

May 12, 2015

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

Dear Ms. Ladner:

Enclosed for your information is a report of the **first 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, field data sheets, and laboratory analytical reports. An electronic data deliverable (EDD) including field parameters is also included.

The **second quarter 2015** groundwater sampling event at the Site is scheduled for the week of June 8, 2015. If you have any questions please feel free to contact me at 314-281-5947.

Sincerely,



Kathy Zeigler  
Director, Environmental Remediation

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

May 11, 2015

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

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

Dear Ms. Zeigler:

Enclosed are the groundwater quality results from the March 2015 first quarter sampling event at the Orrington Remediation Site in Orrington, Maine (Site). Groundwater samples were obtained from 26 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. The locations of the wells are identified 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 the domestic water pressure tank inside two residences (Haseltine and Safian) on Ferry Road that are routinely tested during the quarterly sampling events. The water samples from the residential property were obtained using the methods consistent with the previous quarterly sampling events. The lack of water in five shallow Site monitoring wells and a frozen upper portion of the water column in another well precluded groundwater samples from being obtained at their locations.

Groundwater quality results are summarized in attached Tables 1 through 8. Katahdin Analytical Services (Katahdin) laboratory reports for the March 2015 sampling event are in the attachments to this letter. SME field data sheets completed at each well sampled are also included in the attachments to the transmittal.

#### **QUALITY CONTROL REVIEW**

A technical narrative summarizing the laboratory quality control (QC) for the organics analysis was provided by Katahdin for each of their analytical report deliverables. There were no

significant protocol deviations noted by Katahdin for the water samples analyzed for the March 2015 sampling event. Katahdin evaluated the groundwater analytical results to their Practical Quantitation Limit (PQL). Parameters not detected above the specified PQL were flagged by Katahdin with a "U" data qualifier on the laboratory analytical reports. Groundwater from the semiannual detection monitoring program associated with Landfill 5 was analyzed for several parameters, including total organic halides (TOX). Detectable concentrations of TOX between the reporting limit and the method detection limit (MDL) were qualified as estimated and the result annotated with a "J" flag in the laboratory reports.

A review of the QC data indicated acceptable data quality for the March 2015 first quarter groundwater laboratory results. Method and preparation blanks, laboratory control samples (LCS), laboratory duplicates, matrix spikes (MS), matrix spike duplicates (MSD), and surrogate compound recoveries for the laboratory analyses were evaluated. Except for trace concentrations (i.e., less than the PQL) of iron and sodium detected in the laboratory preparation blanks, no other method or preparation blanks contained volatile, metal or inorganic parameters. The iron and sodium detections in the preparation blanks were of no consequence: (1) iron was not detected in the groundwater samples, and (2) detectable sodium concentrations in the groundwater samples sufficiently exceeded the blank action level that no data qualification was warranted.

Four LCS spiked volatile organic compounds (VOCs) were outside their respective recovery QC limits. Only one of these VOCs, carbon disulfide, was detected in the influent groundwater sample associated with the interim extraction wells. The concentration of carbon disulfide in the sample was qualified as estimated because of a potential high bias (Table 7) in the LCS recovery. Surrogate recoveries for VOCs were within the QC acceptance limits for analytical Method SW846 8260B, along with the surrogates for the chloropicrin analysis. MS/MSDs and laboratory duplicates were also within their QC acceptance limits.

The sampling process and field and sample transport conditions were evaluated in laboratory-supplied trip blanks, and in field blanks and duplicate groundwater samples that were obtained in the field during the sampling round. VOCs were not detected in any of the trip blanks (Table 8). 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. No parameters were detected in the field blanks.

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 inorganics equal to or exceeding five times their sample quantitation limit. Parameters detected in the duplicate groundwater sample pairs met the acceptable RPD criteria of less than 30 percent, except for TOX in the B-304-B1



duplicate pair from Landfill 5. Four replicate samples for TOX were obtained from each monitoring well under the Landfill 5 detection monitoring program consistent with 40 CFR §265.93. The replicates from the TOX duplicate sample pair were averaged, and a RPD of 38 percent was calculated. Therefore, the averaged TOX concentrations in the duplicate pair were qualified as an estimated (J) value consistent with U.S.EPA Region 1 guidelines for reviewing environmental data.<sup>1</sup> Overall, parameter results for the field duplicate samples exhibited satisfactory precision for the March 2015 first sampling event.

## **LABORATORY ANALYTICAL RESULTS**

Mercury was detected in 11 of the 26 monitoring wells sampled at the Orrington Remediation Site during the March 2015 sampling round, consistent with the groundwater quality of the previous quarterly sampling events. Concentrations of mercury ranged from 0.00068 to 0.655 milligrams per liter (mg/L) in these wells. The Site's Media Protection Standard (MPS) for mercury (0.002 mg/L) was exceeded in eight monitoring wells. The highest mercury concentration in the groundwater beneath the Landfill 1 Area continues to be detected in monitoring well MW-501-O1 near the former process lagoon, and at the downgradient margin of the Landfill 1 Area in B-326-03. Two of the newer Landfill 1 Area interim extraction wells in the vicinity of B-326-03, which have been operational since January 2015, along with older extraction well MW-601, captured groundwater with mercury at concentrations in the order of that detected in B-326-03.

Monitoring well MW-510-O1 in the former Manufacturing Area downgradient from the former salt storage pad contained mercury (0.0129 mg/L) at a concentration greater than the MPS, which is typical over its historical record. The mercury concentration in MW-502-O1 was less than the MPS, and has been since about 2007. A sample could not be obtained from monitoring well MW-503-O1 in the March 2015 sampling round because of an insufficient amount of groundwater in the well. Mercury concentrations in MW-503-O1, which is located in the southern portion of the former Manufacturing Area, are usually less than the MPS when samples can be obtained from the well.

Landfills 3, 4 and 5 are located along the landfill ridge to the northeast of the Landfill 1 Area and north of the former Manufacturing Area. The mercury concentration beneath Landfill 4 in MW-506-B1 exceeded the MPS in the March 2015 sampling round, which is typical over the well's historical record of sampling. Mercury concentrations decrease to less than the MPS as groundwater moves southeasterly downgradient of Landfills 3 and 4 by monitoring well MW-410-B1 and P-2A. Mercury was not detected in groundwater samples obtained (1) to the north of Landfills 3 and 4 (B-309-B1 and P-13), (2) around Landfill 5, or (3) in the

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<sup>1</sup> *Environmental Data Review Supplement*, Quality Assurance Unit, U.S.EPA New England; April 22, 2013.



southwestern portion of the Site between the former Manufacturing Area and Ferry Road. The absence of mercury detections is consistent with the history of groundwater monitoring results in these areas. Water samples obtained from the two residential wells on Ferry Road also did not contain detectable mercury, which is typical for the water quality of these two properties.

Chloropicrin was tested for in groundwater from MW-501-O1 near the downgradient side of the former lined process lagoon in the Landfill 1 Area, and from MW-502-O1 and MW-510-O1 in the former Manufacturing Area. Detectable concentrations of chloropicrin were not present in MW-501-O1 or MW-502-O1, which is consistent with the results from previous quarterly sampling rounds. During the March 2015 quarterly sampling round, chloropicrin was detected in MW-510-O1 and its duplicate sample at concentrations of 14 and 18 micrograms per liter ( $\mu\text{g/L}$ ), respectively. These concentrations were less than the chloropicrin MPS of 30  $\mu\text{g/L}$ . Intermittent detections of chloropicrin in MW-510-O1 have occurred in the past, with the last MPS exceedance reported in March 2011.

Groundwater samples were obtained from monitoring wells in the former Manufacturing Area and around Landfills 3, 4 and 5 for analysis of VOCs by U.S.EPA Method 8260B. Four different organic compounds were detected during the March 2015 sampling round; i.e., carbon tetrachloride, chloroform, trichloroethene and dichlorodifluoromethane, which were distributed among eight monitoring wells. Consistent with previous monitoring results, carbon tetrachloride exceeded its MPS of 3  $\mu\text{g/L}$  in groundwater from MW-506-B1 (8.7  $\mu\text{g/L}$ ), screened beneath the middle of Landfill 4, and in MW-410-B1 (40  $\mu\text{g/L}$ ) and P-2A (10  $\mu\text{g/L}$ ) downgradient of Landfills 3 and 4. Detectable concentrations of chloroform, trichloroethene and dichlorodifluoromethane were less than their MPS, or the Maine Maximum Exposure Guideline (MEG) if an MPS did not exist for the compound.

The March 2015 sampling round at Landfill 5 included semiannual detection monitoring for sodium, chloride, sulfate, iron, manganese, total recoverable phenolics, TOC and TOX in wells B-304-B1, B-307-B1 and B-307-B2. Three shallow wells, i.e., B-304-O1, B-306-B3 and B-307-O1, were dry and a groundwater sample could not be obtained from these three wells.

Detectable sodium concentrations in groundwater around Landfill 5 ranged from 8 to 80 mg/L, exceeding the Maine MEG of 20 mg/L in B-304-B1 and B-307-B1. Concentrations of chloride (2.5 to 49 mg/L) and sulfate (17 to 35 mg/L) in the groundwater around Landfill 5 were less than their Federal Secondary Maximum Contaminant Level, which has a value of 250 mg/L for each parameter. Manganese (0.023 mg/L) and total recoverable phenolics (5  $\mu\text{g/L}$ ) were detected in well B-304-B1 at concentrations less than the MPS of 0.5 mg/L and the MEG of 2,000  $\mu\text{g/L}$ , respectively. Iron and TOC were not detected in monitoring wells around Landfill 5 during the March 2015 sampling round. TOX was detected in the B-304-B1 duplicate pair (0.0397 and 0.0271 mg/L) and in B-307-B1 and B-307-B2 (0.0154 and

0.0105 mg/L). However, the duplicate precision in B-304-B1 exceeded the RPD guideline of 30 percent and the results were qualified as estimated. The low concentrations of TOX detected at less than the reporting limit in B-307-B1 and B-307-B2 were also qualified as estimated values.

An influent sample of groundwater from the combined flow from the Landfill 1 Area interim extraction wells (MW-601, EW-1, EW-2, EW-3 and EW-4) was obtained at the on-site groundwater treatment plant and submitted to the laboratory for analysis of a suite of parameters. Analytical results for the influent sample are summarized in Table 7. Mercury, VOCs, and chloropicrin concentrations in the influent sample were within the historical range of groundwater quality associated with the Landfill 1 Area.

### **GROUNDWATER QUALITY SUMMARY**

A comparison of the March 2015 first quarter sample parameter results to the Site MPS 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 (0.0034 to 0.655 mg/L). The mercury distribution is comparable with previous sampling rounds.
- Former Manufacturing Area – Mercury was detected in MW-510-O1 (0.0129 mg/L) at a concentration greater than the MPS, which is consistent with past results.
- Landfills 3 and 4 – The MPS for mercury was exceeded in the groundwater obtained from beneath Landfill 4 in MW-506-B1 (0.059 mg/L); although not in monitoring wells MW-410-B1 and P-2A downgradient of Landfills 3 and 4. Carbon tetrachloride was detected in MW-506-B1 (8.7 µg/L), MW-410-B1 (40 µg/L) and P-2A (10 µg/L) at concentrations greater than the MPS (3 µg/L). The distribution of mercury and carbon tetrachloride along the landfill ridge area is consistent with the history of groundwater monitoring.
- Landfill 5 – Detectable mercury was not present in the groundwater in this area during the March 2015 sampling event, which is consistent with the water quality record of these locations. Monitoring wells B-304-B1 (80 mg/L) and B-307-B1 (20.9 mg/L) exceeded the Maine MEG 20 mg/L for sodium in drinking water.



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

## **WATER LEVEL MONITORING**

Groundwater elevations in wells monitored in the March 2015 sampling event averaged about a 1.8-foot decrease across the Site compared to the December 2014 fourth quarter event three months earlier. The decrease in groundwater elevation was greater in monitoring wells located in the higher topography along the landfill ridge (Landfills 3, 4 and 5) as is usual at the Site. The average difference between December 2014 and March 2015 in groundwater elevation moving west to east along the landfill ridge varied from about 2.5 feet near Landfill 3 to about 4 feet in proximity to Landfill 5. In the lower topography surrounding the former Manufacturing Area and the southeastern part of the Site, the groundwater levels averaged less of a decrease (1.25 feet to less than 1 foot) compared to the landfill ridge area. The groundwater elevations in the Landfill 1 Area were about 1 foot higher when measured during the March 2015 sampling round compared to the previous quarter; however, the groundwater level in these wells experiences a daily tidal fluctuation. A review of the field sampling records indicates that most of the Landfill 1 Area wells were sampled in March 2015 when the Penobscot River was in a stage of a higher tide phase, whereas December 2014 water levels were measured during period of a lower river tide.

Groundwater levels are influenced by precipitation that recharges the subsurface. The on-site weather station recorded about 6 inches less rainfall during the three-month period preceding the March 2015 quarter (4.7 inches) than in the December 2014 sampling round (10.5 inches). Below normal rainfall was also recorded at the Bangor International Airport, located about 4 miles north of the Orrington Remediation Site, during the first three months of 2015 (NOAA National Climatic Data Center).<sup>2</sup>

Over an annual period, the March 2015 groundwater levels were similar to the elevations measured in March 2014. However, there was a significant difference in the amount of snowfall recorded in the area surrounding the Site. From November 2013 through March 2014, about 6.5 feet of snow was recorded at the Bangor International Airport. During the same months in 2014 and 2015, snowfall totaled about 11 feet. Although there was more snow in the 2015 winter season, the air temperature was colder in the two months preceding the first quarter sampling in March 2015 than in March 2014. Specifically, the average

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<sup>2</sup> *Record of Climatological Observations, Bangor International Airport, ME.* National Climatic Data Center Federal Building, Asheville, North Carolina, <http://www.ncdc.noaa.gov> (accessed April 20, 2015).

temperature for February recorded at the Site weather station in 2015 was about 9 degrees Fahrenheit (F) compared to 21 degrees F in 2014. The colder 2015 February temperature was also reported at the Bangor International Airport weather station. Therefore, the colder temperatures likely moderated the melting of the snowpack.

The second quarter 2015 groundwater sampling event at the Orrington Remediation Site is scheduled to start on June 8, 2015. In addition to the routine monitoring, groundwater samples will be obtained from the five interim groundwater extraction wells that are operating in the Landfill 1 Area. MEDEP will be notified about the schedule prior to the sampling event. If you have any questions concerning the March 2015 groundwater quality results, please do not hesitate to contact Bill Metzger or me.

Very truly yours,

SEVEE & MAHER ENGINEERS, INC.

 John E. Sevee

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



Attachments:

- Figure 1 – Well Locations
- Groundwater Monitoring Results Summary - Tables 1 through 8
- Data Tables
- Electronic Data Deliverable
- Relative Percent Difference for Duplicate Samples
- Field Data Sheets
- Laboratory Analytical Reports



**WELL LOCATIONS  
FIGURE 1**





**GROUNDWATER MONITORING RESULTS SUMMARY  
TABLES 1 THROUGH 8**

**TABLE 1**  
**FIRST QUARTER MARCH 2015**  
**GROUNDWATER MONITORING RESULTS**

Ferry Road Monitoring Well Locations									
Parameters	Hazeltine	(DUP-2) Hazeltine	Safian	B-321-B1	B-321-B2	MW-505-B1	MW-505-B2	MW-511-B1	MW-511-B2
	03/18/15	03/18/15	03/18/15	03/16/15	03/16/15	03/16/15	03/16/15	03/16/15	03/16/15
Mercury (mg/L)	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	F	< 0.0002
Chloride (mg/L)	1,600	1,600	680	1,700	790	3,000	1,000	F	2,900
Specific Conductance (µS/cm @25°C)	4,751	NA	2,308	4,830	2,740	8,180	3,310	F	7,510
pH (Standard Units)	7.38	NA	7.23	7.01	7.22	6.98	7.14	F	6.96
Temperature (Degrees Celcius)	5.2	NA	9.2	6.6	7.4	6.2	5.6	F	5.5
Salinity (g/L)	2.62	NA	1.22	2.67	1.46	4.69	1.79	F	4.28
Turbidity (field) (NTU)	1.2	NA	1.4	1.3	1.6	1.4	1.2	F	0.8
Dissolved Oxygen (mg/L)	6.7	NA	8.1	0.81	1.27	0.2	0.4	F	0.6
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

Abbreviations:

F = The sampling location was frozen

NA = Parameter was not analyzed

< = Not detected above the reported sample detection limit



**TABLE 2**  
**FIRST QUARTER MARCH 2015**  
**GROUNDWATER MONITORING RESULTS**

Former Manufacturing Area Monitoring Well Locations					
Parameters	MW-502-O1	MW-503-O1	MW-510-O1	(DUP-4)	(FB-1)
	03/18/15	03/18/15	03/18/15	MW-510-O1 03/18/15	Field Blank 03/18/15
Mercury (mg/L)	0.00068	I	0.0129	0.0135	< 0.0002
Specific Conductance (µS/cm @25°C)	1,435	I	48,560	NA	NA
pH (Standard Units)	7.69	I	7.43	NA	NA
Temperature (Degrees Celcius)	4.4	I	5.2	NA	NA
Salinity (g/L)	0.74	I	32.79	NA	NA
Turbidity (field) (NTU)	2	I	1.3	NA	NA
Dissolved Oxygen (mg/L)	4.73	I	0.58	NA	NA
VOCs					
Acetone (µg/L)	< 5	I	< 5	< 5	< 5
Chloroform (µg/L)	1.8	I	13	13	< 1
Carbon Tetrachloride (µg/L)	< 1	I	< 1	< 1	< 1
Benzene (µg/L)	< 1	I	< 1	< 1	< 1
Toluene (µg/L)	< 1	I	< 1	< 1	< 1
Ethylbenzene (µg/L)	< 1	I	< 1	< 1	< 1
Carbon Disulfide (µg/L)	< 1	I	< 1	< 1	< 1
o-Xylene (µg/L)	< 1	I	< 1	< 1	< 1
m,p-Xylene (µg/L)	< 2	I	< 2	< 2	< 2
Methyltertiarybutylether (µg/L)	< 1	I	< 1	< 1	< 1
Trichloroethene (µg/L)	< 1	I	< 1	< 1	< 1
Naphthalene (µg/L)	< 1	I	< 1	< 1	< 1
1,1-Dichloroethene (µg/L)	< 1	I	< 1	< 1	< 1
Dibromochloromethane (µg/L)	< 1	I	< 1	< 1	< 1
Tetrachloroethene (µg/L)	< 1	I	< 1	< 1	< 1
Bromodichloromethane (µg/L)	< 1	I	< 1	< 1	< 1
Bromoform (µg/L)	< 1	I	< 1	< 1	< 1
1,1,1-Trichloroethane (µg/L)	< 1	I	< 1	< 1	< 1
1,1,2-Trichloroethane (µg/L)	< 1	I	< 1	< 1	< 1
cis-1,2-Dichlorethene (µg/L)	< 1	I	< 1	< 1	< 1
Chloroethane (µg/L)	< 2	I	< 2	< 2	< 2
Chloromethane (µg/L)	< 2	I	< 2	< 2	< 2
Bromomethane (µg/L)	< 2	I	< 2	< 2	< 2
Dichlorodifluoromethane (µg/L)	< 2	I	4.7	5	< 2
Chloropicrin (µg/L)	< 0.5	I	14	18	< 0.5

Abbreviations:

I = The location yielded insufficient quantity of water to collect a sample

NA = Parameter was not analyzed

< = Not detected above the reported sample detection limit

**TABLE 3**  
**FIRST QUARTER MARCH 2015**  
**GROUNDWATER MONITORING RESULTS**

Landfill 1 Area Monitoring Well Locations												
Parameters	B-326-O2	B-326-O3	MW-402-O1	MW-501-O1	MW-512-O1	MW-513-O1	(DUP-1)	(FB-2)				
	03/17/15	03/17/15	03/17/15	03/18/15	03/17/15	03/17/15	MW-513-O1	Field Blank				
Mercury (mg/L)	0.0182	0.0847	0.00337	0.655	0.0155	0.0142	0.0144	03/17/15				
Chloride (mg/L)	300	120	420	NA	110	360	340	< 0.0002				
Specific Conductance (µS/cm @25°C)	1,133	671	1,564	1,996	612	1,337	NA	< 2				
pH (Standard Units)	7.03	6.73	7.3	7.02	6.74	7.23	NA	NA				
Temperature (Degrees Celcius)	9.1	9.3	9.2	3.1	8.7	8.9	NA	NA				
Salinity (g/L)	0.58	0.34	0.81	1.05	0.31	0.69	NA	NA				
Turbidity (field) (NTU)	0.8	0.7	0.9	NA	1	0.8	NA	NA				
Dissolved Oxygen (mg/L)	2.53	9.07	7.91	5.8	8.29	7.08	NA	NA				
VOCs												
Acetone (µg/L)	NA	NA	NA	< 5	NA	NA	NA	NA				
Chloroform (µg/L)	NA	NA	NA	1.8	NA	NA	NA	NA				
Carbon Tetrachloride (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
Benzene (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
Toluene (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
Ethylbenzene (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
Carbon Disulfide (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
o-Xylene (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
m,p-Xylene (µg/L)	NA	NA	NA	< 2	NA	NA	NA	NA				
Methyltertiarybutylether (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
Trichloroethene (µg/L)	NA	NA	NA	3.8	NA	NA	NA	NA				
Naphthalene (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
1,1-Dichloroethene (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
Dibromochloromethane (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
Tetrachloroethene (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
Bromodichloromethane (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
Bromoform (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
1,1,1-Trichloroethane (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
1,1,2-Trichloroethane (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
cis-1,2-Dichloroethene (µg/L)	NA	NA	NA	< 1	NA	NA	NA	NA				
Chloroethane (µg/L)	NA	NA	NA	< 2	NA	NA	NA	NA				
Chloromethane (µg/L)	NA	NA	NA	< 2	NA	NA	NA	NA				
Bromomethane (µg/L)	NA	NA	NA	< 2	NA	NA	NA	NA				
Dichlorodifluoromethane (µg/L)	NA	NA	NA	< 2	NA	NA	NA	NA				
Chloropicrin (µg/L)	NA	NA	NA	< 0.5	NA	NA	NA	NA				

Abbreviations:

NA = Parameter was not analyzed

< = Not detected above the reported sample detection limit



**TABLE 4**  
**FIRST QUARTER MARCH 2015**  
**GROUNDWATER MONITORING RESULTS**

Landfills 3 & 4 Monitoring Well Locations						
Parameters	P-2A	(DUP-5) P-2A	P-13	B-309-B1	MW-410-B1	MW-506-B1
	03/18/15	03/18/15	03/17/15	03/17/15	03/17/15	03/17/15
Mercury (mg/L)	0.00171	0.00171	< 0.0002	< 0.0002	0.00192	0.0595
Specific Conductance (µS/cm @25°C)	794	NA	284	563	821	1,717
pH (Standard Units)	7.02	NA	7.41	8.11	7.29	6.69
Temperature (Degrees Celcius)	6.8	NA	6.7	6.0	2.8	6.6
Salinity (g/L)	0.4	NA	0.14	0.28	0.42	0.89
Turbidity (field) (NTU)	0.2	NA	1	2.8	0.1	0.4
Dissolved Oxygen (mg/L)	6.5	NA	6	0.8	2.8	2.8
VOCs						
Acetone (µg/L)	< 5	< 5	< 5	< 5	< 5	< 5
Chloroform (µg/L)	8.2	7.3	< 1	< 1	12	3.5
Carbon Tetrachloride (µg/L)	10	9.6	< 1	1.1	40	8.7
Benzene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
Toluene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Disulfide (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
o-Xylene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
m,p-Xylene (µg/L)	< 2	< 2	< 2	< 2	< 2	< 2
Methyliertarybutylether (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
Naphthalene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichlorethene (µg/L)	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane (µg/L)	< 2	< 2	< 2	< 2	< 2	< 2
Chloromethane (µg/L)	< 2	< 2	< 2	< 2	< 2	< 2
Bromomethane (µg/L)	< 2	< 2	< 2	< 2	< 2	< 2
Dichlorodifluoromethane (µg/L)	< 2	< 2	< 2	< 2	< 2	< 2
Chloropicrin (µg/L)	NA	NA	NA	NA	NA	NA

Abbreviations:

NA = Parameter was not analyzed

< = Not detected above the reported sample detection limit

TABLE 5  
FIRST QUARTER MARCH 2015  
GROUNDWATER MONITORING RESULTS

Parameters	Landfill 5 Monitoring Well Locations														(FB-3) Field Blank 03/17/15
	B-303-B1 03/16/15	B-303-B2 03/16/15	B-303-B3 03/16/15	B-303-O1 03/16/15	B-304-B1 03/16/15	(DUP-3) B-304-B1 03/16/15		B-304-O1 03/16/15	B-306-B1 03/17/15	B-306-B2 03/17/15	B-306-B3 03/17/15	B-307-B1 03/17/15	B-307-B2 03/17/15	B-307-O1 03/17/15	
Mercury (mg/L)	< 0.0002	< 0.0002	< 0.0002	NA	< 0.0002	< 0.0002	< 0.0002	D	< 0.0002	< 0.0002	D	< 0.0002	< 0.0002	D	< 0.0002
Chloride (mg/L)	NA	NA	NA	NA	49	47	18	D	NA	NA	D	2.7	2.5	D	< 2
Sulfate (mg/L)	NA	NA	NA	NA	18	< 1	< 1	D	NA	NA	D	35	17	D	< 1
Total Organic Carbon (mg/L) <sup>1</sup>	NA	NA	NA	NA	5	< 5.3	< 5.3	D	NA	NA	D	< 1	< 1	D	< 1
Total Recoverable Phenolics (ug/L)	NA	NA	NA	NA	0.0397 J <sup>2</sup>	0.0271 J <sup>2</sup>	0.0271 J <sup>2</sup>	D	NA	NA	D	< 5.1	< 5.1	D	< 5
Total Organic Halides (ug/L) <sup>1</sup>	NA	NA	NA	NA	0.0397 J <sup>2</sup>	0.0271 J <sup>2</sup>	0.0271 J <sup>2</sup>	D	NA	NA	D	0.0154 J <sup>3</sup>	0.0105 J <sup>3</sup>	D	< 0.02
Specific Conductance (uS/cm @25°C)	158	144	141	D	514	NA	NA	D	1,826	1,435	D	253	183	D	NA
pH (Standard Units)	7.81	7.55	6.97	D	7.63	NA	NA	D	8.66	7.46	D	8.88	8.88	D	NA
Temperature (Degrees Celcius)	7.1	6.6	5.2	D	7.1	NA	NA	D	5.8	5.2	D	6.2	6.7	D	NA
Salinity (g/L)	0.08	0.07	0.07	D	0.26	NA	NA	D	0.95	0.74	D	0.13	0.09	D	NA
Turbidity (field) (NTU)	0.1	0.1	0.1	D	0.3	NA	NA	D	0.1	0.8	D	3.5	0.6	D	NA
Dissolved Oxygen (mg/L)	8.9	9	9.9	D	0.2	NA	NA	D	0.3	6.8	D	0.7	4.7	D	NA
Iron (mg/L)	NA	NA	NA	NA	< 0.1	< 0.1	< 0.1	D	NA	NA	D	< 0.1	< 0.1	D	< 0.1
Manganese (mg/L)	NA	NA	NA	NA	0.0232	0.0148	0.0148	D	NA	NA	D	< 0.005	< 0.005	D	< 0.005
Sodium (mg/L)	NA	NA	NA	NA	78.2	79.8	79.8	D	NA	NA	D	20.9	8.12	D	< 1
VOCs															
Acetone (ug/L)	< 5	< 5	< 5	D	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	< 5
Chloroform (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	1.3	< 1	NA	NA	NA	NA	< 1
Carbon Tetrachloride (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Benzene (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Toluene (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Ethylbenzene (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Carbon Disulfide (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
o-Xylene (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
m,p-Xylene (ug/L)	< 2	< 2	< 2	D	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	< 2
Methyltertiarybutylether (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Trichloroethene (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Naphthalene (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
1,1-Dichloroethene (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Dibromochloromethane (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Tetrachloroethene (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Bromodichloromethane (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Bromoform (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
1,1,1-Trichloroethane (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
1,1,2-Trichloroethane (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
cis-1,2-Dichloroethene (ug/L)	< 1	< 1	< 1	D	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	< 1
Chloroethane (ug/L)	< 2	< 2	< 2	D	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	< 2
Chloromethane (ug/L)	< 2	< 2	< 2	D	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	< 2
Bromomethane (ug/L)	< 2	< 2	< 2	D	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	< 2
Dichlorodifluoromethane (ug/L)	< 2	< 2	< 2	D	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	< 2
Chloroplatin (ug/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:  
 1. Value for total organic carbon and total organic halides is the average of four replicates.  
 2. Estimated value due to a Relative Percent Difference exceeding 30% in the B-304 duplicate pair.  
 3. Estimated value less than the Limit of Quantitation, but greater than the Method Detection Limit.

Abbreviations:  
 D = Sampling location was dry  
 J = Estimated value  
 NA = Parameter was not analyzed  
 < = Not detected above the reported sample detection limit



**TABLE 6**  
**FIRST QUARTER MARCH 2015**  
**GROUNDWATER MONITORING RESULTS**

Landfill 5 Monitoring Well Locations									
Parameters	B-304-B1	(DUP-3) B-304-B1	B-304-O1	B-306-B3	B-307-B1	B-307-B2	B-307-O1	(FB-3) Field Blank	
	03/16/15	03/16/15	03/16/15	03/17/15	03/17/15	03/17/15	03/17/15	03/17/15	03/25/14
Total Organic Halides - 1 (mg/L)	0.0404	0.0158 J	D	D	0.0183 J	0.0108 J	D	D	< 0.02
Total Organic Halides - 2 (mg/L)	0.0430	0.0310	D	D	0.0199 J	0.0076 J	D	D	< 0.02
Total Organic Halides - 3 (mg/L)	0.0345	0.0336	D	D	0.0100 J	0.0093 J	D	D	< 0.02
Total Organic Halides - 4 (mg/L)	0.0408	0.0280	D	D	0.0133 J	0.0143 J	D	D	< 0.02
Total Organic Carbon - 1 (mg/L)	< 1	< 1	D	D	< 1	< 1	D	D	< 1
Total Organic Carbon - 2 (mg/L)	< 1	< 1	D	D	< 1	< 1	D	D	< 1
Total Organic Carbon - 3 (mg/L)	< 1	< 1	D	D	< 1	< 1	D	D	< 1
Total Organic Carbon - 4 (mg/L)	< 1	< 1	D	D	< 1	< 1	D	D	< 1

Abbreviations:

D = Sampling location was dry

J = Estimated value detected at a concentration less than the laboratory Limit of Quantitation, but above the Method Detection Limit

< = Not detected above the reported sample detection limit

**TABLE 7**  
**FIRST QUARTER MARCH 2015**  
**GROUNDWATER MONITORING RESULTS**

Groundwater Treatment Plant	
Parameters	IEW Influent
	03/17/15
Mercury (mg/L)	0.0251
Chloride (mg/L)	270
Sulfate (mg/L)	25
Alkalinity (mg/L as CaCO <sub>3</sub> )	170
Specific Conductance (µS/cm @25°C)	1,097
pH (Standard Units)	7.06
Temperature (Degrees Celcius)	10.9
Salinity (g/L)	0.56
Turbidity (field) (NTU)	0.5
Dissolved Oxygen (mg/L)	7
Iron (mg/L)	< 0.1
Manganese (mg/L)	0.0599
Sodium (mg/L)	198
VOCs	
Acetone (µg/L)	< 5
Chloroform (µg/L)	1.6
Carbon Tetrachloride (µg/L)	32
Benzene (µg/L)	< 1
Toluene (µg/L)	< 1
Ethylbenzene (µg/L)	< 1
Carbon Disulfide (µg/L)	6.6 J+
o-Xylene (µg/L)	< 1
m,p-Xylene (µg/L)	< 2
Methyltertiarybutylether (µg/L)	< 1
Trichloroethene (µg/L)	1.6
Naphthalene (µg/L)	< 1
1,1-Dichloroethene (µg/L)	< 1
Dibromochloromethane (µg/L)	< 1
Tetrachloroethene (µg/L)	< 1
Bromodichloromethane (µg/L)	< 1
Bromoform (µg/L)	< 1
1,1,1-Trichloroethane (µg/L)	< 1
1,1,2-Trichloroethane (µg/L)	< 1
cis-1,2-Dichlorethene (µg/L)	< 1
Chloroethane (µg/L)	< 2
Chloromethane (µg/L)	< 2
Bromomethane (µg/L)	< 2
Dichlorodifluoromethane (µg/L)	< 2
Chloropicrin (µg/L)	5,700

Note:

1. Influent represents combined flow from the five  
Landfill 1 Area Interim Extraction Wells (IEWs)

Abbreviations:

- J+ = Estimated concentration due to potential high bias  
indicated by the LCS compound recovery
- < = Not detected above the reported sample detection limit.



**TABLE 8**  
**FIRST QUARTER MARCH 2015**  
**GROUNDWATER MONITORING RESULTS**

Trip Blanks				
Parameters	QCBT(3DG)	QCBT(3EG)	QCBT(3DH)	QCBT(3DI)
	03/16/15	03/16/15	03/17/15	03/17/15
<b>VOCs</b>				
Acetone (µg/L)	< 5	< 5	< 5	< 5
Chloroform (µg/L)	< 1	< 1	< 1	< 1
Carbon Tetrachloride (µg/L)	< 1	< 1	< 1	< 1
Benzene (µg/L)	< 1	< 1	< 1	< 1
Toluene (µg/L)	< 1	< 1	< 1	< 1
Ethylbenzene (µg/L)	< 1	< 1	< 1	< 1
Carbon Disulfide (µg/L)	< 1	< 1	< 1	< 1
o-Xylene (µg/L)	< 1	< 1	< 1	< 1
m,p-Xylene (µg/L)	< 2	< 2	< 2	< 2
Methyltertiarybutylether (µg/L)	< 1	< 1	< 1	< 1
Trichloroethene (µg/L)	< 1	< 1	< 1	< 1
Naphthalene (µg/L)	< 1	< 1	< 1	< 1
1,1-Dichloroethene (µg/L)	< 1	< 1	< 1	< 1
Dibromochloromethane (µg/L)	< 1	< 1	< 1	< 1
Tetrachloroethene (µg/L)	< 1	< 1	< 1	< 1
Bromodichloromethane (µg/L)	< 1	< 1	< 1	< 1
Bromoform (µg/L)	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (µg/L)	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane (µg/L)	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (µg/L)	< 1	< 1	< 1	< 1
Chloroethane (µg/L)	< 2	< 2	< 2	< 2
Chloromethane (µg/L)	< 2	< 2	< 2	< 2
Bromomethane (µg/L)	< 2	< 2	< 2	< 2
Dichlorodifluoromethane (µg/L)	< 2	< 2	< 2	< 2

Abbreviations:

< = Not detected above the reported sample detection limit