs\Preli Flaherty\HoltraChem\Acad\Figures\DOCFIGURE.dwg, 1/21/2016 11:34:32 AM, paf

GROUNDWATER MONITORING RESULTS SUMMARY
TABLES 1 THROUGH 7

TABLE 1
FOURTH QUARTER DECEMBER 2015
GROUNDWATER MONITORING RESULTS

Ferry Road Monitoring Well Locations									
Parameters	**Haseltine**	**(DUP-2) Haseltine**	**Safian**	**B-321-B1**	**B-321-B2**	**MW-505-B1**	**MW-505-B2**	**MW-511-B1**	**MW-511-B2**
	12/07/15	**12/07/15**	**12/07/15**	**12/10/15**	**12/10/15**	**12/09/15**	**12/09/15**	**12/09/15**	**12/09/15**
Mercury (mg/L)	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chloride (mg/L)	1,600	1,600	860	2,400	760	1,100	910	1,100	1,100
Specific Conductance (µS/cm @25°C)	4,453	NA	2,671	5,561	2,933	7,453	6,417	7,575	7,573
pH (Standard Units)	8.04	NA	7.9	7.07	7.36	6.8	6.81	6.77	6.81
Temperature (Degrees Celcius)	11	NA	12	8.5	8.5	8.2	8	6.4	6.6
Salinity (g/L)	2.45	NA	1.42	3.1	1.57	4.24	3.61	0.01	4.31
Turbidity (field) (NTU)	1.3	NA	2.9	5.5	7.9	1.2	0.7	2.2	2.3
Dissolved Oxygen (mg/L)	6.8	NA	2.2	0.2	2.0	1.8	0.7	0.7	0.9
VOCs									
Acetone (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyltertiarybutylether (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichlorethene (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloropicrin (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA

Qualifiers:

NA = Parameter is not included in routine quarterly monitoring

< = Not detected above the reported sample detection limit

TABLE 2
FOURTH QUARTER DECEMBER 2015
GROUNDWATER MONITORING RESULTS

Former Manufacturing Area Monitoring Well Locations					
Parameters	**MW-502-O1**	**MW-503-O1**	**MW-510-O1**	**(DUP-4) MW-510-O1**	**(FB-1) Field Blank**
	12/8/15	**12/8/15**	**12/8/15**	**12/8/15**	**12/8/15**
Mercury (mg/L)	0.00062	I	0.00584	0.0059	< 0.0002
Specific Conductance (µS/cm @25°C)	7,562	I	44,710	NA	NA
pH (Standard Units)	7.41	I	7.24	NA	NA
Temperature (Degrees Celcius)	9.1	I	8.4	NA	NA
Salinity (g/L)	4.31	I	29.89	NA	NA
Turbidity (field) (NTU)	0.4	I	1.2	NA	NA
Dissolved Oxygen (mg/L)	4.8	I	3.7	NA	NA
VOCs					
Acetone (µg/L)	< 5	I	< 5	< 5	< 5
Chloroform (µg/L)	2.2	I	7.2	7	< 0.75
Carbon Tetrachloride (µg/L)	<0.106	I	1.54	1.34	<0.1
Benzene (µg/L)	< 0.5	I	< 0.5	< 0.5	< 0.5
Toluene (µg/L)	< 0.75	I	< 0.75	0.75 U	< 0.75
Ethylbenzene (µg/L)	< 0.5	I	< 0.5	< 0.5	< 0.5
Carbon Disulfide (µg/L)	< 1	I	< 1	< 1	< 1
o-Xylene (µg/L)	< 1	I	< 1	< 1	< 1
m,p-Xylene (µg/L)	< 1	I	< 1	< 1	< 1
Methyltertiarybutylether (µg/L)	< 1	I	< 1	< 1	< 1
Trichloroethene (µg/L)	< 0.5	I	0.38 J	0.38 J	< 0.5
Naphthalene (µg/L)	< 1	I	< 1	< 1	< 1
1,1-Dichloroethene (µg/L)	< 0.5	I	0.32 J	0.3 J	< 0.5
Dibromochloromethane (µg/L)	< 0.5	I	< 0.5	< 0.5	< 0.5
Tetrachloroethene (µg/L)	< 0.5	I	< 0.5	< 0.5	< 0.5
Bromodichloromethane (µg/L)	< 0.5	I	< 0.5	< 0.5	< 0.5
Bromoform (µg/L)	< 1	I	< 1	< 1	< 1
1,1,1-Trichloroethane (µg/L)	< 0.5	I	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane (µg/L)	< 0.75	I	< 0.75	< 0.75	< 0.75
cis-1,2-Dichlorethene (µg/L)	< 0.5	I	< 0.5	< 0.5	< 0.5
Chloroethane (µg/L)	< 1	I	< 1	< 1	< 1
Chloromethane (µg/L)	< 2	I	< 2	< 2	< 2
Bromomethane (µg/L)	< 1	I	< 1	< 1	< 1
Dichlorodifluoromethane (µg/L)	< 2	I	1.9 J	1.9 J	< 2
Chloropicrin (µg/L)	< 0.106	I	< 0.117	< 0.099	< 0.1

Qualifiers:

I = The sampling location yielded insufficient quantity to obtain a sample

J = Analyte was positively identified/Associated value is an estimate below reporting limit

U = Qualified as not detected at the reporting limit due to presence in the associated trip blank

NA = Parameter is not included in routine quarterly monitoring

< = Not detected above the reported sample detection limit

TABLE 3
FOURTH QUARTER DECEMBER 2015
GROUNDWATER MONITORING RESULTS

Landfill 1 Area Monitoring Well Locations								
Parameters	B-326-O2	(DUP-1) B-326-O2	B-326-O3	MW-402-O1	MW-501-O1	MW-512-O1	MW-513-O1	(FB-3) Field Blank
	12/08/15	12/08/15	12/08/15	12/08/15	12/08/15	12/08/15	12/08/15	12/08/15
Mercury (mg/L)	0.02642	0.02663	0.1531	0.00496	0.2758	0.0089	0.01915	< 0.0002
Chloride (mg/L)	400	380	160	580	NA	170	300	0.055 J
Specific Conductance (µS/cm @25°C)	1,421	NA	836	2,253	1,637	850	1,100	NA
pH (Standard Units)	7.8	NA	7.42	7.29	7.02	7.68	7.88	NA
Temperature (Degrees Celcius)	9.9	NA	9.6	11.3	9.1	9.4	9.7	NA
Salinity (g/L)	0.73	NA	0.42	1.19	0.85	0.43	0.56	NA
Turbidity (field) (NTU)	0.6	NA	0.8	1.2	0.6	0.6	0.5	NA
Dissolved Oxygen (mg/L)	4.9	NA	8.5	9.4	4.1	5.4	1.3	NA
VOCs								
Acetone (µg/L)	NA	NA	NA	NA	< 5	NA	NA	NA
Chloroform (µg/L)	NA	NA	NA	NA	3.8	NA	NA	NA
Carbon Tetrachloride (µg/L)	NA	NA	NA	NA	1.42	NA	NA	NA
Benzene (µg/L)	NA	NA	NA	NA	< 0.5	NA	NA	NA
Toluene (µg/L)	NA	NA	NA	NA	< 0.75	NA	NA	NA
Ethylbenzene (µg/L)	NA	NA	NA	NA	< 0.5	NA	NA	NA
Carbon Disulfide (µg/L)	NA	NA	NA	NA	< 1	NA	NA	NA
o-Xylene (µg/L)	NA	NA	NA	NA	< 1	NA	NA	NA
m,p-Xylene (µg/L)	NA	NA	NA	NA	< 1	NA	NA	NA
Methyltertiarybutylether (µg/L)	NA	NA	NA	NA	< 1	NA	NA	NA
Trichloroethene (µg/L)	NA	NA	NA	NA	4.5	NA	NA	NA
Naphthalene (µg/L)	NA	NA	NA	NA	< 1	NA	NA	NA
1,1-Dichloroethene (µg/L)	NA	NA	NA	NA	< 0.5	NA	NA	NA
Dibromochloromethane (µg/L)	NA	NA	NA	NA	< 0.5	NA	NA	NA
Tetrachloroethene (µg/L)	NA	NA	NA	NA	0.75	NA	NA	NA
Bromodichloromethane (µg/L)	NA	NA	NA	NA	< 0.5	NA	NA	NA
Bromoform (µg/L)	NA	NA	NA	NA	< 1	NA	NA	NA
1,1,1-Trichloroethane (µg/L)	NA	NA	NA	NA	0.32 J	NA	NA	NA
1,1,2-Trichloroethane (µg/L)	NA	NA	NA	NA	< 0.75	NA	NA	NA
cis-1,2-Dichlorethene (µg/L)	NA	NA	NA	NA	< 0.5	NA	NA	NA
Chloroethane (µg/L)	NA	NA	NA	NA	< 1	NA	NA	NA
Chloromethane (µg/L)	NA	NA	NA	NA	< 2	NA	NA	NA
Bromomethane (µg/L)	NA	NA	NA	NA	< 1	NA	NA	NA
Dichlorodifluoromethane (µg/L)	NA	NA	NA	NA	0.53 J	NA	NA	NA
Chloropicrin (µg/L)	NA	NA	NA	NA	< 0.106	NA	NA	NA

Qualifiers:

J = Analyte was positively identified/Associated value is an estimate below reporting limit

NA = Parameter is not included in routine quarterly monitoring

< = Not detected above the reported sample detection limit

TABLE 4
FOURTH QUARTER DECEMBER 2015
GROUNDWATER MONITORING RESULTS

Landfills 3 & 4 Monitoring Well Locations						
Parameters	B-309-B1	MW-410-B1	MW-506-B1	P-2A	(DUP-5) P-2A	P-13
	12/08/15	12/08/15	12/08/15	12/08/15	12/08/15	12/08/15
Mercury (mg/L)	!	0.0006	0.04946	0.00076	0.00075	0.0003
Specific Conductance (µS/cm @25°C)	!	477	1837	461	NA	724
pH (Standard Units)	!	6.67	6.38	6.47	NA	7.84
Temperature (Degrees Celcius)	!	8.1	7.7	9.7	NA	7.4
Salinity (g/L)	!	0.24	0.96	0.23	NA	0.36
Turbidity (field) (NTU)	!	2.3	2.1	1.1	NA	0.4
Dissolved Oxygen (mg/L)	!	4.2	2.6	6	NA	3.5
VOCs						
Acetone (µg/L)	!	< 5	< 5	< 5	< 5	< 5
Chloroform (µg/L)	!	2.9	4.4	1.8	1.8	1.7
Carbon Tetrachloride (µg/L)	!	7.8	11	5.2	5.4	2.4
Benzene (µg/L)	!	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene (µg/L)	!	0.75 U	< 0.75	< 0.75	< 0.75	< 0.75
Ethylbenzene (µg/L)	!	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide (µg/L)	!	< 1	< 1	< 1	< 1	0.77 J
o-Xylene (µg/L)	!	< 1	< 1	< 1	< 1	< 1
m,p-Xylene (µg/L)	!	< 1	< 1	< 1	< 1	< 1
Methyltertiarybutylether (µg/L)	!	< 1	< 1	< 1	< 1	< 1
Trichloroethene (µg/L)	!	< 0.5	0.69	< 0.5	< 0.5	0.32 J
Naphthalene (µg/L)	!	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (µg/L)	!	< 0.5	< 0.5	< 0.5	< 0.5	0.25 J
Dibromochloromethane (µg/L)	!	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene (µg/L)	!	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane (µg/L)	!	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform (µg/L)	!	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (µg/L)	!	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane (µg/L)	!	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
cis-1,2-Dichlorethene (µg/L)	!	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane (µg/L)	!	< 1	< 1	< 1	< 1	< 1
Chloromethane (µg/L)	!	< 2	< 2	< 2	< 2	< 2
Bromomethane (µg/L)	!	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (µg/L)	!	< 2	< 2	< 2	< 2	< 2
Chloropicrin (µg/L)	NA	NA	NA	NA	NA	NA

Qualifiers:

J = Analyte was positively identified/Associated value is an estimate below reporting limit

U = Qualified as not detected at the reporting limit due to presence in the associated trip blank

NA = Parameter is not included in routine quarterly monitoring

< = Not detected above the reported sample detection limit

! = The sampling location was damaged or destroyed.

TABLE 5
FOURTH QUARTER DECEMBER 2015
GROUNDWATER MONITORING RESULTS

Parameters	Landfill 5 Monitoring Well Locations							
	B-303-B1	B-303-B2	(DUP-3) B-303-B2	B-303-B3	B-303-O1	B-306-B1	B-306-B2	(FB-2) Field Blank
	12/07/15	12/07/15	12/07/15	12/07/15	12/07/15	12/08/15	12/08/15	12/08/15
Mercury (mg/L)	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.00006 J	< 0.0002
Chloride (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA
Total Recoverable Phenolics (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Halides (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA
Specific Conductance (µS/cm @25°C)	183	152	NA	156	157	1,967	1,732	NA
pH (Standard Units)	7.68	7.31	NA	7.15	6.94	8.46	7.16	NA
Temperature (Degrees Celcius)	8	8.6	NA	8	6.5	8.3	8.4	NA
Salinity (g/L)	0.09	0.08	NA	0.08	0.08	1.03	0.9	NA
Turbidity (field) (NTU)	0.1	0.1	NA	0.3	1.2	1.6	0.6	NA
Dissolved Oxygen (mg/L)	8.9	9.4	NA	9	7.5	0.2	5.1	NA
Iron (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA
Sodium (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA
VOCs								
Acetone (µg/L)	< 5	< 5	< 5	< 5	< 5	< 5	< 5	8
Chloroform (µg/L)	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	1.5	0.56 J	5.2
Carbon Tetrachloride (µg/L)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzene (µg/L)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene (µg/L)	< 0.75	0.29 J	< 0.75	< 0.75	0.16 J	< 0.75	< 0.75	< 0.75
Ethylbenzene (µg/L)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Disulfide (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
o-Xylene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
m,p-Xylene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Methyltertiarybutylether (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (µg/L)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (µg/L)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane (µg/L)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene (µg/L)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane (µg/L)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (µg/L)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane (µg/L)	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
cis-1,2-Dichlorethene (µg/L)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane (µg/L)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Bromomethane (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (µg/L)	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Chloropicrin (µg/L)	NA	NA	NA	NA	NA	NA	NA	NA

Abbreviations:

J = Analyte was positively identified/Associated value is an estimate below reporting limit

NA = Parameter is not included in routine quarterly monitoring

< = Not detected above the reported sample detection limit

TABLE 6
FOURTH QUARTER DECEMBER 2015
GROUNDWATER MONITORING RESULTS

Groundwater Treatment Plant		
Parameters	**IES Influent [1]**	
	12/07/15	**12/21/15**
Mercury (mg/L)	0.03621	--
Chloride (mg/L)	340	--
Sulfate (mg/L)	36	--
Alkalinity (mg/L as $CaCO_3$)	146	--
Specific Conductance (µS/cm @25°C)	1,267	1,459
pH (Standard Units)	8.00	7.61
Temperature (Degrees Celcius)	11.4	12.7
Salinity (g/L)	0.65	0.75
Turbidity (field) (NTU)	0.7	3.7
Dissolved Oxygen (mg/L)	5.2	6.2
Iron (mg/L)	0.0302 J	--
Manganese (mg/L)	0.0604	--
Sodium (mg/L)	218	--
VOCs		--
Acetone (µg/L)	< 20	--
Chloroform (µg/L)	1.4 J	--
Carbon Tetrachloride (µg/L)	< 2	--
Benzene (µg/L)	< 2	--
Toluene (µg/L)	< 3	--
Ethylbenzene (µg/L)	< 2	--
Carbon Disulfide (µg/L)	1.3 J	--
o-Xylene (µg/L)	< 4	--
m,p-Xylene (µg/L)	< 4	--
Methyltertiarybutylether (µg/L)	< 4	--
Trichloroethene (µg/L)	< 2	--
Naphthalene (µg/L)	< 4	--
1,1-Dichloroethene (µg/L)	< 2	--
Dibromochloromethane (µg/L)	< 2	--
Tetrachloroethene (µg/L)	< 2	--
Bromodichloromethane (µg/L)	< 2	--
Bromoform (µg/L)	< 4	--
1,1,1-Trichloroethane (µg/L)	< 2	--
1,1,2-Trichloroethane (µg/L)	< 3	--
cis-1,2-Dichlorethene (µg/L)	< 2	--
Chloroethane (µg/L)	< 4	--
Chloromethane (µg/L)	< 8	--
Bromomethane (µg/L)	11	--
Dichlorodifluoromethane (µg/L)	< 8	--
Chloropicrin (µg/L)	--	3,970

Note:

1. Influent represents combined flow from the five Landfill 1 Area Interim Extraction System (IES) wells

Abbreviations:

J = Analyte was positively identified/Associated value is an estimate below reporting limit

< = Not detected above the reported sample detection limit

TABLE 7
FOURTH QUARTER DECEMBER 2015
GROUNDWATER MONITORING RESULTS

Trip Blanks				
Parameters	**QCBT (58I)**	**QCBT (87D)**	**QCBT (58J)**	**QCBT (8BC)**
	12/07/15	**12/07/15**	**12/08/15**	**12/21/15**
VOCs				
Acetone (µg/L)	< 5	< 5	< 5	NA
Chloroform (µg/L)	< 0.75	< 0.75	< 0.75	NA
Carbon Tetrachloride (µg/L)	< 0.5	< 0.5	< 0.103	< 0.105
Benzene (µg/L)	< 0.5	< 0.5	< 0.5	NA
Toluene (µg/L)	< 0.75	< 0.75	0.23 J	NA
Ethylbenzene (µg/L)	< 0.5	< 0.5	< 0.5	NA
Carbon Disulfide (µg/L)	< 1	< 1	< 1	NA
o-Xylene (µg/L)	< 1	< 1	< 1	NA
m,p-Xylene (µg/L)	< 1	< 1	< 1	NA
Methyltertiarybutylether (µg/L)	< 1	< 1	< 1	NA
Trichloroethene (µg/L)	< 0.5	< 0.5	< 0.5	NA
Naphthalene (µg/L)	< 1	< 1	< 1	NA
1,1-Dichloroethene (µg/L)	< 0.5	< 0.5	< 0.5	NA
Dibromochloromethane (µg/L)	< 0.5	< 0.5	< 0.5	NA
Tetrachloroethene (µg/L)	< 0.5	< 0.5	< 0.5	NA
Bromodichloromethane (µg/L)	< 0.5	< 0.5	< 0.5	NA
Bromoform (µg/L)	< 1	< 1	< 1	NA
1,1,1-Trichloroethane (µg/L)	< 0.5	< 0.5	< 0.5	NA
1,1,2-Trichloroethane (µg/L)	< 0.75	< 0.75	< 0.75	NA
cis-1,2-Dichlorethene (µg/L)	< 0.5	< 0.5	< 0.5	NA
Chloroethane (µg/L)	< 1	< 1	< 1	NA
Chloromethane (µg/L)	< 2	< 2	< 2	NA
Bromomethane (µg/L)	< 1	< 1	< 1	NA
Dichlorodifluoromethane (µg/L)	< 2	< 2	< 2	NA
Chloropicrin - SW8011M (µg/L)	NA	NA	< 0.103	< 0.105

Abbreviations:

J = Analyte was positively identified/Associated value is an estimate below reporting limit

NA = Parameter is not included in routine quarterly monitoring

< = Not detected above the reported sample detection limit