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J.H. Baxter

GSI Water Solutions, Inc.

April 30, 2015

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DEPARTMENT OF ECOLOGY

Mike Young
Snohomish Health District
3020 Rucker Avenue, Suite 104
Everett, WA 98201

Subject: 2014 Groundwater Monitoring Report, South Woodwaste Landfill
J.H. Baxter & Co., Arlington, Washington

Dear Mr. Young,

On behalf of J.H. Baxter & Co. (Baxter), please find enclosed a copy of the *2014 Groundwater Monitoring Report - South Woodwaste Landfill* for Baxter's closed woodwaste landfill in Arlington, Washington. This report was prepared by Baxter and GSI Water Solutions, Inc., under the direction of a State of Washington licensed hydrogeologist, and is submitted to you in accordance with Washington Administrative Code (WAC) 173-304-490. A copy has also has been sent directly to the Washington Department of Ecology.

If you have questions or comments regarding this report, please contact me at (971) 200-8527.

Sincerely,

Heidi Blischke

State of Washington
Hydrogeologist
765
Licensed Geologist
HEIDI HOFFMAN BLISCHKE

Heidi Blischke, LHG
Principal Hydrogeologist
GSI Water Solutions, Inc.

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2014 Groundwater Monitoring Report
South Woodwaste Landfill
Arlington, Washington

J.H. Baxter

Submitted to

Snohomish Health District
3020 Rucker Avenue, Suite 104
Everett, Washington 98201

Prepared for

J.H. Baxter & Co.
P.O. Box 10797
Eugene, OR 97440

April 2015

Prepared by

GSI Water Solutions, Inc.
[redacted]

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1. Introduction

This report presents quarterly groundwater data collected from March to November 2014 by the J.H. Baxter & Company (Baxter) for Baxter's closed South Woodwaste Landfill (South Landfill, Site), located at 6520 188th Street NE in Arlington, Snohomish County, Washington (Figure 1). Baxter closed the South Landfill in 1991; it is covered with a vegetated soil cap.

Four monitoring wells were installed in 1988. Monitoring wells BXS-1, BXS-2, and BXS-3 are located hydraulically downgradient of the Site. Monitoring well BXS-4 is located hydraulically upgradient of the South Landfill (Figures 2 and 3). Monitoring well BXS-4 represents the background groundwater quality providing the benchmark to compare with the water quality data from the downgradient wells. Boring logs, groundwater monitoring procedures, and a summary of site conditions encountered during the installation of the monitoring wells are included in the hydrogeologic report prepared by Sweet-Edwards/EMCON, Inc. (EMCON, 1989).

Quarterly monitoring events were conducted in March, June, September, and November 2014.

For ease of comparison, GSI Water Solutions, Inc. (GSI), assembled this report, along with the attached tables, figures, and appendices, in the same general format as previous monitoring reports for the Site.

2. Hydrogeology

Quarterly groundwater monitoring events included collecting groundwater level measurements at the four monitoring wells to understand the flow direction and gradient of shallow groundwater.

2.1 Groundwater Elevations

Groundwater levels were measured at the four monitoring wells prior to pumping the wells for groundwater sampling. Groundwater elevation data for 2014 are summarized in Table 1.

Groundwater elevations were highest for BXS-1 and BXS-3 during the June 2014 monitoring event, and highest groundwater elevation for BXS-4 was in March 2014. During the March 2014 monitoring event, BXS-2 had an unusually high groundwater elevation, which is suspected to be a field measurement error (see Table 1). If this suspect measurement is not considered, BXS-2's groundwater elevation was the highest in June 2014, which is similar to historical trends. Groundwater elevations were lowest for BXS-1 and BXS-2 in November 2014 and lowest for BXS-3 and BXS-4 in September 2014. The static groundwater level in wells BXS-1, BXS-2, BXS-3, and BXS-4 fluctuated throughout the year by 3.85 feet, 3.70 feet[1], 3.89 feet, and 3.03 feet, respectively.

[1] Does not include the March 2014 groundwater level because of suspect field measurement.

Groundwater elevation contour maps for June 2014[2] (Figure 2) and November 2014 (Figure 3) are provided for reference. The groundwater flow direction throughout the year was toward the northwest and is consistent with the regional groundwater flow in the aquifer (Figure 4).

2.2 Groundwater Velocities

Groundwater velocities (v_x) were estimated using Darcy's law:

$$v_x = - Ki / n_e$$

Hydraulic conductivity (K) in the fine sand beneath the Site was estimated at 3×10^{-2} to 6×10^{-2} centimeters per second based on slug tests performed in monitoring wells BXS-2 and BXS-4 (EMCON, 1989). Porosity (n_e) was assumed to be 0.300 (i.e., 30 percent).

The gradient (i) was 0.016 to 0.020 (Table 2), resulting in velocity estimates of 4.6 to 11.3 feet per day. Table 2 shows the calculated hydraulic gradients and groundwater velocities during the 2014 monitoring events. The gradient and groundwater velocity is consistent with previous years.

3. Groundwater Quality

Groundwater monitoring events were conducted on March 17, 2014, for the first quarter; June 2, 2014, for the second quarter; September 29, 2014, for the third quarter; and November 17, 2014, for the fourth quarter. Groundwater sampling was performed using dedicated submersible bladder pumps. The sampling procedures used originally were described in Appendix C of EMCON's Hydrogeologic Report (EMCON, 1989).

Field measurements were taken for pH, conductivity, temperature, oxidation-reduction potential (ORP), and dissolved oxygen prior to groundwater sampling. Groundwater samples were analyzed by ALS Environmental Laboratories (ALS) of Kelso, Washington, for the following:

- **Conventional Parameters:** pH, conductivity, ammonia as nitrogen, chemical oxygen demand (COD), chloride, nitrate plus nitrite as nitrogen, total dissolved solids (TDS), sulfate, tannin and lignin, and total organic carbon (TOC)
- **Dissolved Metals:** Arsenic, barium, copper, iron, manganese, nickel, and zinc

Additionally, total coliform was analyzed by Edge Analytical Laboratory (Edge) of Burlington, Washington.

3.1 Groundwater Sampling

Beginning in the second quarter of 2011, field duplicates were collected from the closed South Landfill, and equipment rinsate blanks were collected at the closed North Landfill (19600 67th Avenue NE, Arlington, Washington). Because groundwater samples were

[2] June 2014 was contoured in place of March 2014 because of BXS-2's suspect field measurement in March 2014.

collected from both landfills on the same day, they are considered to be part of the same sampling event and the field quality control (QC) is applicable to both datasets.

Well headspace was not tested for methane during the 2014 quarterly events. Field measurement data collected from February 2007 through November 2014 are summarized in Table 3A. Field sampling records are included in Appendix A. The analytical data from 2007 through 2014 are summarized in Tables 3B and 3C. Laboratory analytical reports and chain-of-custody (COC) forms for the 2014 groundwater monitoring events are included in Appendix B. TDS was not analyzed during the June and November 2014 groundwater monitoring events.

4. Data Review

This section describes the data review process that was performed to evaluate the adequacy and quality of the analytical data from the 2014 groundwater monitoring events. The objective of the data review is to identify estimated, unreliable, or invalid measurements. Information about the reliability of the data is critical to the interpretation of the results. The review was performed according to guidelines prepared by the U.S. Environmental Protection Agency (EPA) (EPA, 2010).

4.1 Field Quality Assurance (QA) /QC

During the quarterly groundwater monitoring events, field duplicates were prepared and collected by field personnel in accordance with standard practice. The March, June, September, and November 2014 monitoring event field duplicate samples were collected from monitoring well BXS-1, and labeled as BXS-5. The field rinsate blank for each monitoring event was collected at monitoring well BXN-4, and labeled as BXN-6, from the North Landfill.

Field duplicate results aid in the assessment of sampling and analytical precision. Analytical results for the original and duplicate samples collected from each sampling event were evaluated using the relative percent difference (RPD). RPD is the difference between the two results divided by the mean and expressed as a percent. The RPD was calculated for an analyte when both the primary sample and duplicate sample had a detected concentration. For analytes with concentrations greater than or equal to 5 times the associated method reporting limit (MRL) and when the RPD is greater than 35 percent, the reported values are considered estimated concentrations. For analytes with concentrations less than 5 times the associated MRL, the reported values are considered estimated if the absolute difference between primary and duplicate is greater than the value of the MRL. The following analytes for the primary and duplicate samples at monitoring well BXS-1 were qualified by GSI as estimated detections (J-flag) because of potential analytical imprecision:

- **June 2014:** Tannin and lignin
- **November 2014:** Chloride and sulfate

In addition to the field duplicates collected from the South landfill, a field rinsate blank was collected from the North landfill during each quarterly sampling event. The following were detections at a level above the method detection limit (MDL):

- **March 2014:** Nitrate plus nitrite as nitrogen and manganese
- **June 2014:** Tannin and lignin, and TOC
- **September 2014:** Nitrate plus nitrite as nitrogen, iron, manganese, copper, and nickel
- **November 2014:** Nitrate plus nitrite as nitrogen, TOC, barium, manganese, and copper

GSI validated the data in accordance with EPA's blank qualification guidelines, which state:

- For any analytes detected in the blanks below the MRLs, associated field sample detections that are below MRLs should be reported at the MRL and as a non-detect value (EPA, 1999b).
- For any analytes detected in the blanks below the MRLs, associated field sample detections above the MRL, but less than 5 times the blank concentration, are reported as is, but qualified as non-detect values (EPA, 1999b).

Based on EPA's guidelines, manganese concentrations from the March, September, and November 2014 monitoring events; nickel concentrations from the September 2014 monitoring event; and TOC and barium concentrations from the November 2014 monitoring event were not qualified during validation because the concentrations were greater than 5 times the field rinsate blank concentration. The following analytes were qualified by GSI during validation based on the field rinsate blank detections:

- **March 2014**
  - **Nitrate plus Nitrite as Nitrogen:** BXS-4 and BXS-2 samples were detected above the MDL, but below the MRL. These results were reported at the MRL and as a non-detect value. BXS-3, BXS-1, and BXS-1 (duplicate) samples were detected above the MRL, but less than 5 times the blank concentration, and the result was qualified as non-detect.
- **June 2014**
  - **Tannin and Lignin:** The BXS-1 sample was detected above the MDL, but below the MRL. This result was reported at the MRL and as a non-detect value. The BXS-4 sample was detected above the MRL, but less than 5 times the blank concentration and the result was qualified as non-detect.
  - **TOC:** The BXS-4 sample was detected above the MRL, but less than 5 times the blank concentration and the result was qualified as non-detect.
- **September 2014**
  - **Nitrate plus Nitrite as Nitrogen:** BXS-1 and BXS-1 (duplicate) samples were detected above the MDL, but below the MRL. These results were reported at the MRL and as a non-detect value.

- **Iron:** BXS-1 and BXS-1 (duplicate) samples were detected above the MDL, but below the MRL. These results were reported at the MRL and as a non-detect value.
- **Copper:** BXS-2, BXS-1, and BXS-1 (duplicate) samples were detected above the MDL, but below the MRL. These results were reported at the MRL and as a non-detect value.

- **November 2014**
  - **Nitrate plus Nitrite as Nitrogen:** BXS-2, BXS-1, and BXS-1 (duplicate) samples were detected at the MRL, and the result was reported as a non-detect value.
  - **Copper:** BXS-2, BXS-1, and BXS-1 (duplicate) samples were detected above the MDL, but below the MRL. These results were reported at the MRL and as a non-detect value.

Field rinsate blank detections were below the secondary maximum contaminant levels (SMCL) and/or other laboratory results for field samples were consistent with historical values, indicating that the contamination is minimal. Results from the field blank sample are shown in Tables 3B and 3C.

4.2 Laboratory QA/QC

The sample coolers for each quarterly monitoring event arrived at the laboratories in good condition, with no broken bottles, below EPA's 6° Celsius (C) recommendation, and with proper COC documentation. Samples for total coliform were analyzed by Edge. The remaining analyses were performed by ALS.

With the exception of pH, all analyses were performed within the required holding time for the parameters of interest. The samples were analyzed for pH between 1 and 3 days after collection. The method used for pH analysis, Standard Methods 4500-H+ B (APHA, 1998), does not list an analysis holding time. The EPA method for pH analysis of water samples, Method 150.1 (EPA, 1999a), specifies that pH analyses be performed "as soon as possible preferably in the field at the time of sampling." For that reason, the field-analyzed pH results are used for trend analysis and statistical evaluation.

The method blanks did not have any analytes detected above the MRL. The following analytes were detected in the method blank at a level above the MDL, but below the MRL:

- **March 2014:** Nitrate plus nitrite as nitrogen, arsenic, and copper
- **September 2014:** Iron
- **November 2014:** Barium, copper, iron, and manganese

Conductivity also was detected in the method blanks, however, it is not considered to affect data quality because it is a physical property of the water. Additionally, primary samples were within historical ranges for conductivity.

For the remaining laboratory method blank detections, GSI validated the data in accordance with EPA's blank qualification guidelines (EPA, 1999b). Barium and manganese

concentrations from the November 2014 monitoring event were not altered during validation because the concentrations were greater than 5 times the laboratory method blank concentration. Nitrate plus nitrite as nitrogen concentrations from the March 2014 monitoring event, iron concentrations from the September 2014 monitoring event, and copper concentrations from the November 2014 monitoring event were not altered during validation based on the laboratory method blank because they were modified during validation based on the field rinsate blank. The following analytes were altered by GSI during validation based on the laboratory method blank detections:

- **March 2014**
  - **Arsenic:** BXS-1 and BXS-1 (duplicate) samples were detected above the MDL, but below the MRL. These results were reported at the MRL and as a non-detect value.
  - **Copper:** BXS-2, BXS-1, and BXS-1 (duplicate) samples were detected above the MDL, but below the MRL. These results were reported at the MRL and as a non-detect value.
- **November 2014**
  - **Iron:** BXS-1 and BXS-1 (duplicate) samples were detected above the MDL, but below the MRL. These results were reported at the MRL and as a non-detect value.

Laboratory duplicate RPDs were below laboratory limits or, for sample concentrations below 5 times the MRL, the difference between parent and duplicate sample concentrations were below the MRL, and data were not adversely affected.

Matrix spike (MS) recoveries were within laboratory limits, or the analyte concentration was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery. The only exception was the nitrate plus nitrite as nitrogen MS from the September 2014 monitoring event that was outside the laboratory control criteria. The recovery in the laboratory control sample was acceptable, which indicated the analytical batch was in control. No further corrective action was appropriate according to ALS.

The laboratory reports are complete and contain results for all samples and corresponding analyses requested on the COC forms.

4.3 Statistical Analysis of Data

Groundwater sample analysis results were statistically evaluated to assess if there was a significant difference between the downgradient wells (BXS-1, BXS-2, and BXS-3) and the upgradient well (BXS-4). The following approach was used for performing the statistical analysis:

- **Non-Detects:** Non-detect results were replaced with a value of half the laboratory MRL.
- **Data Distribution:** A key assumption in the Student's t-test is that the data are normally distributed.

- **Parametric Hypothesis Testing:** Parametric hypothesis testing was performed using the Student's t-test for all parameters in both the upgradient and downgradient wells. For each comparison, the null hypothesis was that there was no difference between the downgradient and upgradient concentrations. The null hypothesis was tested using a two-tailed test at a significance level of 0.025. The t-test statistic (t_{stat}) was calculated from the average and variance of quarterly sampling results in a downgradient well and the upgradient well. Each quarterly sample was compared to the previous three quarterly samples to provide a four-sample running average. The average concentration in the downgradient well was significantly higher than the upgradient well if t_{stat} was greater than the critical test statistic (t_c). Similarly, the average concentration in the downgradient well was significantly lower than the upgradient well if t_{stat} was less than the negative value of the critical test statistic (t_c). The critical test statistic was computed using the percent point function (ppf). The ppf is the inverse of the cumulative distribution function.

Statistically significant detections above the background well (BXS-4) concentrations are shown in **bold** in the tables included in Appendix C. Statistically significant detections below background concentrations are shown in gray in the tables included in Appendix C. Historical statistically higher values above the background well concentrations since 1989 are shown in Table 4.

5. Discussion of Results

5.1 Statistical Results

Appendix C presents the results of the statistical analyses for each individual parameter tested in the groundwater samples from monitoring wells BXS-1 through BXS-4. These include average concentration, variance, standard deviation, and Student's t-test statistic. The parameters detected at a statistically higher concentration in specific downgradient wells compared to the upgradient well are:

- Ammonia and arsenic in BXS-3
- Copper in BXS-2
- Nitrate plus nitrate as nitrogen and sulfate in BXS-1
- Tannin and lignin, barium, and iron in BXS-3 and BXS-2
- Chloride and zinc in BXS-2 and BXS-1
- TOC, COD, field conductivity, TDS, manganese, and nickel in BXS-3, BXS-2, and BXS-1

Additionally, field pH was statistically lower in the BXS-3, BXS-2, and BXS-1 compared to the upgradient well.

5.2 Concentration Trends over Time

Figures 5 through 18 show the concentration trends from 2007 through 2014 for each of the following parameters:

- **Ammonia as Nitrogen** (Figure 5): BXS-3 concentrations in 2014 were above those in BXS-4 (upgradient well), with concentrations ranging from 0.91 to 1.21 milligrams per liter (mg/L). Ammonia in BXS-3 showed an increasing trend since fourth quarter 2011, but the current concentrations were consistent with concentrations present in BXS-3 between 2009 and third quarter 2011. BXS-1 and BXS-2 were well below background concentrations and were stable.
- **Arsenic** (Figure 6): Arsenic in BXS-3 was above the concentrations detected in the upgradient well and showed an increasing trend in concentration. Arsenic concentrations in BXS-1 and BXS-2 were below background and are stable.
- **Barium** (Figure 7): BXS-3 and BXS-2 barium concentrations in 2014 were above those in BXS-4 (upgradient well), with concentrations ranging from 127 to 140 µg/L and 49.6 to 52.8 µg/L, respectively. Barium concentrations in BXS-1, the most downgradient of the monitoring wells, continued to be below those in BXS-4 (upgradient well). BXS-1, BXS-2, and BXS-3 barium concentrations were stable.
- **COD** (Figure 8): BXS-3, BXS-2, and BXS-1 COD concentrations were above those in BXS-4 (upgradient well). BXS-1, BXS-2, BXS-3, and BXS-4 COD concentrations have been relatively consistent.
- **Chloride** (Figure 9): BXS-3, BXS-2, and BXS-1 chloride concentrations were above those in BXS-4 (upgradient well) in 2014, with the exception of BXS-3 in November 2014. Chloride concentrations appeared to be decreasing in the downgradient wells. The concentrations in BXS-3 have decreased to concentrations that are similar to background concentrations. The background chloride concentration was stable.
- **Field Conductivity** (Figure 10): Field conductivity in BXS-3, BXS-2, and BXS-1 was higher than in BXS-4 (upgradient well). BXS-1, BXS-2, BXS-3, and BXS-4 conductivity was within historical levels and has been relatively stable.
- **Iron** (Figure 11): BXS-3 and BXS-2 concentrations in 2014 were above those in BXS-4 (upgradient well), with concentrations ranging from 111,000 to 127,000 µg/L and 409 to 424 µg/L, respectively. BXS-1, BXS-2, and BXS-4 concentrations have been stable since 2007. Iron concentrations in BXS-3 were stable between 2010 and first quarter 2013 and showed an increasing trend since 2013.
- **Manganese** (Figure 12): BXS-3, BXS-2, and BXS-1 manganese concentrations were above those in BXS-4 (upgradient well) in 2014. Concentrations in BXS-3 in 2014 had an overall downward trend. BXS-1, BXS-2, and BXS-4 manganese concentrations were stable.
- **Nickel** (Figure 13): BXS-3, BXS-2, and BXS-1 nickel concentrations were above those in BXS-4 (upgradient well) in 2014. BXS-1, BXS-2, BXS-3, and BXS-4 nickel concentrations were stable.

- **Sulfate** (Figure 14): BXS-1 sulfate concentrations in 2014 were above those in BXS-4 (upgradient well), with concentrations ranging from 7.2 to 12.7 mg/L. Sulfate concentrations in BXS-1 showed a downward trend since 2010. BXS-2, BXS-3, and BXS-4 sulfate concentrations were low and stable.
- **Tannin and Lignin** (Figure 15): BXS-3 and BXS-2 tannin and lignin concentrations were above those in BXS-4 (upgradient well) in 2014. Tannin and lignin concentrations in BXS-1 were slightly below the background concentration. Tannin and lignin concentrations in the wells were stable, with the exception of BXS-3, which showed fluctuations between 3 and 50 mg/L.
- **TOC** (Figure 16): BXS-3, BXS-2, and BXS-1 TOC concentrations were above those in BXS-4 (upgradient well) in 2014. BXS-1, BXS-2, BXS-3, and BXS-4 TOC concentrations were within historical levels, with a slightly overall downward trend in BXS-3.
- **Field pH** (Figure 17): BXS-4 (upgradient well) field pH was higher that the pH in BXS-3, BXS-2, and BXS-1 (downgradient wells) in 2014, with the exception of an anomalous field pH in BXS-4 in March 2014. The corresponding laboratory pH for BXS-4 in March 2014 was within historical levels. The field pH in BXS-1, BXS-2, and BXS-3 was within historical levels.
- **TDS** (Figure 18): TDS in BXS-3, BXS-2, and BXS-1 was higher than that present in BXS-4 (upgradient well). TDS was decreasing in BXS-3 and stable in the other wells.

5.3 Comparison to Standards

Federal maximum contaminant levels (MCL) are established by EPA as the primary drinking water standards. Federal SMCLs are related to criteria other than adverse health effects. SMCLs are non-enforceable guidelines for cosmetic and aesthetic purposes, and are not considered to be a risk to human health.

In the state of Washington (Washington), water quality standards for groundwater are provided in the Washington Administrative Code (WAC) 173-200-040 (Washington, 2003). Washington water quality standards are similar to the federal standards for most of the Site-related analytes where available, with the exception of arsenic, barium, cadmium, and copper. MCLs, SMCLs, and Washington water quality standards for groundwater are listed in Tables 3A, 3B, and 3C.

5.3.1 Comparison to MCLs

Of the monitored parameters, there are MCLs for total coliforms, arsenic, barium, cadmium (no longer analyzed), copper, nickel, and nitrate plus nitrate as nitrogen. There were no detections in 2014 that exceeded the associated MCL, with the following exceptions:

- **Total Coliforms:** BXS-1 exceeded the MCL of 1/100 milliliter (mL) in November 2014, with a count of 4.1 most probable number (MPN) per 100 mL. However, a duplicate sample was taken at BXS-1 in November 2014 with a non-detect result. There is no reason to associate coliform to the wood waste present in the landfill.
- **Arsenic:** BXS-3 exceeded the MCL of 10 µg/L in all four 2014 quarterly monitoring events, with concentrations ranging from 157 to 191 µg/L in 2014.

5.3.2 Comparison to SMCLs

Among the monitored parameters, there are SMCLs for pH, chloride, TDS, sulfate, iron, manganese, and zinc. There were no detections in 2014 that exceeded the associated SMCL, with the following exceptions:

- **Field pH:** BXS-4 was below the SMCL of 6.5 to 8.5 for all four quarterly monitoring events, with levels of 5.92 to 6.28 in 2014.
- **TDS:** BXS-3 exceeded the SMCL of 500 mg/L, with concentrations of 504 mg/L and 513 mg/L in March and September 2014, respectively.
- **Iron:** BXS-3 and BXS-2 exceeded the SMCL of 300 µg/L in all four quarterly monitoring events, with concentrations ranging from 111,000 to 127,000 µg/L and 409 to 424 µg/L, respectively, in 2014.
- **Manganese:** All four monitoring wells exceeded the SMCL of 50 µg/L in all four quarterly monitoring events. Concentrations were highest in BXS-3, ranging from 1,640 to 1,680 µg/L in 2014.

5.3.3 Comparison to Washington State Standards

Washington water quality standards for groundwater are similar to the MCL or SMCL for Site-related compounds, with the exception of arsenic, barium, cadmium (no longer analyzed), and copper. Of these metals, there were no detections in 2014 that exceeded the associated Washington standard, with the following exception:

- **Arsenic:** All four monitoring wells exceeded Washington's water quality standard for groundwater of 0.05 µg/L in all four quarterly monitoring events. Concentrations were highest in BXS-3, ranging from 157 to 191 µg/L in 2014.

6. Summary

Quarterly groundwater monitoring samples were collected from one upgradient well (BXS-4) and three downgradient wells (BXS-1 through BXS-3) during 2014 at the former J.H. Baxter South Woodwaste Landfill. The samples were analyzed for 11 groundwater quality parameters and 7 dissolved metals.

Groundwater samples collected during the 2014 monitoring events did not exceed the MCLs for any of the monitored parameters, with the exception of total coliform and arsenic. Total coliform had a detection in monitoring well BXS-1 in November 2014, while a duplicate sample at BXS-1 had a non-detect result. The concentrations of arsenic in monitoring well BXS-3 exceeded the MCL in all four quarterly monitoring events.

There were no exceedances of the SMCL for chloride, sulfate, and zinc during the monitoring events in 2014. However, there was at least one well that exceeded the SMCL for field pH, TDS, iron, and manganese during one or more groundwater monitoring events in 2014.

Of the metals with a more conservative Washington water quality standard than the MCL, only arsenic was present above the standard. The arsenic concentrations in the four

monitoring wells in all four quarterly monitoring events in 2014 exceeded the Washington water quality standard.

7. References

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Tables

Table 1. Groundwater Elevation Summary for 2014

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Well ID	Inner Casing Diameter (inches)	Total Depth (ft bgs)	Screen Length (ft)	Screened Interval (ft bgs)	TOC Elevation[1] (ft msl)	Date	Depth to Groundwater (ft below TOC)	Groundwater Elevation (ft msl)
BXS-1	2	47.90	10	37.90 - 47.90	142.65	3/16/2014	33.90	108.75
						6/2/2014	31.45	111.2
						9/29/2014	35.19	107.46
						11/17/2014	35.30	107.35
BXS-2	2	45.40	10	35.40 - 45.40	142.89	3/16/2014	22.14[2]	120.75[2]
						6/2/2014	29.80	113.09
						9/29/2014	33.40	109.49
						11/17/2014	33.50	109.39
BXS-3	2	44.15	10	34.15 - 44.15	142.07	3/16/2014	28.00	114.07
						6/2/2014	25.71	116.36
						9/29/2014	29.60	112.47
						11/17/2014	28.90	113.17
BXS-4	2	47.40	10	37.40 - 47.40	143.42	3/18/2014	11.57	131.85
						6/2/2014	12.26	131.16
						9/29/2014	14.60	128.82
						11/17/2014	12.10	131.32

Notes

bgs = below ground surface.

ft = feet.

msl = mean sea level.

TOC = top of casing.

[1] Wells resurveyed in October 2002.

[2] Suspect field measurement.

Table 2. Hydraulic Gradient and Groundwater Velocity

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Date	Gradient (i)	Hydraulic Conductivity (K) (cm/sec)	Porosity (n_e)	Velocity (v_x) (cm/sec)	Velocity (v_x) (ft/day)
3/16/2014	NC[1]	0.0300 to 0.0600	0.300	--	--
6/2/2014	0.016			0.002 to 0.003	4.6 to 9.3
9/29/2014	NC			--	--
11/17/2014	0.020			0.002 to 0.004	5.6 to 11.3

Notes

cm = centimeter.

ft = feet.

NC = not calculated.

sec = second.

[1] Quarter 1 was not contoured because of suspect field measurement in BXS-2. Quarter 2 was contoured in its place.

Table 3A. Summary of Groundwater Sampling Field Parameters: 2007 through 2014
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Date	pH (standard unit)				Conductivity (µS/cm)				Temperature (°C)				ORP (mV)				Dissolved Oxygen (mg/L)				Methane (percent)			
SMCL	6.5 - 8.5				--				--				--				--				--			
WA WQ Std	6.5 - 8.5				--				--				--				--				--			
Well ID	BXS-4	BXS-3	BXS-2	BXS-1	BXS-4	BXS-3	BXS-2	BXS-1	BXS-4	BXS-3	BXS-2	BXS-1	BXS-4	BXS-3	BXS-2	BXS-1	BXS-4	BXS-3	BXS-2	BXS-1	BXS-4	BXS-3	BXS-2	BXS-1
2/5/2007	8.60	7.12	6.81	6.75	166	730	672	299	9.5	13.2	12.1	11.4	-40	-103	1	241	9.80	2.40	3.00	2.30	NT	NT	NT	NT
4/18/2007	8.09	6.62	6.47	6.31	176	808	796	379	9.5	13.1	12.3	11.7	-136	-113	45	187	1.20	1.80	1.20	0.80	NT	NT	NT	NT
7/18/2007	8.25	6.64	6.52	6.38	222	867	922	415	9.8	13.1	12.5	12.0	-145	-113	62	219	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
10/9/2007	7.83	6.30	6.19	6.02	199	810	804	495	9.8	12.8	12.5	12.0	-148	-97	40	226	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
1/9/2008	7.81	6.25	6.18	5.91	196	788	772	369	9.3	12.1	12.1	11.4	-147	-67	54	251	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
4/30/2008	7.66	6.23	6.10	5.98	201	846	794	485	9.1	12.9	12.2	11.8	-157	-126	32	138	0.00	0.00	0.08	0.15	NT	NT	NT	NT
7/29/2008	7.98	6.42	6.37	6.14	180	726	732	510	9.4	12.9	12.4	12.0	-150	-90	31	185	0.33	0.37	1.77	5.80	0.0	0.0	0.0	0.0
10/22/2008	8.32	6.55	6.48	6.28	177	722	733	496	9.6	12.7	12.4	12.0	-173	-93	20	157	0.07	0.12	0.14	1.10	NT	NT	NT	NT
2/1/2009	8.09	6.77	6.56	6.42	176	734	749	401	9.2	12.7	12.0	11.6	-154	-118	59	299	2.33	2.04	1.87	2.66	0.0	0.0	0.0	0.0
5/1/2009	8.25	6.44	6.35	6.33	185	736	812	335	9.4	13.2	12.6	12.0	-192	-99	86	121	1.21	0.08	0.10	0.53	NT	NT	NT	NT
8/1/2009	7.89	6.52	6.64	6.41	185	695	797	309	9.4	12.6	12.3	11.9	-172	-128	36	245	8.60	6.28	6.03	6.04	0.0	0.0	0.0	0.0
11/1/2009	7.96	6.50	6.46	6.37	192	755	815	315	9.3	12.2	12.0	11.5	-167	-98	52	257	6.73	2.86	1.98	1.18	NT	NT	NT	NT
2/10/2010	8.05	6.59	6.55	6.58	180	726	799	274	9.3	12.9	12.1	12.0	-183	-73	-3	74	0.11	0.17	0.31	1.23	NT	NT	NT	NT
5/26/2010	7.46	6.04	5.96	5.90	189	719	853	288	9.3	12.8	17.0	12.0	-247	-142	59	129	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
8/18/2010	7.63	5.98	5.87	5.94	230	690	833	309	9.7	12.5	12.3	12.3	-285	-51	141	258	0.00	0.18	0.38	0.93	NT	NT	NT	NT
11/18/2010	7.99	6.37	6.52	6.34	184	694	813	344	9.7	12.8	12.1	11.9	-287	-193	-42	-30	0.43	0.12	1.98	0.24	0.0	0.0	0.0	0.0
2/9/2011	8.02	6.22	6.16	6.24	187	710	844	334	9.5	12.8	11.9	12.0	-164	-128	36	-167	0.10	0.11	0.26	0.28	NT	NT	NT	NT
5/17/2011	7.99	6.24	6.20	6.25	183.0	732	929.0	315	9.9	12.8	12.2	12.6	-205.0	-120	32.0	158	0.36	0.38	0.43	0.45	0.2	0.1	0.0	0.0
8/24/2011	7.77	5.79	5.73	5.75	190	741	833	337	10.2	13.0	12.4	12.4	-172	-115	45	164	0.09	0.09	0.19	0.18	NT	NT	NT	NT
11/3/2011	8.36	6.43	6.37	6.46	192	673	852	346	9.8	12.5	12.0	12.0	-274	-140	39	150	1.12	1.04	1.19	1.29	0.1	0.0	0.0	0.0
2/14/2012	7.72	6.92	6.74	6.67	192	696	865	359	10.4	13.1	12.5	12.6	-142	-118	74	302	3.10	4.17	4.21	5.76	NT	NT	NT	NT
5/2/2012	6.97	5.70	5.65	5.06	193	693	914	319	10.4	13.1	12.7	12.6	-98	-49	141	396	1.37	1.86	2.23	3.94	0.0	0.0	0.0	0.0
8/21/2012	6.62	5.33	5.34	4.90	192	707	895	308	10.7	13.1	12.8	12.8	-84	-47	182	330	1.53	1.97	2.39	2.28	NT	NT	NT	NT
11/13/2012	7.68	6.29	6.26	6.10	147	520	641	239	12.5	12.5	12.9	10.5	-125	-82	216	439	2.39	4.73	7.79	6.45	NT	NT	NT	NT
2/12/2013	7.07	5.66	5.72	5.57	184	529	869	278	9.7	12.4	11.8	12.0	-118	-92	76	337	2.16	3.68	0.82	0.91	NT	NT	NT	NT
6/4/2013	7.32	5.92	5.84	5.69	190	635	892	271	10.1	12.2	12.0	12.2	-141	-99	90	313	0.83	2.62	1.52	0.44	NT	NT	NT	NT
8/25/2013	7.62	6.30	6.22	6.03	193	709	871	299	10.2	12.2	12.0	12.5	-119	-104	118	315	0.36	0.80	2.96	2.22	NT	NT	NT	NT
12/2/2013	7.39	5.88	5.66	5.63	198	699	882	313	9.8	11.9	11.6	12.1	-124	-112	135	328	1.02	5.46	5.74	2.36	NT	NT	NT	NT
3/17/2014	5.92	6.28	6.16	6.06	189	730	817	299	10.0	12.2	11.6	12.7	-112	-94	128	268	1.85	8.84	12.60	2.07	NT	NT	NT	NT
6/2/2014	7.47	5.72	5.79	5.64	213	793	952	318	10.1	12.3	12.2	13.3	-92	-86	84	213	0.15	0.00	0.00	0.00	NT	NT	NT	NT
9/29/2014	7.69	6.25	6.15	5.99	212	733	918	306	10.5	12.3	12.0	12.5	-126	-94	106	273	0.00	0.00	0.00	0.00	NT	NT	NT	NT
11/17/2014	7.48	5.99	5.88	5.69	192	675	822	285	10.2	11.9	11.6	12.2	-117	-77	111	285	0.00	10.75	0.71	0.00	NT	NT	NT	NT

Notes

µS/cm = microSiemen per centimeter.

°C = degree Celsius.

mg/L = milligram per liter.

mV = millivolt.

NT = not tested.

ORP = oxidation-reduction potential.

SMCL = Federal secondary maximum contaminant levels for drinking water.

WA WQ Std = State of Washington's water quality standards for groundwater (WAC 173-200).

Table 3B. Summary of Groundwater Conventional Parameters: 2007 through 2014
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Date	pH (standard unit)									Conductivity (µS/cm)									Chloride (mg/L)								
MCL/SMCL	6.5 - 8.5									--									250								
WA WQ Std	6.5 - 8.5									--									250								
Well ID	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank
2/1/2007	7.81	7.90	6.38		6.36		6.36		5.79	193	192	517		743		338		4	1.6	1.6	3.1		4.9		6.4		0.2 U
4/18/2007	7.61	7.45	6.05		6.10		5.94		5.66	195	199	565		779		377		2	1.9	1.9	2.3		4.5		5.4		0.2 U
7/18/2007	7.69		6.34		6.96		6.28	6.23	6.04	201		518		798		410	401	2	1.7		2.8		4.1		5.1	5.0	0.2 U
10/9/2007	7.82	7.85	6.36		6.35		6.18		5.72	200	201	638		814		482		3	1.7	1.7	2.7		4.3		5.2		0.1 J
1/9/2008	7.75		6.41		6.46		6.23	6.25	5.10	215		681		747		375	360	5	2.0		3.1		4.5		5.8	5.8	0.2 U
4/30/2008	7.76		6.36		6.44		6.38	6.38	6.21	188		658		797		475	472	2630	1.8		2.4		4.4		5.0	5.1	0.0 J
7/29/2008	7.83		6.32		6.45	6.40	6.27		5.30	206		659		853	865	592		4	1.8		2.8		4.2	4.4	4.5		0.2 U
10/22/2008	7.83		6.33		6.41	6.40	6.49			210		700		892	877	592			1.9		3.6		4.9	4.9	5.1		
2/1/2009	7.94		6.30		6.50		6.67	6.42	5.89	209		604		889		489	479	6	1.7		2.6		4.2		7.6	7.6	0.0 J
5/1/2009	7.92		6.29		6.29		6.38	6.30	5.64	171		496		768		357	328	2	2.2		4.5		6.1		7.3	7.3	0.2 U
8/1/2009	6.32		6.45	6.42	6.40		6.31		5.44	176		412	413	757		299		3	1.8		3.8	3.7	4.3		5.9		0.2 U
11/1/2009	7.66		6.41		6.41		6.42	6.42	6.40	194		598		823		299	314	3	1.9		3.3		4.4		6.5	6.6	0.2 U
2/10/2010	8.04		6.38		6.56	6.56	6.70		6.43	187		634		848	854	298		2 J	1.81		2.90		4.20	4.20	5.30		0.06 J
5/26/2010	7.87		6.26		6.33		6.41	6.48	4.93	192		461		881		297	300	4	1.88		3.40		4.10		5.90	6.00	0.04 J
8/18/2010	7.83		6.15		6.30		6.42	6.46	7.91	209		423		805		311	316	137	1.91		3.04		3.32		5.67	5.70	1.57
11/18/2010	7.72		5.99		6.27		6.35	6.34	6.00	172		543		901		377	364	3	1.57		2.74		3.21		5.38	5.29	0.40 U
2/9/2011	7.88		6.23		6.38		6.49	6.51		155		371		729		296	296	5	2.10		2.37		3.43		6.99	7.09	0.40 U
5/17/2011	7.79		6.28		6.42		6.32	6.50	6.06	219		377		801		321	310	3	1.65		2.07		3.05		6.17	5.94	0.40 U
8/24/2011	8.14		6.45		6.47		6.46	6.74	6.03	202		603		941		359	359	2 J	1.69		1.85		2.88		5.71	5.71	0.40 U
11/3/2011	7.78		6.35		6.49		6.75	6.57	7.33	195		505		884		360	361	2	1.93		2.49		3.38		6.01	5.74	0.40 U
2/14/2012	7.94		6.42		6.54		6.64	6.59	6.04	194		425		873		363	361	2	1.67		2.11		2.91		5.33	5.37	0.40 U
5/2/2012	7.91		6.35		6.68		6.70	6.59	6.86	168		435		925		329	288	3	1.66		1.50		2.97		5.70	5.65	0.40 U
8/21/2012	7.66		6.32		6.62		6.43	6.69	6.39	192		451		898		311	315	3	1.62		1.58		2.96		4.75	4.72	0.40 U
11/13/2012	8.09		6.62		6.63		6.81	6.77	7.42	193		463		867		316	326	2490	1.63		1.69		3.00		4.80	4.80	0.40 U
2/12/2013	8.28		6.60		7.03		7.07	6.93	7.27	194		377		939		303	299	2 J	1.61		2.08		3.07		5.70	5.70	0.40 U
6/4/2013	8.21		6.60		6.75		6.94	6.78	7.32	202		516		945		290	299	2 J	1.62		1.98		3.00		3.60	3.60	0.40 U
8/27/2013	8.04		6.54		6.62		6.69	6.63	6.43	188		428		876		293	292	2 J	1.90		1.88		3.39		4.00	3.90	0.40 U
12/2/2013	8.13		6.58		6.88		6.93	6.79	6.20	193		513		866		312	310	2 J	1.54		1.57		2.65		3.56	3.56	0.40 U
3/17/2014	8.30		6.57		6.76		6.80	6.75	6.38	170		408		774		314	260	7	1.81		2.20 J		2.90		5.97	5.89	0.40 U
6/2/2014	8.00		6.44		6.42		6.52	6.48	5.97	192		4790		861		290	292	2 J	1.64		1.73		2.74		5.23	5.18	0.40 U
9/29/2014	8.04		6.59		7.26		7.11	7.34	6.35	192		396		840		281	284	3	1.62		1.71		2.57		4.44	4.45	0.40 U
11/17/2014	7.61		6.23		6.69		7.04	6.75	7.77	190		406		819		281	294	3	2.02		1.76		3.16		5.04 J	0.52 J	0.40 U

Table 3B. Summary of Groundwater Conventional Parameters: 2007 through 2014
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Date	Nitrate + Nitrite as N (mg/L)									Solids, total dissolved (TDS) (mg/L)									Sulfate (mg/L)								
MCL/SMCL	10									500									250								
WA WQ Std	10									500									250								
Well ID	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank
2/1/2007	0.28	0.58	0.96		0.94		0.75		0.03 J	142	146	522		420		231		5 U	1.4	1.4	0.1 J		0.2 J		14.8		0.2 U
4/18/2007	0.23	1.21	0.20		0.63		0.85		0.01 J	151	140	493		490		229		5 U	1.3	1.3	0.2 U		0.2 U		13.9		0.2 U
7/18/2007	0.05 U		0.19		0.08		0.70	0.68	0.01 J	154		414		495		262	248	5 U	1.4		0.2 U		0.2 U		11.3	11.4	0.2 U
10/9/2007	0.05 U	0.05 U	0.17		0.05 U		0.47		0.05 U	159	151	476		478		294		5 U	1.3	1.3	0.1 J		0.1 J		9.4		0.2 U
1/9/2008	0.05 U		0.07		0.05 U		0.58	0.54	0.05 U	148		578		508		239	233	5 U	0.8		0.2 U		0.2 U		14.0	14.9	0.2 U
4/30/2008	0.05 U		0.05 U		0.05 U		0.74	0.73	0.05 U	118		496		430		265	256	5 U	1.3		0.1 J		0.2 J		9.6	9.7	0.2 U
7/29/2008	0.10		0.15		0.05 U	0.05 U	1.48		0.05 U	161		415		506	505	363		5 U	1.3		0.1 J		0.1 J	0.2	6.2		0.2 U
10/22/2008	0.05 U		0.10		0.03 J	0.01 J	0.51			139		465		478	491	323			1.1		0.1 J		0.2 J	0.4	6.7		
2/1/2009	0.05 U		0.17		0.01 J		0.99	1.02	0.05	136		461		498		261	263	5 U	1.4		0.1 J		0.1 J		6.4	6.4	0.0 J
5/1/2009	0.01 J		0.21		0.03 J		0.12	0.13	0.02 J	130		460		513		223	220	7	1.7		0.4		0.2 U		6.7	6.6	0.2 U
8/1/2009	0.05 U		0.17	0.17	0.02 J		0.11		0.05 U	119		378	425	491		178		5 U	1.1		0.1 J	0.1 J	0.1 J		13.9		0.2 U
11/1/2009	0.05 U		0.06		0.05 U		0.05 U	0.05 U	0.05 U	121		452		496		198	201	5 U	3.3		0.2 U		0.2 U		15.0	14.9	0.2 U
2/10/2010	0.05 U		0.13		0.05 U	0.05 U	0.04 J		0.05 U	152		422		518	501	186		5	1.6		0.1 J		0.1 J	0.1 J	19.6		0.0 J
5/26/2010	0.03 J		0.22		0.04 J		0.11	0.11	0.04 J	129		340		508		166	178	5 U	1.5		0.8		0.2 J		15.3	13.4	0.4
8/18/2010	0.04 J		0.18		0.04 J		0.14	0.14	0.17	202		381		564		250	241	134	1.6		0.8		1.1		14.1	14.0	1.1
11/18/2010	0.05 U		0.12		0.05 U		0.09	0.09	0.05 U	98		330		462		153	161	5 U	1.1		0.4 U		0.4 U		12.3	11.7	0.4 U
2/9/2011	0.05 U		190.0		0.05 U		0.05 U	0.05 U	0.05 U	165		377		512		211	216	5 U	1.5		1.0		1.3		15.2	15.4	0.4 U
5/17/2011	0.01 J		0.14		0.02 J		0.15	0.14	0.01 J	129		374		559		209	194	5 U	0.9		0.2 J		0.3 J		15.9	15.1	0.4 U
8/24/2011	0.01 J		0.10		0.01 J		0.06	0.06	0.01 J	128		399		550		188	199	5 U	1.0		0.4 J		0.6		16.2	16.7	0.4 U
11/3/2011	0.05 U		0.14		0.01 J		0.10	0.09	0.05 U	115		350		532		217	220	5 U	1.1		0.6		0.8		15.8	15.0	0.4 U
2/14/2012	0.03 J		0.13		0.02 J		0.08	0.08	0.03 J	131		344		518		214	269	5 U	0.9		0.3 J		0.4 J		15.7	15.6	0.4 U
5/2/2012	0.05 U		0.10		0.01 J		0.05 J	0.03 J	0.05 U	129		336		547		230	222	5.5	0.8		0.3 J		0.3 J		16.4	16.3	0.4 U
8/21/2012	0.05 U		0.10		0.05 U		0.05	0.07	0.05 U	119		376		569		189	210	5 U	0.8		0.4		0.5		14.7	14.6	0.2 U
11/13/2012	0.01 J		0.05 U		0.01 J		0.04 J	0.03 J	0.05 U	131		331		537		188	188	5 U	0.9		0.4		0.5		14.5	14.5	0.2 U
2/12/2013	0.02 J		0.13		0.05 U		0.09	0.09	0.05 U	107		288		539		160	174	5.5	0.8		0.2		0.3		14.3	14.6	0.2 U
6/4/2013	0.05 U		0.05		0.05 U		0.09	0.07	0.05 U	141		340		553		179	168	5 U	0.8		0.4		0.6		13.5	13.3	0.2 U
8/27/2013	0.02 J		0.03 J		0.02 J		0.13	0.14	0.04 J	141		349		574		201	189	5 U	0.8		0.1 J		0.2 J		12.7	12.6	0.2 U
12/2/2013	0.05 U		0.20		0.01 J		0.03 J	0.03 J	0.01 J	132		356		530		223	197	5.5	0.8		0.1 J		0.2 J		12.3	11.9	0.2 U
3/17/2014	0.05 U		0.18 U		0.05 U		0.13 U	0.13 U	0.03 J	137		332		504		176	184	5 U	1.0		2.0 Ui		0.3		12.7	12.7	0.2 U
6/2/2014	0.05 U		0.05 U		0.05 U		0.14	0.14	0.05 U	NT		NT		NT		NT	NT	NT	0.9		0.2 U		0.1 J		10.1	9.9	0.2 U
9/29/2014	0.05 U		0.05 U		0.05 U		0.05 U	0.05 U	0.06	131		312		513		169	162	5 U	0.8		0.1 J		0.2		7.2	7.0	0.2 U
11/17/2014	0.05 U		0.05 U		0.05 U		0.05 U	0.05 U	0.03 J	NT		NT		NT		NT	NT	NT	1.6		0.2 J*		0.3		8.4 J*	0.8 J*	0.2 U

Table 3B. Summary of Groundwater Conventional Parameters: 2007 through 2014
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Date	Ammonia as N (mg/L) -- --									Chemical Oxygen Demand (COD) (mg/L) -- --									Tannin and Lignin (mg/L) -- --								
MCL/SMCL WA WQ Std Well ID	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank
2/1/2007	0.50	0.52	0.93		0.05 U		0.05 U		0.03 J	5.0 U	5.0 U	75.0		36.0		6.0		50.0 U	0.30	0.40	4.10		1.10		0.16 J		0.09 J
4/18/2007	0.50	0.50	0.71		0.05 U		0.05 U		0.05 U	6.0	6.0	80.0		39.0		14.0		4.0 J	0.30	0.30	11.90		1.30		0.20 U		0.20 U
7/18/2007	0.50		0.74		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		67.0		31.0		5.0 U	6.0	5.0 U	0.30		13.40		1.30		0.12 J	0.13 J	0.20 U
10/9/2007	0.48	0.49	0.98		0.05 U		0.05 U		0.05 U	5.0 U	5.0 U	71.0		33.0		17.0		5.0 U	0.30	0.30	4.70		1.10		0.30		0.20 U
1/9/2008	0.55		0.41		0.05 U		0.05 U	0.05 U	0.02 J	5.0 U		61.0		35.0		12.0	13.0	5.0 U	0.30		8.00		1.20		0.30	0.30	0.06 J
4/30/2008	0.46		0.39		0.05 U		0.05 U	0.05 U	0.05 U	3.0 J		76.0		42.0		13.0	14.0	5.0 U	0.30		22.50		1.20		0.20	0.20	0.20 U
7/29/2008	0.48		0.75		0.05 U	0.05 U	0.05 U		0.08	6.0		75.0		37.0	35.0	24.0		9.0	0.20		11.50		1.20	1.20	0.20		0.20 U
10/22/2008	0.53		0.54		0.05 U	0.05 U	0.05 U			6.0		65.0		39.0	41.0	16.0			0.30		2.50		1.10	1.10	0.20		
2/1/2009	0.51		1.44		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		69.0		42.0		16.0	16.0	5.0 U	0.20		3.40		1.40		0.17 J	0.20	0.20 U
5/1/2009	0.61		1.08		0.05 U		0.05 U	0.05 U	0.05 U	22.0		70.0		38.0		13.0	11.0	5.0 U	0.30		3.50		0.90		0.30	0.30	0.20 U
8/1/2009	0.49		1.24	1.14	0.05 U		0.05 U		0.01 J	3.0 J		106.0	83.0	43.0		12.0		3.0 J	0.30		10.70	31.40	0.90		0.09 J		0.20 U
11/1/2009	0.54		0.56		0.03 J		0.05 J	0.18	0.02 J	5.0 U		65.9		42.1		13.7	13.7	5.0 U	0.39		20.10		1.32		0.19 J	0.18 J	0.04 J
2/10/2010	0.53		1.23		0.05 U	0.05 U	0.05 U		0.05 U	5.0 U		68.1		34.8	34.8	5.0 U		5.0 U	0.28		10.00		1.30	1.04	0.07 J		0.20 U
5/26/2010	0.56		0.97		0.03 J		0.03 J	0.02 J	0.05 U	3.3 J		73.9		41.0		11.0	10.5	5.0 U	0.32		31.30		1.10		0.11 J	0.11 J	0.20 U
8/18/2010	0.53		1.22		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		74.1		41.1		10.9	11.8	5.0 U	0.34		5.22		1.68		0.18 J	0.14 J	0.04 J
11/18/2010	0.50		1.02		0.05 U		0.05 U	0.05 U	0.05 U	5.6		67.5		42.1		14.7	12.2	7.6	0.36		13.10		1.43		0.15 J	0.16 J	0.04 J
2/9/2011	0.51		1.21		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		74.9		44.4		9.1	5.0 U	5.0 U	0.42		15.70		1.58		0.21	0.25	0.09 J
5/17/2011	0.54		0.70		0.05 U		0.05 U	0.05 U	0.05 U	3.4 J		70.5		45.4		8.2	9.7	5.0 U	0.30		15.00		0.46		0.10 J	0.14 J	0.20 U
8/24/2011	0.55		0.66		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		84.4		41.5		9.8	8.8	5.0 U	0.26		21.40		1.15		0.09 J	0.12 J	0.20 U
11/3/2011	0.57		0.05 U		0.04 J		0.05 U	0.05 U	0.05 U	5.0 U		68.9		37.8		4.7 J	7.6	5.0 U	0.36		7.70		1.51		0.24	0.24	0.07 J
2/14/2012	0.54		0.81		0.05 U		0.02 J	0.05 U	0.05 U	6.1		73.8		42.5		19.7	60.2	3.5 J	0.50		22.40		2.36		0.22	0.20	0.10 J
5/2/2012	0.54		0.56		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		62.8		41.9		8.4	5.0 U	5.0 U	0.41		49.70		1.46		0.13 J	0.18 J	0.20 U
8/21/2012	0.54		0.58		0.05 U		0.05 U	0.05 U	0.05 U	3.6 J		69.4		43.9		6.6	6.1	5.0 U	0.20 J		21.20		1.42		0.20 U	0.20 U	0.20 U
11/13/2012	0.51		0.93		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		65.3		37.8		5.9	10.3	5.0 U	0.33		12.70		1.63		0.17	0.27	0.20 U
2/12/2013	0.52		0.74		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		56.9		41.2		6.3	7.3	5.0 U	0.31		13.20		1.06		0.09 J	0.09 J	0.20 U
6/4/2013	0.53		1.01		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		62.6		41.4		5.9	7.4	5.0 U	0.25		13.10		1.73		0.06 J	0.07 J	0.20 U
8/27/2013	0.54		0.71		0.05 U		0.05 U	0.05 U	0.05 U	3.0 J		67.9		42.2		7.5	10.1	5.0 U	0.28		8.60		1.18		0.13 J	0.15 J	0.20 U
12/2/2013	0.55		0.82		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		65.2		36.7		6.7	5.2	5.0 U	0.18 J		5.75		1.38		0.10 J	0.20 U	0.20 U
3/17/2014	0.55		1.21		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		72.9		38.5		6.7	5.7	5.0 U	0.23		29.00		1.52		0.03 J	0.06 J	0.20 U
6/2/2014	0.58		0.91		0.05 U		0.05 U	0.05 J	0.05 U	5.0 U		70.5		39.8		7.1	7.6	5.0 U	0.28		20.80		1.27		0.20 U	1.15 J	0.12 J
9/29/2014	0.52		1.24		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		68.2		38.5		6.3	5.8	5.0 U	0.30		22.60		0.92		0.10 J	0.08 J	0.20 U
11/17/2014	0.55		1.08		0.05 U		0.05 U	0.05 U	0.05 U	5.0 U		65.2		33.9		5.6	6.6	5.0 U	0.29		20.50		1.37		0.11 J	0.10 J	0.20 U

Table 3B. Summary of Groundwater Conventional Parameters: 2007 through 2014
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Date	Total Organic Carbon (TOC) (mg/L)									Total Coliforms MPN/100 mL								
MCL/SMCL	--									1/100 mL								
WA WQ Std	--									1/100 mL								
Well ID	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank
2/1/2007	1.10	1.00	28.20		15.60		3.60		0.08 J	1.0 U	1.0 U	1.0 U		1.0 U		1.0 U		1.0 U
4/18/2007	1.00	1.00	28.40		16.70		4.80		0.25 J	1.0 U	1.0 U	1.0 U		1.0 U		1.0 U		1.0 U
7/18/2007	0.90		28.60		15.60		5.20	5.20	0.07 J	1.0		6.0		##### >		1.0 U	1.0	1.0 U
10/9/2007	1.00	0.90	26.40		15.50		7.10		0.08 J	1.0 U	1.0 U	1.0 U		5.1		1.0 U		1.0 U
1/9/2008	0.80		23.90		15.80		6.00	6.10	0.14 J	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U	3.1
4/30/2008	0.90		27.80		17.50		5.90	5.90	0.50 U	1.0 U		1.0 U		2.0		1.0 U	1.0 U	1.0 U
7/29/2008	0.90		27.90		15.90	16.20	8.30		0.50 U	1.0 U		1.0 U		248.9	70.8	1.0 U		18.7
10/22/2008	0.90		23.80		15.50	16.30	6.60			1.0 U		1.0 U		1.0 U	1.0 U	1.0 U		24.9
2/1/2009	0.90		21.80		16.60		5.20	5.20	0.50 U	1.0 U		1.0 U		17.5		1.0	1.0 U	1.0 U
5/1/2009	1.00		22.00		15.80		4.70	4.90	0.50 U	1.0 U		1.0		1.0		1.0 U	1.0 U	4.2
8/1/2009	1.10		29.00	28.40	16.90		5.10		0.17 J	1.0 U		1.0 U	1.0 U	1.0 U		1.0 U		1.0
11/1/2009	0.72		23.70		16.70		5.27	5.15	0.50 U	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U	3.1
2/10/2010	0.77		23.80		17.10	16.50	3.91		0.50 U	1.0 U		1.0 U		1.0	1.0	1.0 U		1.0
5/26/2010	0.93		25.20		17.30		4.17	4.14	0.10 J	1.0 U		1.0 U		2.0		165.2	165.2	47.8
8/18/2010	0.81		21.50		15.30		3.70	3.46	0.50 U	1.0 U		1.0 U		1.0		9.7	3.0	18.9
11/18/2010	2.61		24.70		18.20		7.41	7.18	0.08 J	1.0		5.2		2.0		1.0	1.0 U	1.0
2/9/2011	1.15		21.60		17.20		4.37	4.16	0.50 U	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U	1.0 U
5/17/2011	0.94		18.80		16.40		2.94	3.01	0.07 J	2.0		1.0 U		1.0 U		1.0 U	1.0	1.0 U
8/24/2011	0.67		25.50		14.20		2.98	3.06	0.50 U	1.0 U		1.0 U		18.1		1.0 U	1.0 U	1.0 U
11/3/2011	1.00		4.41		14.60		3.13	3.35	0.50 U	1.0 U		P		P		P		1.0 U
2/14/2012	1.19		22.20		15.40		3.09	3.28	0.08 J	2.0		1.0 U		5.2		1.0 U	1.0 U	1.0 U
5/2/2012	0.68		17.30		15.50		2.64	4.04	0.50 U									
8/21/2012	0.84		19.30		14.80		2.51	2.56	0.50 U	1.0 U		1.0 U		1.0 U		2.0	1.0 U	1.0 U
11/13/2012	0.90		19.80		14.30		2.74	2.81	0.08 J	1.0 U		1.0 U		1.0		1.0 U		1.0 U
2/12/2013	0.73		15.40		15.50		2.54	2.46	0.50 U	1.0 U		10.0 U		1.0 U		1.0 U	1.0 U	1.0 U
6/4/2013	0.82		18.40		15.40		2.39	2.44	0.50 U									
8/27/2013	0.88		18.90		14.60		2.54	2.49	0.50 U	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U	1.0 U
12/2/2013	0.90		18.40		14.30		2.48	2.54	0.08 J	1.0 U		1.0 U		1.0 U		40.8 J	24.1 J	1.0 U
3/17/2014	0.84		20.40		13.30		2.29	2.23	0.50 U	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U	1.0 U
6/2/2014	1.00 U		19.80		14.60		2.34	2.48	0.26 J	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U	1.0 U
9/29/2014	0.78		19.50		14.00		2.25	2.15	0.50 U	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U	1.0 U
11/17/2014	0.78		18.00		13.80		2.45	2.32	0.12 J	1.0 U		1.0 U		1.0 U		4.1	1.0 U	1.0 U

Notes

µS/cm = microSiemen per centimeter.

J = result is an estimated concentration that is less than the method reporting limit, but greater than or equal to the method detection limit.

J* = result is an estimated concentration because of lab impression.

MCL = Federal maximum contaminant levels for drinking water.

MPN = most probable number.

mg/L = milligram per liter.

NT = not tested.

SMCL = Federal secondary maximum contaminant levels for drinking water.

U = analyte was not detected above the reported sample quantification limit.

WA WQ Std = State of Washington's water quality standards for groundwater (WAC 173-200).

Table 3C. Summary of Groundwater Metals: 2007 through 2014
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Date	Arsenic, dissolved (µg/L)									Barium, dissolved (µg/L)									Iron, dissolved (µg/L)								
MCL/SMCL	10									2,000									300								
WA WQ Std	0.05									1,000									300								
Well ID	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank
2/1/2007	6.8	5.8	145.0		1.1 B		5.0 U		5.0 U	28.6	28.9	101		47.0		19.1		5.0 U	38.6	36.7	110,000		846		20 U		20 U
4/18/2007	6.0	6.0	113.0		0.7 B		5.0 U		1.5 B	25.6	25.6	73.8		39.8		24.5		3.0 B	42.8	36.4	90,500		771		10.1 B		4.7 B
7/18/2007	5.4		113.0		5.0 U		5.0 U	5.0 U	5.0 U	33.0		80.6		50.1		24.6	23.0	5.0 U	38.3		88,100		699		20 U	20 U	20 U
10/9/2007	5.4	4.8 B	67.2		5.0 U		5.0 U		5.0 U	29.4	29.3	83.2		48.3		26.5		5.0 U	36.1	36	62,700		656		20 U		20 U
1/9/2008	6.7		42.6		5.0 U		5.0 U	5.0 U	0.7 U	26.7		65.4		42.3		18.3	19.0	0.6 U	41.3		35,500		608		7.8 J	8.2 J	3 U
4/30/2008	4.4 J		117.0		5.0 U		5.0 U	5.0 U	0.7 U	27.6		111		41.7		22.1	22.6	0.6 U	41.5		102,000		624		8.8 J	8.3 J	3 U
7/30/2008	5.4		111.0		0.8 J	5.0 U	5.0 U		0.6 U	29.7		122		49.5	50.9	31.5		0.5 U	35.2		96,800		593	591	20 U		4 U
10/22/2008	7.2		46.5		5.0 U	5.0 U	1.1 J			26.7		72.2		41.9	43.3	24.8			74.8		53,800		560	571	8.8 J		
2/1/2009	14.4		114.0		5.0 U		5.0 U	5.0 U	5.0 U	29.5		125		49.7		23.2	22.6	5.0 U	54.6		109,000		542		4.6 J	20 U	4.5 J
5/1/2009	6.2		120.0		1.6 J		0.6 J	0.7 J	5.0 U	26.7		111.0		45.4		16.7	16.8	5.0 U	51.7		102,000		473		6.1 J	4.9 J	20 U
8/1/2009	0.8 J		5.0 U	2.5 J	1.5 J		0.8 J		5.0 U	229		15.6	22.7	39.6		230		5.0 U	91.1		11.6 J	2,280	1340		91		0.8 J
11/1/2009	6.0		63.5		5.0 U		5.0 U	5.0 U	5.0 U	26.5		115.0		45.5		13.9	13.1	5.0 U	43.6		59,700		480		4.7 J	4.2 J	20 U
2/10/2010	7.1		133		3.0 J	2.5 J	1.6 J		5.0 U	28.4		132.0		49.6	52.2	14.3		5.0 U	33.7		94,700		465	493	20 U		20 U
5/26/2010	5.5		149		0.9 J		5.0 U	5.0 U	5.0 U	27.7		134.0		53.7		14.5	14.6	5.0 U	43.5		104,000		451		3.5 J	8.9 J	20 U
8/18/2010	5.3		139		0.9 J		5.0 U	5.0 U	3.0 J	25.8		119.0		47.7		14.9	14.3	1.5 J	38.6		104,000		482		3.7 J	1.6 J	20 U
11/18/2010	5.6		186		5.0 U		5.0 U	5.0 U	5.0 U	24.6		132.0		44.9		15.7	15.7	5.0 U	20 U		116,000		420		8.7 J	6 J	20 U
2/9/2011	5.5		119		5.0 U		5.0 U	5.0 U	5.0 U	28.6		142.0		53.6		16.9	16.6	5.0 U	46.8		109,000		466		20 U	20 U	20 U
5/17/2011	6.2		139		1.1 J		5.0 U	5.0 U	5.0 U	25.4		123.0		53.0		15.3	15.5	5.0 U	55.6		110,000		470		11.7 J	13 J	6.8 J
8/24/2011	6.4		155		5.0 U		5.0 U	5.0 U	5.0 U	24.4		120.0		47.2		15.8	15.3	5.0 U	35.1		107,000		412		20 U	1 J	20 U
11/3/2011	6.2		156		1.0 J		5.0 U	0.6 J	5.0 U	24.7		121.0		44.5		15.0	15.2	5.0 U	42.1		100,000		388		7.7 J	7.6 J	20 U
2/14/2012	5.2		158		0.6 J		5.0 U	5.0 U	5.0 U	27.2		136.0		48.4		16.7	16.3	0.6 J	42.8		97,800		375		20 U	20 U	20 U
5/2/2012	5.8		133		0.9 J		5.0 U	5.0 U	5.0 U	28.8		116.0		54.2		16.4	15.9	5.0 U	55.1		97,900		430		20 UJ	20 UJ	20 U
8/21/2012	4.9 J		135		5.0 U		5.0 U	5.0 U	5.0 U	27.5		114.0		52.7		15.3	15.5	5.0 U	43.4		99,200		417		20 U	20 U	20 U
11/13/2012	6.2		170		5.0 U		5.0 U	5.0 U	5.0 U	28.0		137.0		50.6		15.7	15.8	5.0 U	77.5		98,100		395		20 U	20 U	20 U
2/12/2013	6.1		119		5.0 U		5.0 U	5.0 U	5.0 U	26.1		90.4		54.9		13.9	14.2	5.0 U	60.1		91,600		450		4.4 J	4.6 J	20 U
6/4/2013	6.8		138		1.5 J		5.0 U	1.1 J	1.1 J	26.1		85.5		53.0		13.3	13.3	4.0 U	58.4		93,500		416		3.7 J	5.9 J	4.1 J
8/27/2013	6.3		140		1.0 J		5.0 U	5.0 U	5.0 U	27.5		115		54.4		16.1	15.2	4.0 U	64.6		109,000		416		20 U	5.8 J	20 U
12/2/2013	6.4		164		1.3 J		5.0 U	5.0 U	5.0 U	26.0		124		47.3		15.1	15.6	4.0 U	55.5		107,000		400		20 U	3 J	20 U
3/17/2014	6.00		175		0.78		0.50 U	0.50 U	0.50 U	27.4		140		50.3		15.4	15.5	4.0 U	69.3		127,000		424		20 U	8.5 J	20 U
6/2/2014	6.00		157		0.70		0.20 J	0.30 J	0.50 U	28.1		127		52.8		15.2	15	4.0 U	52.4		118,000		421		20 U	20 U	20 U
9/29/2014	5.86		191		0.69		0.25 J	0.24 J	0.50 U	27.6		135		50.0		14.9	15	4.0 U	72.7		111,000		409		20 U	20 U	8.3 J
11/17/2014	5.70		174		0.70		0.30 J	0.30 J	0.50 U	27.7		130		49.6		15.3	14.7	0.6 J	70		120,000		421		20 U	20 U	40 U

Table 3C. Summary of Groundwater Metals: 2007 through 2014
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Date	Manganese, dissolved (µg/L)									Cadmium, dissolved (µg/L)									Copper, dissolved (µg/L)								
MCL/SMCL	50									5									1,300								
WA WQ Std	50									10									1,000								
Well ID	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank
2/1/2007	112	114	13,500		1350		89.5		5 U	5.0 U	5.0 U	5.0 U		5.0 U		5.0 U		5.0 U	10.0 U	10.0 U	10.0 U		10.0 U		3.0 B		10.0 U
4/18/2007	107	106	13,500		1330		123		1.6 B	5.0 U	5.0 U	2.9 B		0.7 B		1.9 B		5.0 U	10.0 U	10.0 U	10.0 U		10.0 U		10.0 U		10.0 U
7/18/2007	118		14,000		1330		268	268	5 U	5.0 U		5.0 U		5.0 U		5.0 U	5.0 U		10.0 U		4.4 B		5.4 B		4.2 B	6.0 B	10.0 U
10/9/2007	121	120	14,700		1280		353		2.7 B	5.0 U	5.0 U	5.0 U		5.0 U		5.0 U			10.0 U	10.0 U	10.0 U		10.0 U		10.0 U		10.0 U
1/9/2008	125		17,900		1270		422	428	1.6 B	5.0 U		1.8 J		1.4 J		5.0 U	1.3 J		10.0 U		10.0 U		10.0 U		10.0 U	10.0 U	7.0 U
4/30/2008	110		12,600		1150		240	234	0.3 B	5.0 U		5.0 U		1.1 J		5.0 U	0.7 J		10.0 U		10.0 U		10.0 U		10.0 U	10.0 U	7.0 U
7/30/2008	111		13,100		1190	1210	309		0.2 U	5.0 U		4.3 J		5.0 U	5.0 U	0.2 J			10.0 U		10.0 U		1.4 J	1.4 J	3.3 J		1.4 B
10/22/2008	111		15,400		1290	1300	297			5.0 U		5.0 U		5.0 U	5.0 U	5.0 U			10.0 U		10.0 U		10.0 U	10.0 U	10.0 U		
2/1/2009	120		11,800		1250		175	174	0.2 J	5.0 U		1.2 J		5.0 U		0.2 J	0.3 J	0.2 J	10.0 U		10.0 U		2.1 J		1.6 J	2.6 J	10.0 U
5/1/2009	108		11,300		1230		114	116	0.4 J	5.0 U		2.1 J		5.0 U		5.0 U	5.0 U	5.0 U	10.0 U		10.0 U		10.0 U		10.0 U	10.0 U	5.8 J
8/1/2009	4220		7870	2540	2500		4180		0.2 J	5.0 U		5.0 U	5.0 U	5.0 U		5.0 U		5.0 U	22.2		10.0 U	10.0 U	10.0 U		21.2		10.0 U
11/1/2009	110		13,400		1300		204	204	0.7 J	5.0 U		5.0 U		5.0 U		5.0 U	5.0 U	5.0 U	10.0 U		10.0 U		10.0 U		10.0 U	10.0 U	10.0 U
2/10/2010	116		11,200		1260	1330	36.2		5 U	5.0 U		5.0 U		5.0 U	5.0 U	5.0 U		5.0 U	1.3 J		2.0 J		3.8 J	4.1 J	3.9 J		10.0 U
5/26/2010	115		9,380		1340		77.6	78	5 U	5.0 U		5.0 U		5.0 U		5.0 U	5.0 U	5.0 U	10.0 U		10.0 U		1.6 J		2.0 J	2.3 J	10.0 U
8/18/2010	108		9,670		1310		48	47.2	5 U	5.0 U		3.0 J		5.0 U		5.0 U	5.0 U	5.0 U	4.2 J		6.9 J		4.4 J		4.0 J	6.8 J	10.0 U
11/18/2010	112		7,880		1340		92.8	95.4	5 U	5.0 U		4.5 J		5.0 U		5.0 U	5.0 U	5.0 U	10.0 U		10.0 U		10.0 U		10.0 U	10.0 U	5.8 J
2/9/2011	125		9,610		1400		159	160	0.2 J									5.0 U	10.0 U		3.3 J		10.0 U		2.0 J	2.0 J	10.0 U
5/17/2011	100		13,600		1460		122	116	5 U									5.0 U	10.0 U		10.0 U		2.8 J		10.0 U	10.0 U	2.2 J
8/24/2011	97.2		14,000		1340		144	136	5 U									5.0 U	10.0 U		10.0 U		10.0 U		10.0 U	10.0 U	10.0 U
11/3/2011	105				1300		149	150	0.5 J	5.0 U		2.9 J		2.6 J		5.0 U		5.0 U	10.0 U		10.0 U		10.0 U		10.0 U	2.3 J	10.0 U
2/14/2012	114		8,650		1510		252	242	0.3 J	5.0 U		5.0 U		5.0 U		5.0 U	5.0 U	5.0 U	10.0 U		5.2 J		1.7 J		1.7 J	2.9	10.0 U
5/2/2012	116		12,900		1570		254	252	5 U	5.0 U		5.0 U		0.6 J		5.0 U	5.0 U	5.0 U	0.6 J		10.0 U		1.7 J		2.1 J	2.2	10.0 U
8/21/2012	113		14,000		1510		201	200	5 U	NT		NT		NT		NT		NT	10.0 U		10.0 U		1.5 J		2.1 J	1.9	10.0 U
11/13/2012	119		9,650		1550		242	244	5 U	NT		NT		NT		NT		NT	10.0 U		10.0 U		3.4 J		10.0 U	10.0 U	10.0 U
2/12/2013	110		10,700		1610		220	220	5 U	NT		NT		NT		NT		NT	10.0 U		10.0 U		1.5 J		1.4 J	1.7 J	10.0 U
6/4/2013	118		14,800		1680		212	209	6.2	NT		NT		NT		NT		NT	4.0 U		4.0 U		2.8 J		2.1 J	2.0 J	4.0 U
8/27/2013	119		14,200		1700		224	219	0.5 J	NT		NT		NT		NT		NT	4.0 U		4.0 U		2.3 J		2.0 J	1.6 J	4.0 U
12/2/2013	111				1580		217	221	0.1 J	NT		NT		NT		NT		NT	4.0 U		4.0 U		3.6 J		2.6 J	2.9 J	4.0 U
3/17/2014	119		10,400		1640		287	282	0.3 J	NT		NT		NT		NT		NT	4.0 U		4.0 U		4.0 U		4.0 U	4.0 U	4.0 U
6/2/2014	116		12,300		1680		253	250	1 U	NT		NT		NT		NT		NT	4.0 U		4.0 U		2.6 J		2.0 J	2.1 J	4.0 U
9/29/2014	118		7,310		1650		240	241	0.6 J	NT		NT		NT		NT		NT	4.0 U		4.0 U		4.0 U		4.0 U	4.0 U	1.2 J
11/17/2014	115		8,620		1680		265	267	0.2 J	NT		NT		NT		NT		NT	4.0 U		4.0 U		4.0 U		4.0 U	4.0 U	1.0 J

Table 3C. Summary of Groundwater Metals: 2007 through 2014
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Date	Nickel, dissolved (µg/L)									Zinc, dissolved (µg/L)								
MCL/SMCL	100									5,000								
WA WQ Std	--									5,000								
Well ID	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank	BXS-4	BXS-4 Dup	BXS-3	BXS-3 Dup	BXS-2	BXS-2 Dup	BXS-1	BXS-1 Dup	Field Blank
2/1/2007	20.0 U	20.0 U	20.0 U		38.4		20.0 U		20.0 U	2.4 B	10.0 U	12.9		5.8 B		4.0 B		10.0 U
4/18/2007	20.0 U	20.0 U	18.2 B		33.9		10.4 B		20.0 U	10.0 U	10.0 U	8.5 B		30.2		10.0 U		10.0 U
7/18/2007	20.0 U		20.4		30.1		20.0 U	20.0 U	20.0 U	10.0 U		12.4		11.1		8.0 B	6.5 B	10.0 U
10/9/2007	20.0 U	20.0 U	20.0 U		31.4		20.0 U		20.0 U	10.0 U	12.9	15.9		22.3		7.9 B		10.0 U
1/9/2008	20.0 U		17.0 J		30.6		16.0 J	15.5 J	2.0 U	8.3 J		10.0 U		14.8		10.0 U	8.0 J	7.0 U
4/30/2008	20.0 U		20.2		31.8		11.1 J	11.8 J	2.0 U	10.0 U		10.0 U		10.0 U		10.0 U	10.0 U	7.0 U
7/30/2008	20.0 U		4.5 J		24.8	25.1	10.2 J		0.5 U	1.0 J		4.8 J		4.4 J	4.2 J	9.1 J		1.5 B
10/22/2008	20.0 U		22.8		31.7	32.4	15.5 J			10.0 U		3.9 J		6.2 J	7.1 J	12.1		
2/1/2009	20.0 U		20.6		32.1		10.7 J	10.5 J	20.0 U	1.5 J		2.1 J		6.5 J		3.6 J	3.5 J	1.6 J
5/1/2009	20.0 U		17.7 J		31.2		7.0 J	7.9 J	20.0 U	10.0 U		3.9 J		3.7 J		1.5 J	2.2 J	5.0 J
8/1/2009	104.0		48.5	26.7	134.0		109.0		20.0 U	3.8 J		2.6 J	2.4 J	10.0 U		3.4 J		2.4 J
11/1/2009	20.0 U		13.2 J		31.1		11.1 J	10.1 J	20.0 U	10.0 U		1.5 J		2.8 J		1.5 J	10.0 U	10.0 U
2/10/2010	20.0 U		22.8		32.4	34.0	5.9 J		20.0 U	10.0 U		1.6 J		5.3 J	5.8 J	1.7 J		10.0 U
5/26/2010	20.0 U		19.5 J		32.6		6.5 J	6.7 J	20.0 U	10.0 U		10.0 U		3.5 J		2.1 J	2.5 J	10.0 U
8/18/2010	20.0 U		12.5 J		29.9		6.8 J	5.5 J	20.0 U	10.0 U		10.0 U		1.7 J		10.0 U	10.0 U	1.9 J
11/18/2010	20.0 U		17.5 J		33.3		5.8 J	5.2 J	20.0 U	10.0 U		2.3 J		4.8 J		10.0 U	1.9 J	10.0 U
2/9/2011	20.0 U		20.8		34.4		10.0 J	9.6 J	20.0 U	0.4 J		20.0 U		4.9 J		3.1 J	2.5 J	0.3 J
5/17/2011	20.0 U		15.3 J		38.7		8.7 J	7.0 J	20.0 U									
8/24/2011	20.0 U		16.2 J		32.2		8.5 J	9.2 J	20.0 U	10.0 U		4.2 J		4.7 J		1.7 J	3.1 J	10.0 U
11/3/2011	20.0 U		11.2 J		30.5		10.6 J	10.1 J	20.0 U	10.0 U		3.0 J		4.0 J		1.0 J	1.3 J	10.0 U
2/14/2012	20.0 U		22.7		29.6		9.4 J	9.3 J	20.0 U	0.7 J		6.8 J		5.5 J		3.0 J	3.2 J	0.7 J
5/2/2012	20.0 U		13.0 J		33.7		9.2 J	8.9 J	20.0 U	0.4 J		10.0 U		4.3 J		2.5 J	2.3 J	10.0 U
8/21/2012	0.7 J		15.8 J		33.5		8.9 J	9.1 J	20.0 U	10.0 U		0.8 J		2.3 J		2.6 J	2.5 J	10.0 U
11/13/2012	20.0 U		13.6 J		31.7		8.8 J	9.7 J	20.0 U	10.0 U		0.8 J		3.8 J		2.7 J	2.3 J	10.0 U
2/12/2013	20.0 U		18.2 J		36.1		9.2 J	9.4 J	20.0 U	10.0 U		0.9 J		3.2 J		2.4 J	2.1 J	10.0 U
6/4/2013	0.4 J		18.4		36.9		8.5	8.4	4.0 U	4.0 U		2.7 J		3.8 J		2.4 J	2.5	4.0 U
8/27/2013	2.2 J		22.2		38.4		11.2	10.8	4.0 U	4.0 U		2.9 J		3.6 J		2.7 J	2.5 J	4.0 U
12/2/2013	5.4		25.1		38.2		12.8	13.5	4.0 U	4.0 U		1.9 J		3.7 J		3.1 J	3.1 J	4.0 U
3/17/2014	4.0 U		11.2		31.0		7.4	7.6	4.0 U	4.0 U		0.8 J		4.4		2.8 J	2.8 J	4.0 U
6/2/2014	2.2 J		21.2		38.5		10.9	10.4	4.0 U	4.0 U		1.3 J		3.4 J		2.2 J	2.2 J	4.0 U
9/29/2014	4.0 U		16.1		34.3		8.8	9.0	0.4 J	0.5 J		1.7 J		5.6		3.2 J	2.4 J	4.0 U
11/17/2014	1.1 J		19.7		35.8		10.0	10.1	4.0 U	5.0 U		2.3 J		4.4 J		2.1 J	2.6 J	5.0 U

Notes

µg/L = microgram per liter.

B = detected in laboratory method blank.

J = result is an estimated concentration that is less than the method reporting limit, but greater than or equal to the method detection limit.

MCL = Federal maximum contaminant levels for drinking water.

NT = not tested.

SMCL = Federal secondary maximum contaminant levels for drinking water.

R = rejected value.

U = analyte was not detected above the reported sample quantification limit.

WA WQ Std = State of Washington's water quality standards for groundwater (WAC 173-200).

Table 4. Parameters Statistically Higher than Background: 1989-2014

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Analyte Group	Parameter[1]	Monitoring Period	Unit	Mean Value Downgradient[2,3]			Mean Value Upgradient[2]
				BXS-1	BXS-2	BXS-3	BXS-4
Conventionals	Ammonia as Nitrogen	2001	mg/L			0.10	0.50
Conventionals	Ammonia as Nitrogen	2007	mg/L			0.84	0.50
Conventionals	Ammonia as Nitrogen	2009	mg/L			1.08	0.54
Conventionals	Ammonia as Nitrogen	2010	mg/L			1.11	0.53
Conventionals	Ammonia as Nitrogen	2013	mg/L			0.82	0.53
Conventionals	Ammonia as Nitrogen	2014	mg/L			1.11	0.55
Conventionals	Carbon, Total Organic	1992	mg/L	3.6	5.0	18.7	1.5
Conventionals	Carbon, Total Organic	1993	mg/L		7.3	20.0	2.0
Conventionals	Carbon, Total Organic	1994	mg/L		8.6	21.9	2.3
Conventionals	Carbon, Total Organic	1995	mg/L		10.7	30.6	3.4
Conventionals	Carbon, Total Organic	1996	mg/L	4.9	12.7	38.5	2.3
Conventionals	Carbon, Total Organic	1997	mg/L		15.0		3.8
Conventionals	Carbon, Total Organic	1998	mg/L			32.1	10.8
Conventionals	Carbon, Total Organic	1999	mg/L		15.8	31.8	6.6
Conventionals	Carbon, Total Organic	2000	mg/L	8.1	15.2		1.0
Conventionals	Carbon, Total Organic	2001	mg/L	7.5	14.6	25.2	3.1
Conventionals	Carbon, Total Organic	2002	mg/L	6.4	13.8	22.2	2.0
Conventionals	Carbon, Total Organic	2003	mg/L		14.0	21.5	0.7
Conventionals	Carbon, Total Organic	2004	mg/L	5.1	14.7	23.1	0.9
Conventionals	Carbon, Total Organic	2005	mg/L	5.7	15.8	25.1	1.1
Conventionals	Carbon, Total Organic	2006	mg/L	5.1	14.5	28.4	1.0
Conventionals	Carbon, Total Organic	2007	mg/L	5.2	15.8	27.9	1.0
Conventionals	Carbon, Total Organic	2008	mg/L	6.7	16.2	25.9	0.9
Conventionals	Carbon, Total Organic	2009	mg/L	5.1	16.5	24.1	0.9
Conventionals	Carbon, Total Organic	2010	mg/L	4.8	17.0	23.8	1.3
Conventionals	Carbon, Total Organic	2011	mg/L	3.4	15.6	17.6	0.9
Conventionals	Carbon, Total Organic	2012	mg/L	2.8	15.0	19.7	0.9
Conventionals	Carbon, Total Organic	2013	mg/L	2.5	15	18	0.83
Conventionals	Carbon, Total Organic	2014	mg/L	2.3	14	19	0.85
Conventionals	Chemical Oxygen Demand	1990	mg/L	27.9	41.2	97.8	2.2
Conventionals	Chemical Oxygen Demand	1993	mg/L			106.0	30.5
Conventionals	Chemical Oxygen Demand	1994	mg/L		30.0	83.0	22.0
Conventionals	Chemical Oxygen Demand	1995	mg/L			90.0	32.0
Conventionals	Chemical Oxygen Demand	1996	mg/L		41.0	98.0	16.0
Conventionals	Chemical Oxygen Demand	1997	mg/L		43.0	87.0	19.0
Conventionals	Chemical Oxygen Demand	1998	mg/L		51.0	98.0	20.1
Conventionals	Chemical Oxygen Demand	1999	mg/L			92.0	40.5
Conventionals	Chemical Oxygen Demand	2000	mg/L		43.5	71.3	13.6
Conventionals	Chemical Oxygen Demand	2001	mg/L	22.3	42.5	69.5	17.3
Conventionals	Chemical Oxygen Demand	2002	mg/L	19.0	38.0	60.0	18.0
Conventionals	Chemical Oxygen Demand	2003	mg/L		37.0	55.8	2.9
Conventionals	Chemical Oxygen Demand	2004	mg/L		38.0	58.8	2.9
Conventionals	Chemical Oxygen Demand	2005	mg/L		42.8	69.5	8.4
Conventionals	Chemical Oxygen Demand	2006	mg/L	12.5	36.0	72.0	2.9
Conventionals	Chemical Oxygen Demand	2007	mg/L	9.9	34.8	73.3	3.4

Table 4. Parameters Statistically Higher than Background: 1989-2014

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Analyte Group	Parameter[1]	Monitoring Period	Unit	Mean Value Downgradient[2,3]			Mean Value Upgradient[2]
				BXS-1	BXS-2	BXS-3	BXS-4
Conventionals	Chemical Oxygen Demand	2008	mg/L	16.3	38.3	69.3	4.4
Conventionals	Chemical Oxygen Demand	2009	mg/L	13.7	41.3	77.7	7.5
Conventionals	Chemical Oxygen Demand	2010	mg/L	9.8	39.8	70.9	3.5
Conventionals	Chemical Oxygen Demand	2011	mg/L	8.0	42.3	74.7	4.6
Conventionals	Chemical Oxygen Demand	2012	mg/L		41.5	67.8	3.7
Conventionals	Chemical Oxygen Demand	2013	mg/L	6.6	40	63	4.5
Conventionals	Chemical Oxygen Demand	2014	mg/L	6.4	38	69	ND
Conventionals	Chloride	1989	mg/L	45.0	61.0	17.0	6.6
Conventionals	Chloride	1990	mg/L	22.5	14.5	6.8	2.2
Conventionals	Chloride	1992	mg/L	16.7	6.7	7.7	2.2
Conventionals	Chloride	1993	mg/L	12.1	6.6	12.8	2.3
Conventionals	Chloride	1994	mg/L	13.0	7.4	7.4	2.1
Conventionals	Chloride	1995	mg/L	14.0	10.0	9.6	1.9
Conventionals	Chloride	1996	mg/L	14.6	17.3	9.1	2.0
Conventionals	Chloride	1997	mg/L	12.6	14.8	35.0	2.0
Conventionals	Chloride	1998	mg/L	11.6	11.0	6.3	2.1
Conventionals	Chloride	1999	mg/L	10.0		6.1	2.2
Conventionals	Chloride	2000	mg/L	7.8	8.3	5.0	2.1
Conventionals	Chloride	2001	mg/L	5.9	7.4	4.7	2.1
Conventionals	Chloride	2002	mg/L	5.3	6.5	3.8	2.0
Conventionals	Chloride	2003	mg/L	4.6	5.5		2.0
Conventionals	Chloride	2004	mg/L		4.3	2.3	1.8
Conventionals	Chloride	2005	mg/L	4.5	4.4	3.7	1.8
Conventionals	Chloride	2006	mg/L	4.0	3.5	2.8	1.7
Conventionals	Chloride	2007	mg/L	5.5	4.4	2.7	1.7
Conventionals	Chloride	2008	mg/L	5.1	4.5	3.0	1.9
Conventionals	Chloride	2009	mg/L	6.8	4.8	3.6	1.9
Conventionals	Chloride	2010	mg/L	5.6	3.7	3.0	1.8
Conventionals	Chloride	2011	mg/L	6.2	3.2		1.8
Conventionals	Chloride	2012	mg/L		3.0		1.7
Conventionals	Chloride	2013	mg/L	4.2	3.0	1.9	1.7
Conventionals	Chloride	2014	mg/L	5.2	2.8	1.9	1.8
Conventionals	Coliform, total	2010	mg/L		2.0		0.6
Conventionals	Conductivity	1989	µS/cm	351	607	514	180
Conventionals	Conductivity	1990	µS/cm	366	624	500	214
Conventionals	Conductivity	1992	µS/cm	292	586	533	189
Conventionals	Conductivity	1993	µS/cm		487	526	173
Conventionals	Conductivity	1994	µS/cm	214	479	602	169
Conventionals	Conductivity	1995	µS/cm	333	623		149
Conventionals	Conductivity	1996	µS/cm	290	602	787	161
Conventionals	Conductivity	1997	µS/cm	326		765	169
Conventionals	Conductivity	1998	µS/cm	393	678	738	177
Conventionals	Conductivity	1999	µS/cm	406	786	748	177
Conventionals	Conductivity	2000	µS/cm	417	762	651	166
Conventionals	Conductivity	2001	µS/cm	493	878	886	193

Table 4. Parameters Statistically Higher than Background: 1989-2014

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Analyte Group	Parameter[1]	Monitoring Period	Unit	Mean Value Downgradient[2,3]			Mean Value Upgradient[2]
				BXS-1	BXS-2	BXS-3	BXS-4
Conventionals	Conductivity	2002	µS/cm	470	849	825	187
Conventionals	Conductivity	2004	µS/cm		821	853	198
Conventionals	Conductivity	2005	µS/cm	393	788	750	192
Conventionals	Conductivity	2006	µS/cm	414	773	785	191
Conventionals	Conductivity	2007	µS/cm	397	799	804	191
Conventionals	Conductivity	2008	µS/cm	465	758	771	189
Conventionals	Conductivity	2009	µS/cm	340	793	730	185
Conventionals	Conductivity	2010	µS/cm	304	825	707	196
Conventionals	Conductivity	2011	µS/cm	334	839	464	193
Conventionals	Conductivity	2012	µS/cm	330	891	444	187
Conventionals	Conductivity	2013	µS/cm	290	879	643	191
Conventionals	Conductivity	2014	µS/cm	292	824	1,500	186
Conventionals	Nitrate + Nitrite as Nitrogen	1990	mg/L	0.72			0.10
Conventionals	Nitrate + Nitrite as Nitrogen	1993	mg/L	0.79			0.18
Conventionals	Nitrate + Nitrite as Nitrogen	1994	mg/L	0.50			ND
Conventionals	Nitrate + Nitrite as Nitrogen	1996	mg/L	1.65			ND
Conventionals	Nitrate + Nitrite as Nitrogen	1997	mg/L	0.75			ND
Conventionals	Nitrate + Nitrite as Nitrogen	1999	mg/L	0.43			ND
Conventionals	Nitrate + Nitrite as Nitrogen	2000	mg/L	0.33			0.10
Conventionals	Nitrate + Nitrite as Nitrogen	2002	mg/L	0.50			0.20
Conventionals	Nitrate + Nitrite as Nitrogen	2004	mg/L	0.85			0.06
Conventionals	Nitrate + Nitrite as Nitrogen	2005	mg/L	0.75			0.06
Conventionals	Nitrate + Nitrite as Nitrogen	2006	mg/L	0.71			0.04
Conventionals	Nitrate + Nitrite as Nitrogen	2007	mg/L	0.69			0.14
Conventionals	Nitrate + Nitrite as Nitrogen	2008	mg/L	0.83			0.04
Conventionals	Nitrate + Nitrite as Nitrogen	2009	mg/L	0.31		0.15	0.02
Conventionals	Nitrate + Nitrite as Nitrogen	2010	mg/L	0.09		0.16	0.03
Conventionals	Nitrate + Nitrite as Nitrogen	2011	mg/L	47.60			0.02
Conventionals	Nitrate + Nitrite as Nitrogen	2012	mg/L	0.05		0.09	0.02
Conventionals	Nitrate + Nitrite as Nitrogen	2013	mg/L	0.08		0.10	0.03
Conventionals	Nitrate + Nitrite as Nitrogen	2014	mg/L	0.09		0.08	0.05
Conventionals	pH	1992	--	6.1	6.3	6.4	7.9
Conventionals	pH	2000	--	6.1	6.4	6.5	7.9
Conventionals	pH	2001	--	6.1	6.4	6.7	7.9
Conventionals	Solids, Total Dissolved	1990	mg/L		397	436	228
Conventionals	Solids, Total Dissolved	1992	mg/L		352	351	147
Conventionals	Solids, Total Dissolved	1993	mg/L		330		141
Conventionals	Solids, Total Dissolved	1994	mg/L	161	330	418	134
Conventionals	Solids, Total Dissolved	1995	mg/L	188	361	492	141
Conventionals	Solids, Total Dissolved	1996	mg/L	224	423	604	153
Conventionals	Solids, Total Dissolved	1997	mg/L	236	456	613	150
Conventionals	Solids, Total Dissolved	1998	mg/L	273	473	562	137
Conventionals	Solids, Total Dissolved	1999	mg/L	256	524	517	156
Conventionals	Solids, Total Dissolved	2000	mg/L	297	544	527	140
Conventionals	Solids, Total Dissolved	2001	mg/L	261	299	346	135

Table 4. Parameters Statistically Higher than Background: 1989-2014

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Analyte Group	Parameter[1]	Monitoring Period	Unit	Mean Value Downgradient[2,3]			Mean Value Upgradient[2]
				BXS-1	BXS-2	BXS-3	BXS-4
Conventionals	Solids, Total Dissolved	2002	mg/L	298	466	518	145
Conventionals	Solids, Total Dissolved	2003	mg/L	291	525	572	132
Conventionals	Solids, Total Dissolved	2004	mg/L	228	439	493	127
Conventionals	Solids, Total Dissolved	2005	mg/L	255	516	449	135
Conventionals	Solids, Total Dissolved	2006	mg/L	259	507	526	145
Conventionals	Solids, Total Dissolved	2007	mg/L	254	471	476	152
Conventionals	Solids, Total Dissolved	2008	mg/L	298	481	489	142
Conventionals	Solids, Total Dissolved	2009	mg/L	215	500	438	127
Conventionals	Solids, Total Dissolved	2010	mg/L	189	513	368	145
Conventionals	Solids, Total Dissolved	2011	mg/L	206	538	375	134
Conventionals	Solids, Total Dissolved	2012	mg/L	205	543	347	128
Conventionals	Solids, Total Dissolved	2013	mg/L	191	549	333	103
Conventionals	Solids, Total Dissolved	2014	mg/L	173	509	322	134
Conventionals	Sulfate	1989	mg/L	5.9			2.3
Conventionals	Sulfate	1990	mg/L	6.6			1.9
Conventionals	Sulfate	1992	mg/L	9.1			2.0
Conventionals	Sulfate	1993	mg/L	10.0			2.0
Conventionals	Sulfate	1994	mg/L	11.8			1.9
Conventionals	Sulfate	1995	mg/L	12.0			1.8
Conventionals	Sulfate	1996	mg/L	10.7			1.7
Conventionals	Sulfate	1997	mg/L	11.8			1.6
Conventionals	Sulfate	1998	mg/L	9.5			1.3
Conventionals	Sulfate	1999	mg/L	7.8			1.4
Conventionals	Sulfate	2001	mg/L	7.5			1.4
Conventionals	Sulfate	2002	mg/L	7.3			1.4
Conventionals	Sulfate	2005	mg/L	10.1			1.3
Conventionals	Sulfate	2006	mg/L	11.3			1.4
Conventionals	Sulfate	2007	mg/L	12.4			1.4
Conventionals	Sulfate	2008	mg/L	9.1			1.1
Conventionals	Sulfate	2009	mg/L	10.5			1.9
Conventionals	Sulfate	2010	mg/L	15.3			1.4
Conventionals	Sulfate	2011	mg/L	15.8			1.1
Conventionals	Sulfate	2012	mg/L	15.3			0.8
Conventionals	Sulfate	2013	mg/L	13			0.82
Conventionals	Sulfate	2014	mg/L	10			1.10
Conventionals	Tannin and Lignin	1990	mg/L			3.1	1.4
Conventionals	Tannin and Lignin	1993	mg/L		0.5		0.3
Conventionals	Tannin and Lignin	1994	mg/L		0.5	1.0	0.2
Conventionals	Tannin and Lignin	1995	mg/L			3.1	0.6
Conventionals	Tannin and Lignin	1996	mg/L		0.7	5.6	0.3
Conventionals	Tannin and Lignin	1998	mg/L			8.1	0.7
Conventionals	Tannin and Lignin	1999	mg/L			12.2	0.5
Conventionals	Tannin and Lignin	2000	mg/L		9.1	9.2	0.4
Conventionals	Tannin and Lignin	2002	mg/L		1.6	11.1	0.4
Conventionals	Tannin and Lignin	2003	mg/L			6.3	0.4

Table 4. Parameters Statistically Higher than Background: 1989-2014

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Analyte Group	Parameter[1]	Monitoring Period	Unit	Mean Value Downgradient[2,3]			Mean Value Upgradient[2]
				BXS-1	BXS-2	BXS-3	BXS-4
Conventionals	Tannin and Lignin	2004	mg/L		1.4		0.5
Conventionals	Tannin and Lignin	2005	mg/L			8.1	0.4
Conventionals	Tannin and Lignin	2006	mg/L			11.5	0.4
Conventionals	Tannin and Lignin	2007	mg/L		1.2	8.5	0.3
Conventionals	Tannin and Lignin	2008	mg/L		1.2	11.1	0.3
Conventionals	Tannin and Lignin	2009	mg/L		1.1	9.4	0.3
Conventionals	Tannin and Lignin	2010	mg/L		1.4	14.9	0.3
Conventionals	Tannin and Lignin	2011	mg/L		1.2	15.0	0.3
Conventionals	Tannin and Lignin	2012	mg/L		1.7	26.5	0.4
Conventionals	Tannin and Lignin	2013	mg/L		1.3	10	0.26
Conventionals	Tannin and Lignin	2014	mg/L		1.3	23	0.28
Metals	Arsenic	1996	µg/L			9.0	4.0
Metals	Arsenic	1997	µg/L			15.0	5.0
Metals	Arsenic	1998	µg/L			20.0	4.6
Metals	Arsenic	1999	µg/L			34.0	5.8
Metals	Arsenic	2002	µg/L			10.4	3.8
Metals	Arsenic	2007	µg/L			110	5.9
Metals	Arsenic	2008	µg/L			79.3	5.9
Metals	Arsenic	2009	µg/L			75.0	6.9
Metals	Arsenic	2010	µg/L			151.8	5.9
Metals	Arsenic	2011	µg/L			142.3	6.1
Metals	Arsenic	2012	µg/L			149.0	5.5
Metals	Arsenic	2013	µg/L			140	6.4
Metals	Arsenic	2014	µg/L			174	5.9
Metals	Barium	1993	µg/L			38.0	28.0
Metals	Barium	1994	µg/L		38.0	51.0	25.0
Metals	Barium	1995	µg/L		45.0	58.0	27.0
Metals	Barium	1996	µg/L		48.0	74.0	26.0
Metals	Barium	1997	µg/L		50.0	58.0	21.0
Metals	Barium	1998	µg/L		51.0	65.0	26.0
Metals	Barium	1999	µg/L		51.0	58.0	27.0
Metals	Barium	2000	µg/L			87.8	26.5
Metals	Barium	2001	µg/L	28.3	51.0	60.0	27.3
Metals	Barium	2002	µg/L		50.0	78.0	28.0
Metals	Barium	2003	µg/L		46.5	54.7	29.2
Metals	Barium	2004	µg/L		48.0	70.9	23.1
Metals	Barium	2005	µg/L		44.3	87.8	29.1
Metals	Barium	2006	µg/L		45.9	95.4	31.2
Metals	Barium	2007	µg/L		46.3	84.6	29.2
Metals	Barium	2008	µg/L		43.9	92.7	27.7
Metals	Barium	2009	µg/L		45.1	91.7	77.9
Metals	Barium	2011	µg/L		49.6	126.5	25.8
Metals	Barium	2012	µg/L		51.5	125.8	27.9
Metals	Barium	2013	µg/L		52	104	26
Metals	Barium	2014	µg/L		51	133	28

Table 4. Parameters Statistically Higher than Background: 1989-2014
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Analyte Group	Parameter[1]	Monitoring Period	Unit	Mean Value Downgradient[2,3]			Mean Value Upgradient[2]
				BXS-1	BXS-2	BXS-3	BXS-4
Metals	Cadmium	2002	µg/L		1.1	1.1	ND
Metals	Copper	1993	µg/L			8	5
Metals	Iron	1990	µg/L		140	1,950	48
Metals	Iron	1994	µg/L		748	1,950	45
Metals	Iron	1995	µg/L		1,120	341	50
Metals	Iron	1996	µg/L		1,520	9,490	46
Metals	Iron	1997	µg/L		1,220	17,800	50
Metals	Iron	1998	µg/L		1,130	20,700	56
Metals	Iron	1999	µg/L		950	34,500	30
Metals	Iron	2000	µg/L		665	37,740	47.5
Metals	Iron	2001	µg/L	10	715	6,538	42.5
Metals	Iron	2002	µg/L		729	10,474	42
Metals	Iron	2003	µg/L		814		42.45
Metals	Iron	2004	µg/L		784		38.18
Metals	Iron	2005	µg/L		758	10,013	42.6
Metals	Iron	2006	µg/L		813	47,648	39.7
Metals	Iron	2007	µg/L		743	87,825	39.0
Metals	Iron	2008	µg/L		596	72,025	48.2
Metals	Iron	2009	µg/L		709	67,678	60.3
Metals	Iron	2010	µg/L		455	104,675	31.5
Metals	Iron	2011	µg/L		434	106,500	44.9
Metals	Iron	2012	µg/L		404	98,250	54.7
Metals	Iron	2013	µg/L		421	100,275	60
Metals	Iron	2014	µg/L		419	119,000	66
Metals	Lead	1993	µg/L			2	1
Metals	Manganese	1989	µg/L	210	580	1,100	120
Metals	Manganese	1990	µg/L		650	1,820	99
Metals	Manganese	1993	µg/L		570		110
Metals	Manganese	1994	µg/L		670	1,110	120
Metals	Manganese	1995	µg/L		834	3,780	122
Metals	Manganese	1996	µg/L		1,120	10,800	121
Metals	Manganese	1997	µg/L		1,510	13,000	90
Metals	Manganese	1998	µg/L	175	1,650	13,800	126
Metals	Manganese	1999	µg/L	200	1,420	14,800	116
Metals	Manganese	2000	µg/L	331	1,450	15,025	124
Metals	Manganese	2001	µg/L	426	1,513	15,350	119
Metals	Manganese	2002	µg/L	430	1,502	15,763	119
Metals	Manganese	2003	µg/L		1,523	15,750	113
Metals	Manganese	2004	µg/L		1,420	16,625	103
Metals	Manganese	2005	µg/L		1,305	13,503	112
Metals	Manganese	2006	µg/L		1,330	15,275	113
Metals	Manganese	2007	µg/L		1,323	13,925	114
Metals	Manganese	2008	µg/L	317	1,225	14,750	114
Metals	Manganese	2009	µg/L		1,570	11,093	1,140
Metals	Manganese	2010	µg/L			9,533	113

Table 4. Parameters Statistically Higher than Background: 1989-2014

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Analyte Group	Parameter[1]	Monitoring Period	Unit	Mean Value Downgradient[2,3]			Mean Value Upgradient[2]
				BXS-1	BXS-2	BXS-3	BXS-4
Metals	Manganese	2011	µg/L	144	1,375	12,403	107
Metals	Manganese	2012	µg/L	237	1,535	11,300	116
Metals	Manganese	2013	µg/L	218	1,643	13,233	115
Metals	Manganese	2014	µg/L	261	1,663	9,658	117
Metals	Nickel	1993	µg/L		18.0		1.0
Metals	Nickel	1994	µg/L		18.0		ND
Metals	Nickel	1995	µg/L		21.0	30.0	ND
Metals	Nickel	1996	µg/L			25.0	ND
Metals	Nickel	1997	µg/L		34.0	20.0	ND
Metals	Nickel	1998	µg/L		43.0	29.0	ND
Metals	Nickel	1999	µg/L		36.0	22.0	ND
Metals	Nickel	2000	µg/L		37.0		ND
Metals	Nickel	2001	µg/L	20.3	37.5	17.5	10.0
Metals	Nickel	2002	µg/L	21.3	38.5	24.0	5.5
Metals	Nickel	2003	µg/L		37.0		10.0
Metals	Nickel	2004	µg/L		40.8		10.0
Metals	Nickel	2005	µg/L		36.2		10.0
Metals	Nickel	2006	µg/L		34.4		10.0
Metals	Nickel	2007	µg/L		33.4		10.0
Metals	Nickel	2008	µg/L		29.7	16.1	10.0
Metals	Nickel	2009	µg/L		57.1		33.5
Metals	Nickel	2011	µg/L		30.5		12.5
Metals	Nickel	2012	µg/L		32.1	16.3	7.7
Metals	Nickel	2013	µg/L	10	37	21	7
Metals	Nickel	2014	µg/L	9	35	17	3
Metals	Zinc	2002	µg/L	8.0	6.8		ND
Metals	Zinc	2005	µg/L	10.0			5.0
Metals	Zinc	2007	µg/L	6.2	17.3	12.4	4.4
Metals	Zinc	2008	µg/L		7.6		4.8
Metals	Zinc	2014	µg/L		4.5	6.1	3.4

Notes:

µg/L = microgram per liter.

µS/cm = microSiemen per centimeter.

mg/L = milligram per liter.

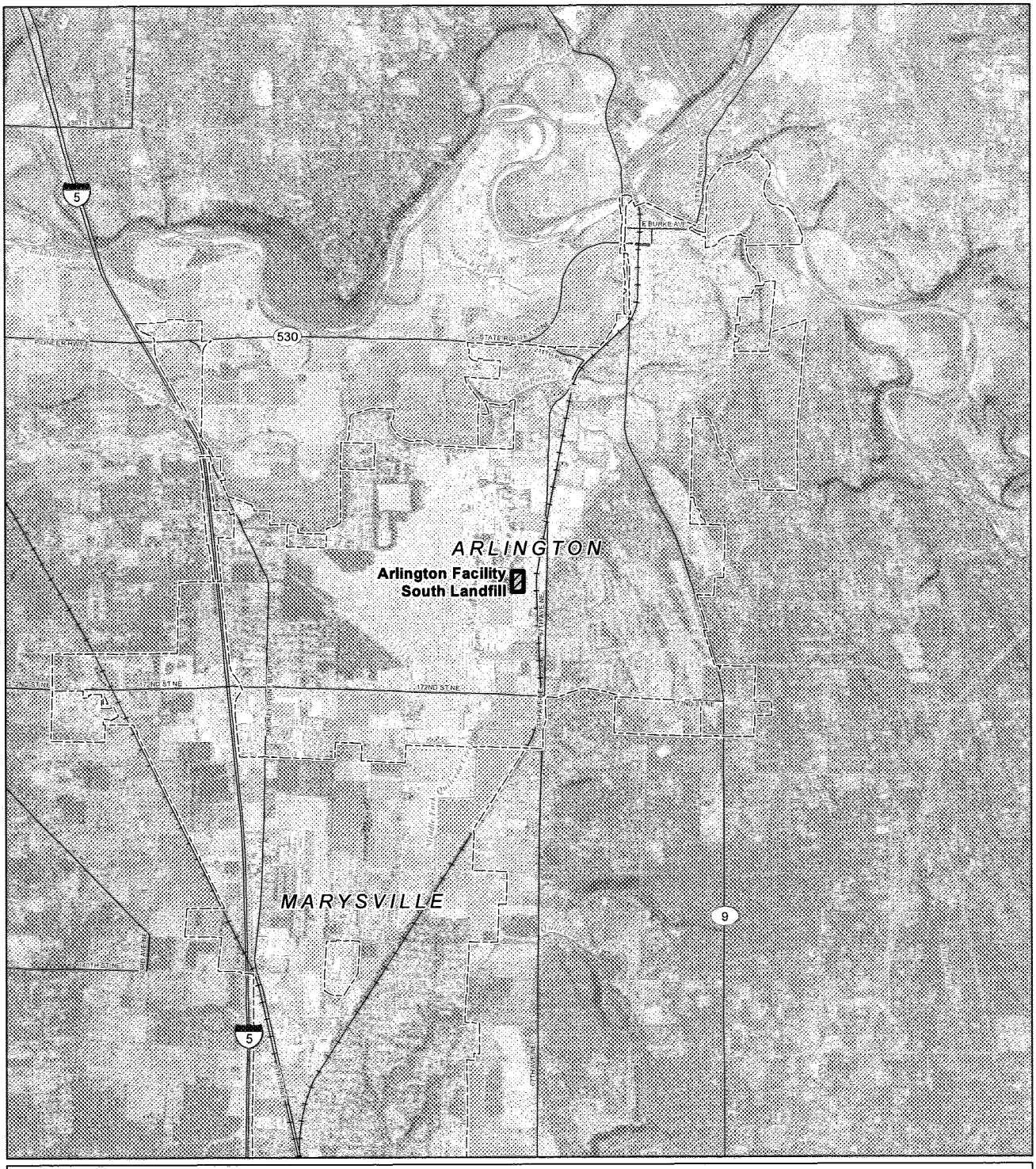
ND = not detected.

[1] Parameters listed only when at least one downgradient well has a higher mean value than the upgradient well.

[2] Mean values are yearly averages.

[3] Mean values in downgradient wells shown when exceeding the mean value of the upgradient well. Value in downgradient wells not shown if the mean value does not exceed the upgradient well's mean value.

Figures



LEGEND

- Cities
- Railroads
- Major Roads
- Watercourses

MAP NOTES:
Date: March 31, 2015
Data Sources: Air photo taken on July 15, 2013 by the USDA

FIGURE 1

Site Vicinity Map

Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

N

0 0.5 1
Miles

GSI Water Solutions, Inc.

Document Path: P:\Portland\07 - Baxter\GIS\Arlington_Landfill\Project_mxds\South\2014_Annual_Report\Figure_1_Site_Vicinity_Map.mxd

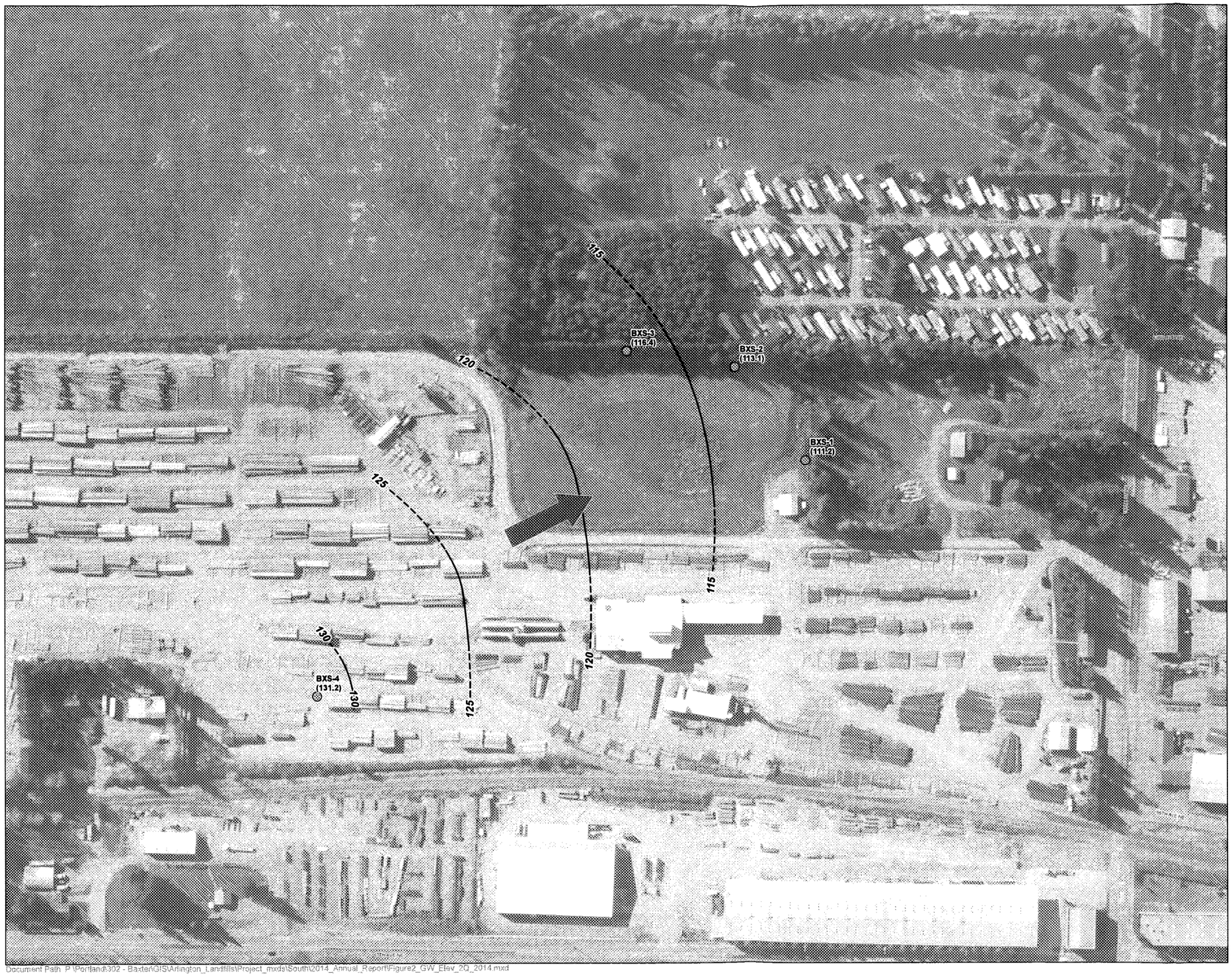


FIGURE 2

Groundwater Elevation Contour Map: Second Quarter 2014

Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

LEGEND

- Groundwater Elevation Contours (dashed where inferred)
- Monitoring Well (June 2014 Groundwater Elevation)
- Direction of Groundwater Flow

NOTES:

1. All elevations exist in NAVD88.
2. Quarter 2 contoured in place of Quarter 1 due to suspect field measurement at BXS-2.

N

0 100 200 300
Feet

MAP NOTES:
Date: April 23, 2015
Data Sources: AMEC, ESRI, Air photo taken on July 9, 2010 by Microsoft

GSI Water Solutions, Inc.

Document Path: P:\Portland\302 - Baxter\GIS\Arlington_Landfills\Project_mxds\South\2014_Annual_Report\Figure2_GW_Elev_2Q_2014.mxd

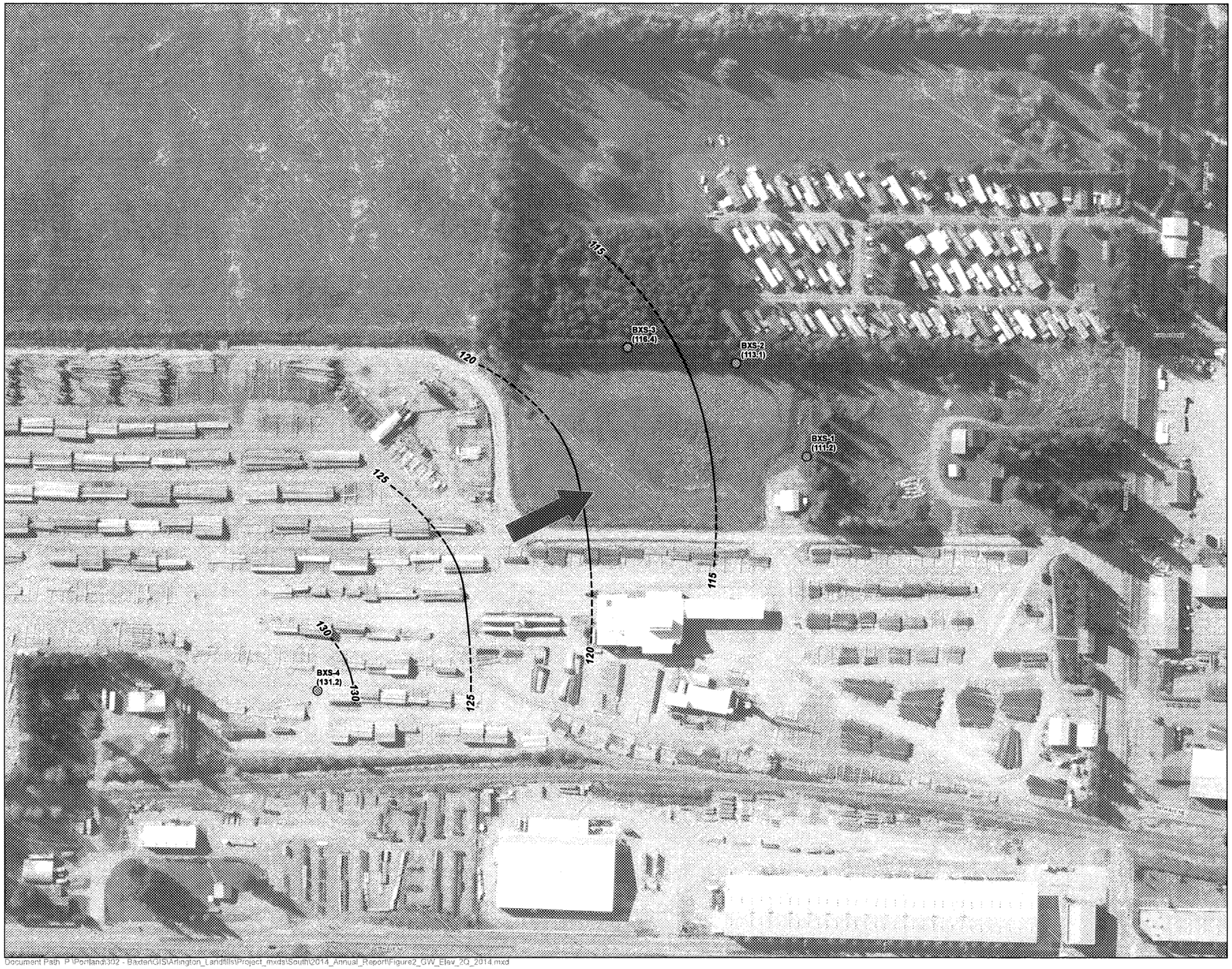


FIGURE 2

Groundwater Elevation Contour Map: Second Quarter 2014

Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

LEGEND

- Groundwater Elevation Contours (dashed where inferred)
- Monitoring Well (June 2014 Groundwater Elevation)
- Direction of Groundwater Flow

NOTES:

1. All elevations exist in NAVD88.
2. Quarter 2 contoured in place of Quarter 1 due to suspect field measurement at BXS-2.

N

0 100 200 300
Feet

MAP NOTES:

Date: April 23, 2015
Data Sources: AMEC, ESRI, Air photo taken on July 9, 2010 by Microsoft

GSI Water Solutions, Inc.

Document Path: P:\Portland\302 - Baxter\GIS\Arlington_Landfills\Project_mxds\South\2014_Annual_Report\Figure2_GW_Elev_2Q_2014.mxd

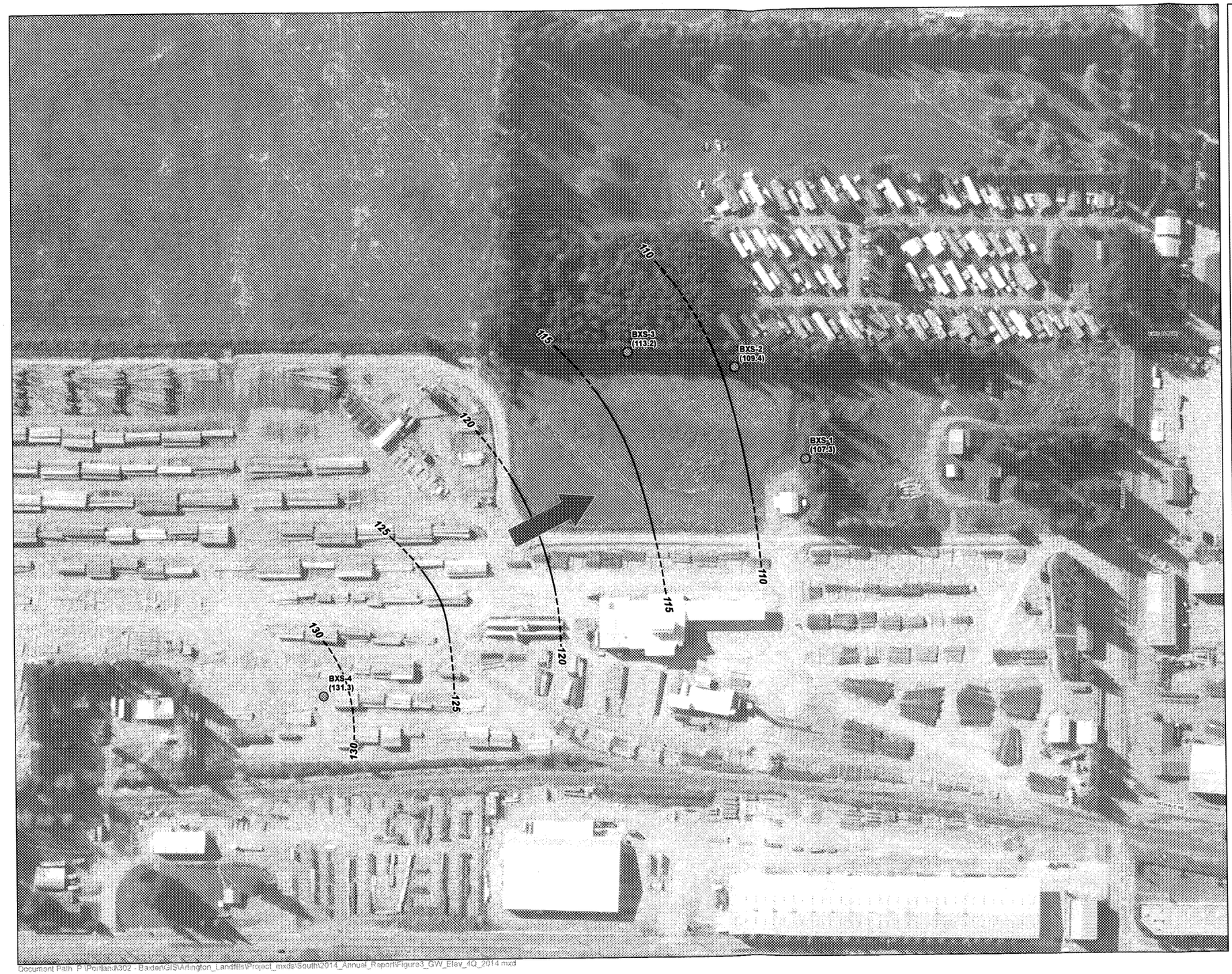


FIGURE 3

Groundwater Elevation Contour Map: Fourth Quarter 2014

Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

LEGEND

- Groundwater Elevation Contours (dashed where inferred)
- Monitoring Well (November 2014 Groundwater Elevation)
- Direction of Groundwater Flow

NOTES:
1. All elevations exist in NAVD88.

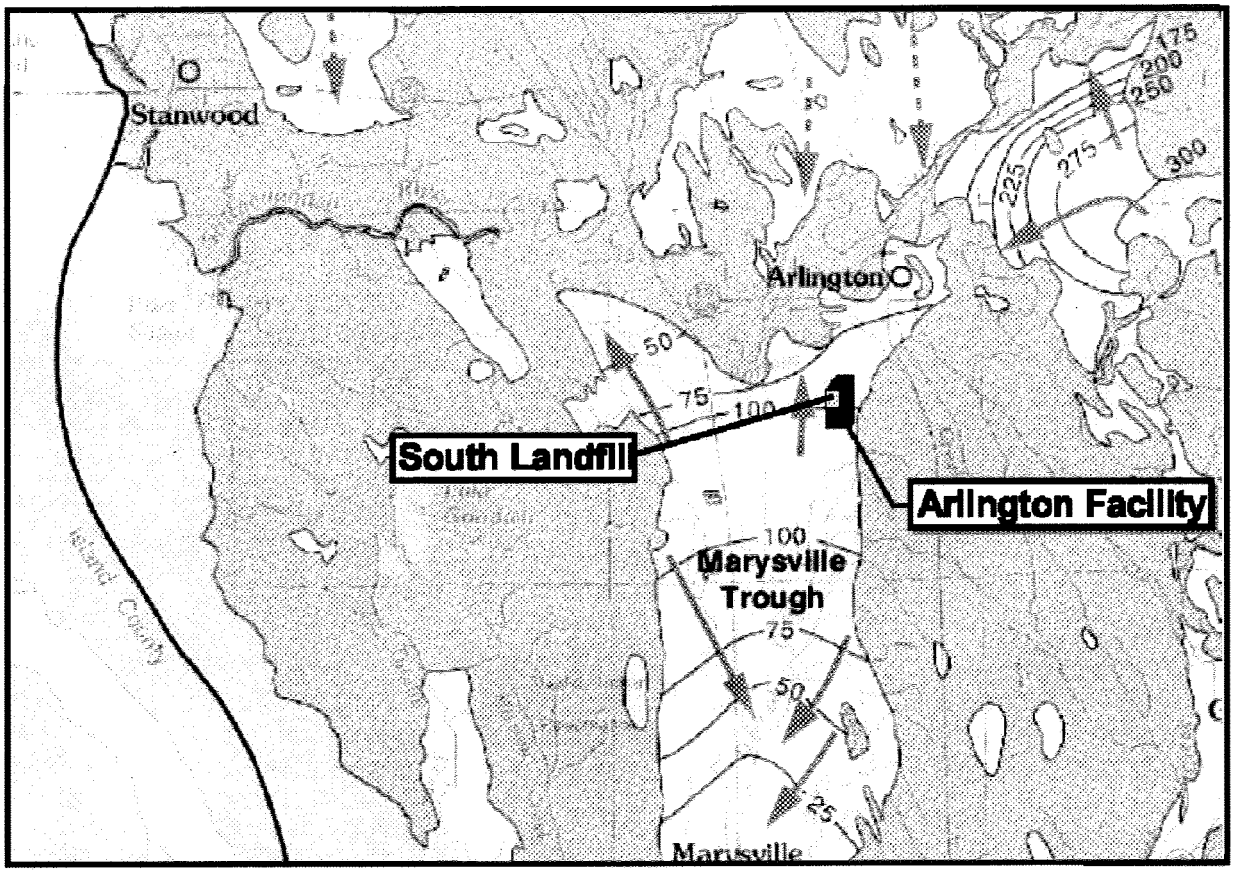
N

0 100 200 300
Feet

MAP NOTES:
Date: April 23, 2015
Data Sources: AMEC, ESRI, Air photo taken on July 9, 2010 by Microsoft

GSI Water Solutions, Inc.

Document Path: P:\Portland\302 - Baxter\GIS\Arlington_Landfills\Project_mxds\South\2014_Annual_Report\Figure3_GW_Elev_4Q_2014.mxd



Note:
Map created by base map by B.E. Thomas, J.M. Wilkinson, and S.S. Embrey, entitled "Plate 6. Areal Recharge From Precipitation and Potentiometric Surfaces of Principal Aquifers, Western Snohomish County, Washington," dated 1997

N

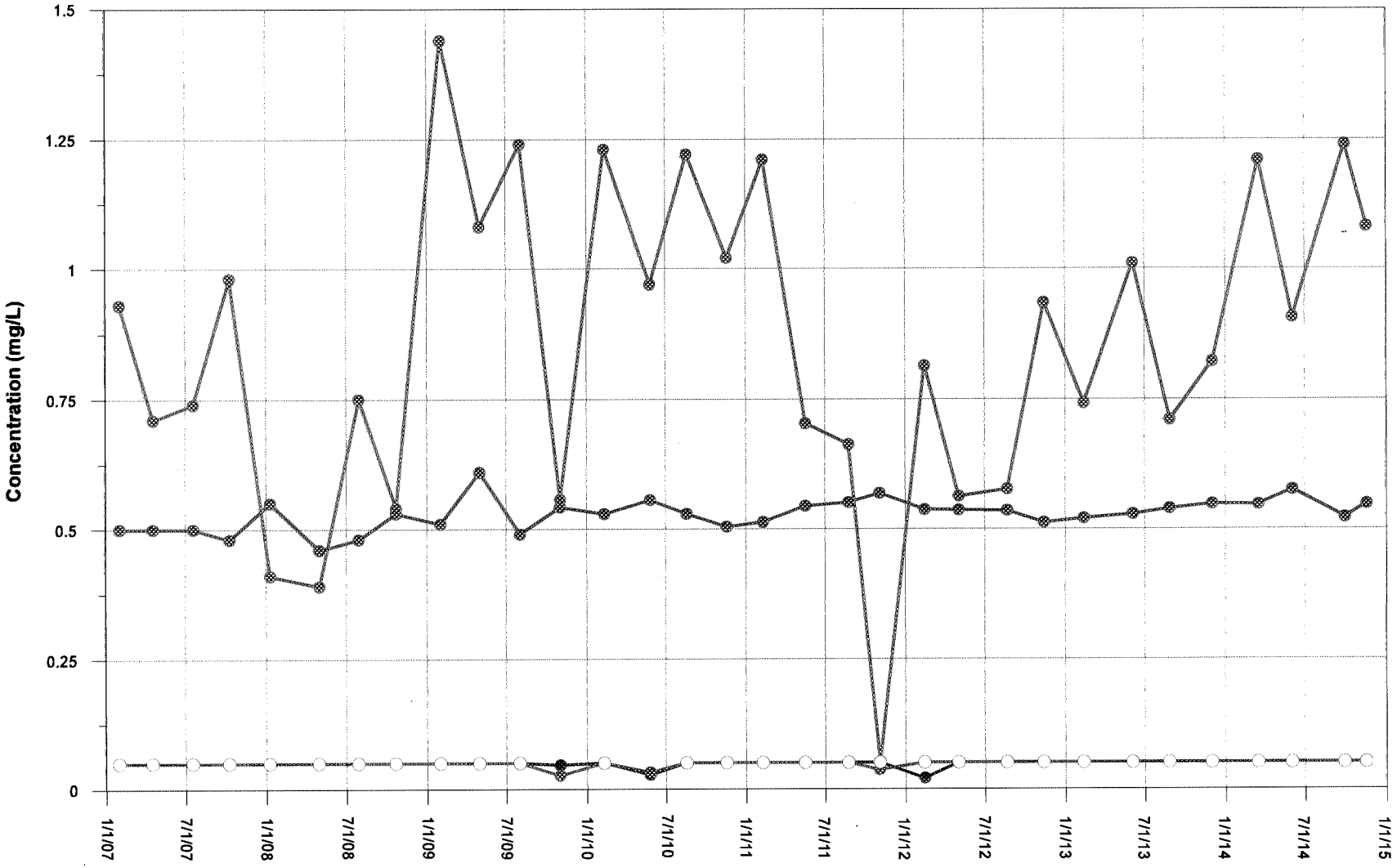
FIGURE 4

Regional Groundwater Flow

Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

MAP NOTES:
Date: April 13, 2015
Data Sources: AMEC Figure 4 from 2013 Annual Report

GSI Water Solutions, Inc.



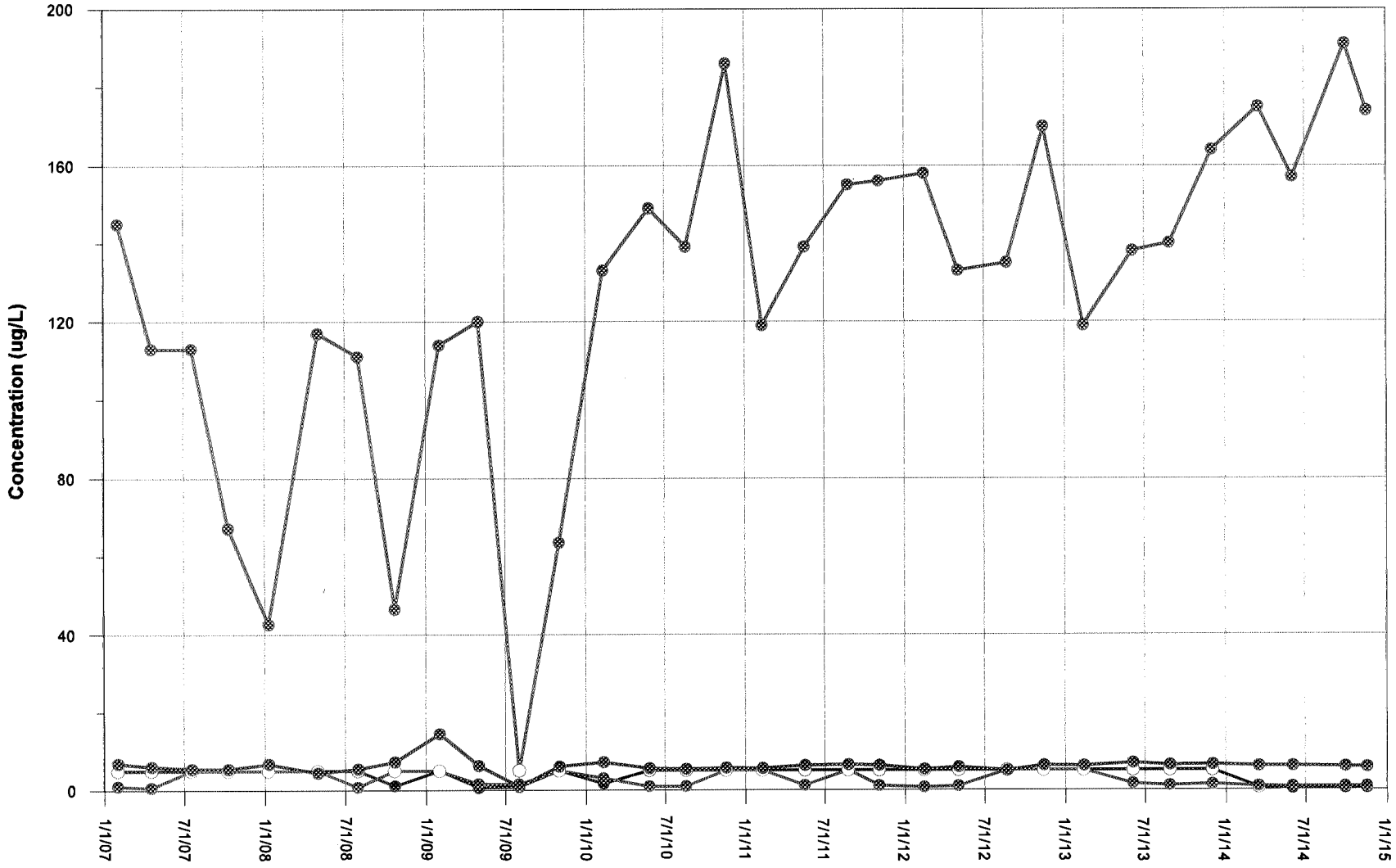
Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:
mg/L = milligram per liter

FIGURE 5
Ammonia Concentration Trends
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

GSI Water Solutions, Inc.



Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:

ug/L = microgram per liter

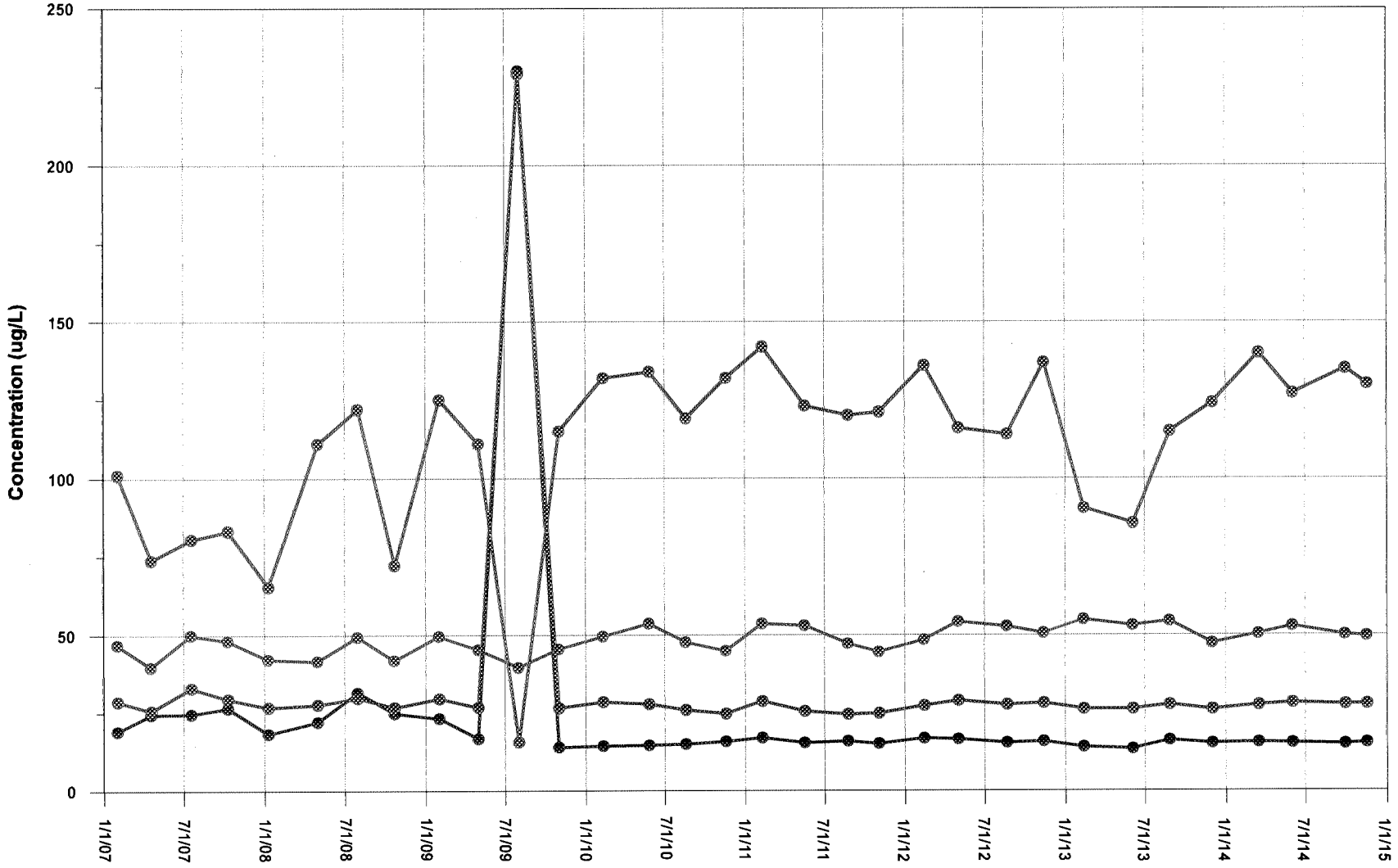
FIGURE 6

Arsenic Concentration Trends

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

GSI Water Solutions, Inc.



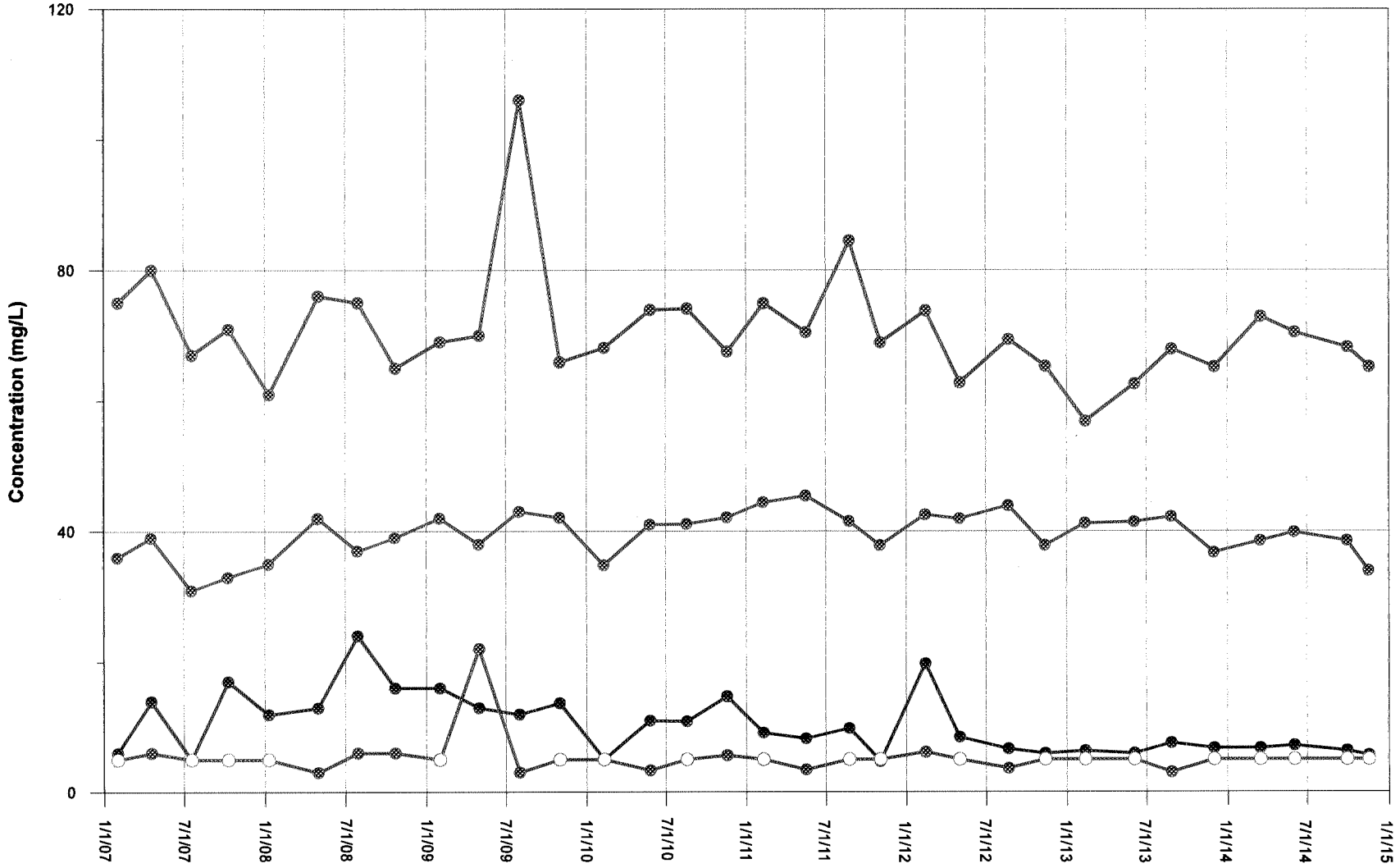
Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:
ug/L = microgram per liter

FIGURE 7
Barium Concentration Trends
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

GSI Water Solutions, Inc.



Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:

mg/L = milligram per liter

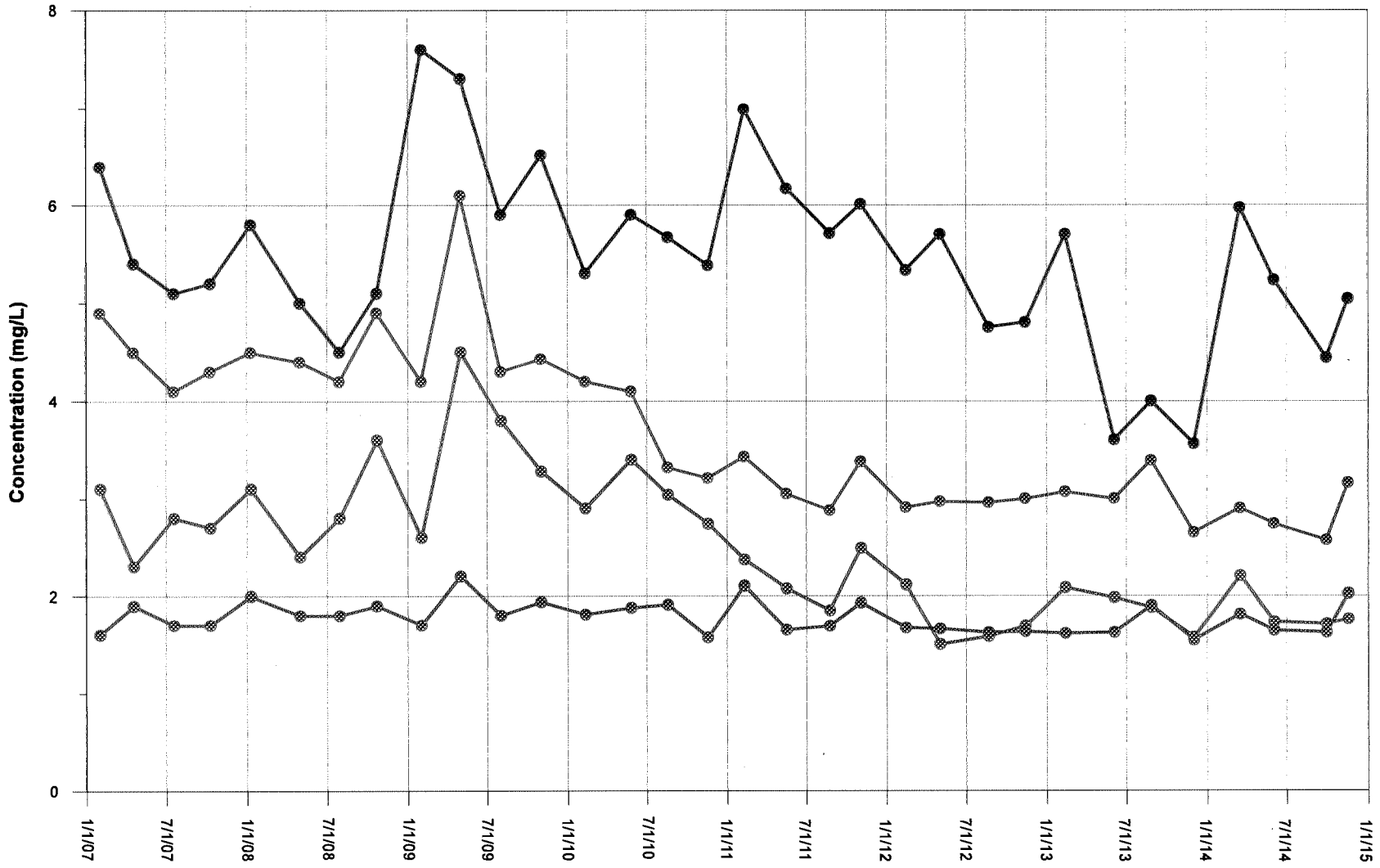
FIGURE 8

Chemical Oxygen Demand Concentration Trends

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

GSI Water Solutions, Inc.



Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:

mg/L = milligram per liter

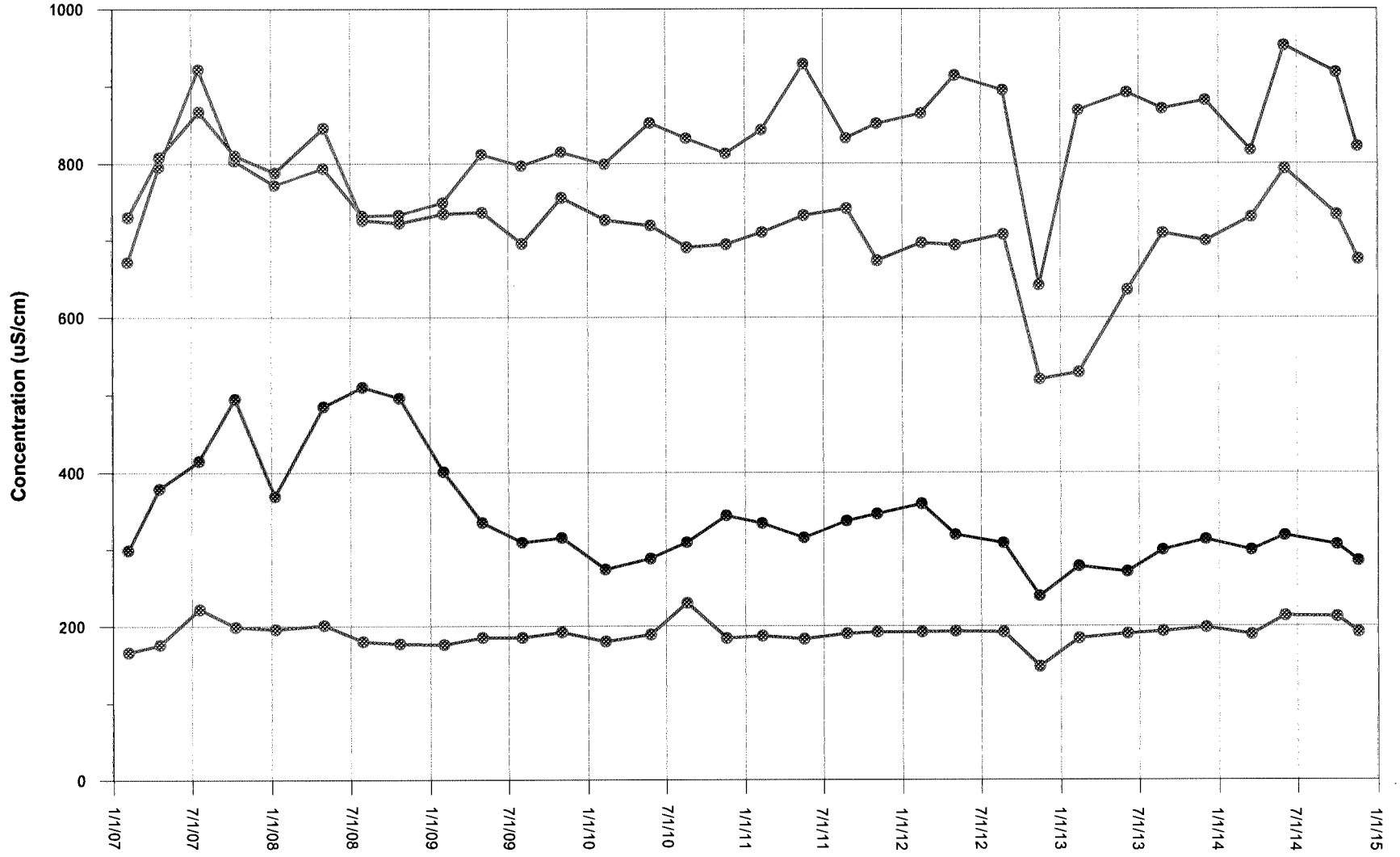
FIGURE 9

Chloride Concentration Trends

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

GSI Water Solutions, Inc.



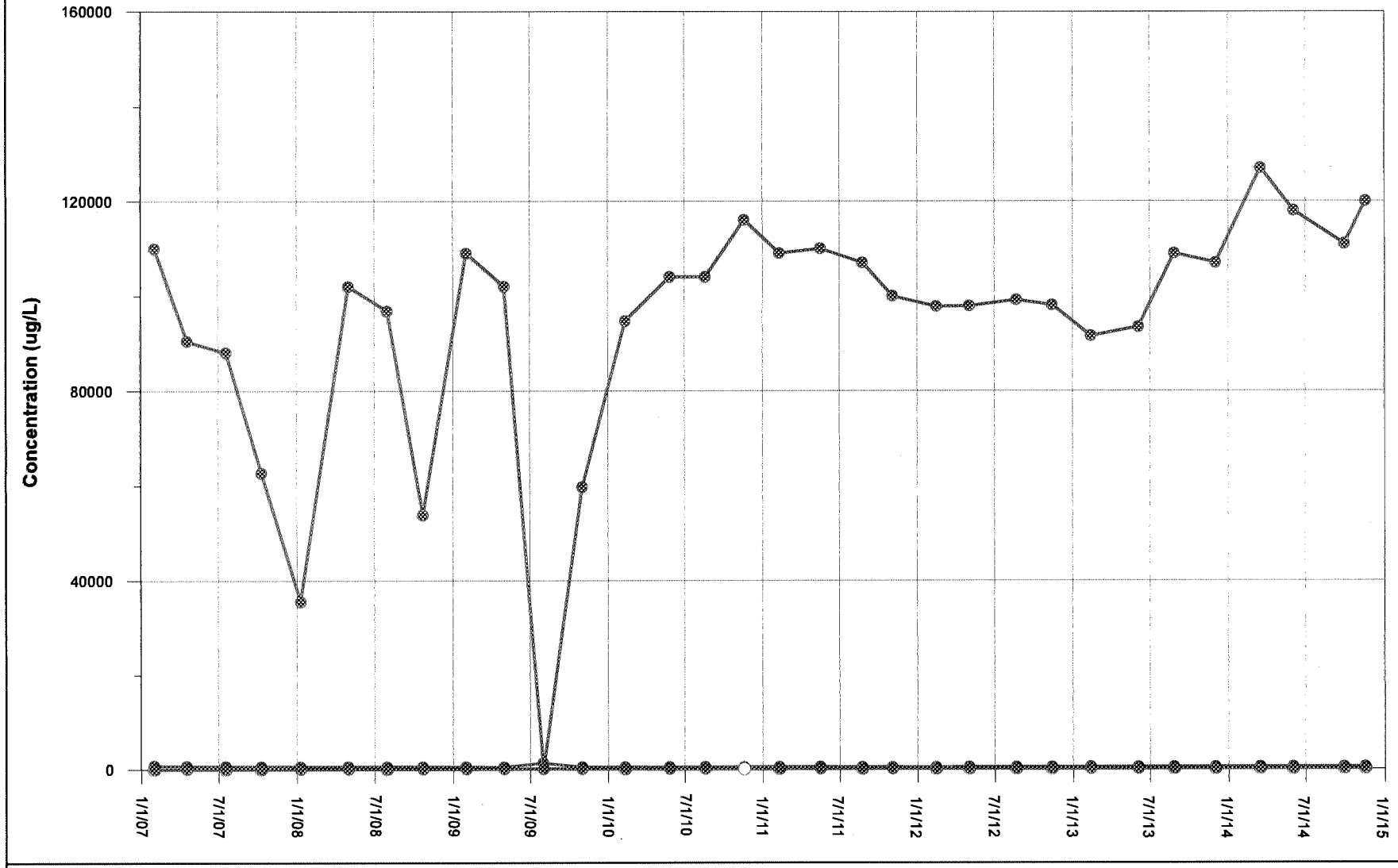
Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:
uS/cm = microSiemen per centimeter

FIGURE 10
Field Conductivity Concentration Trends
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

GSI Water Solutions, Inc.



Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:

ug/L = microgram per liter

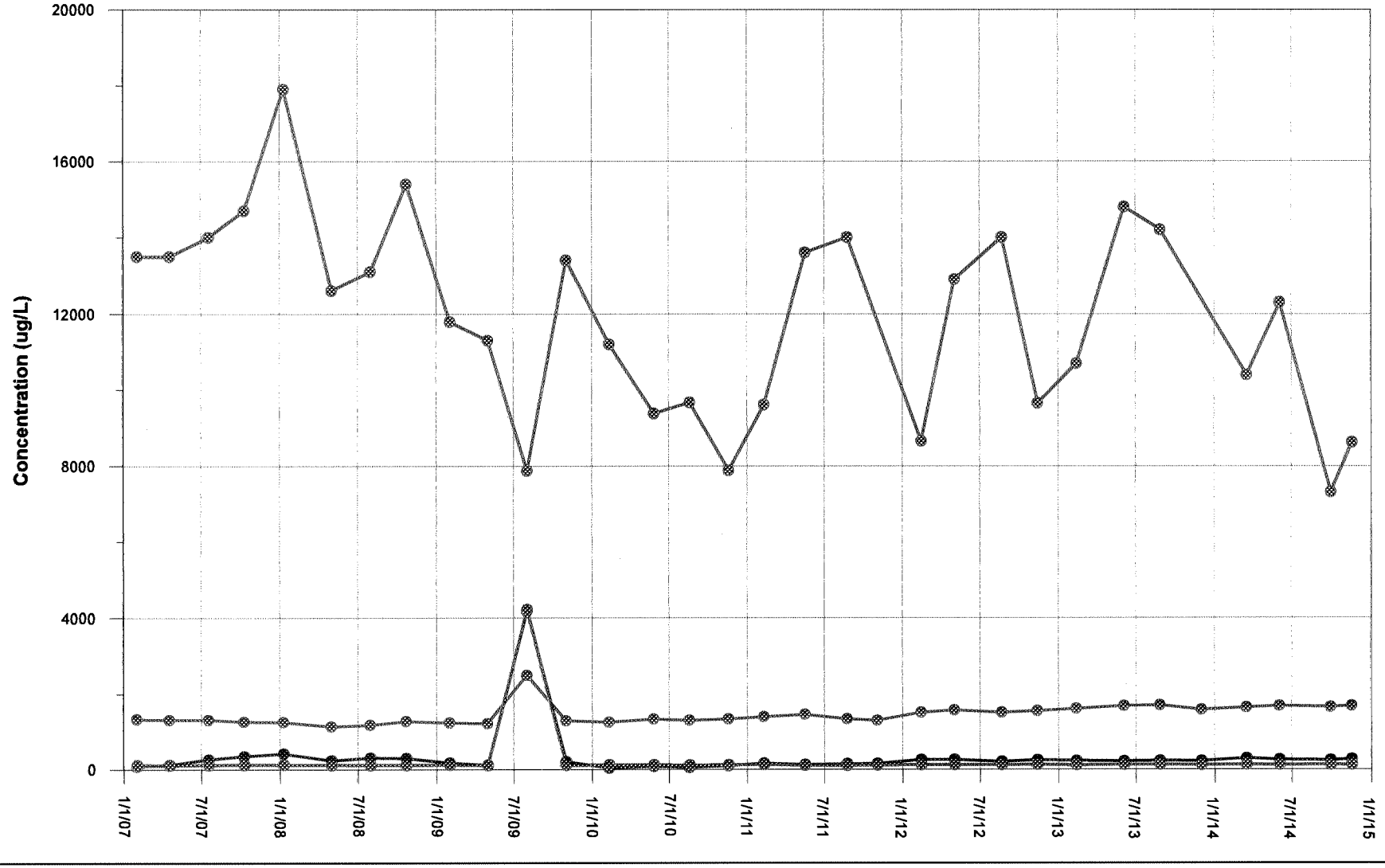
FIGURE 11

Iron Concentration Trends

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

GSI Water Solutions, Inc.



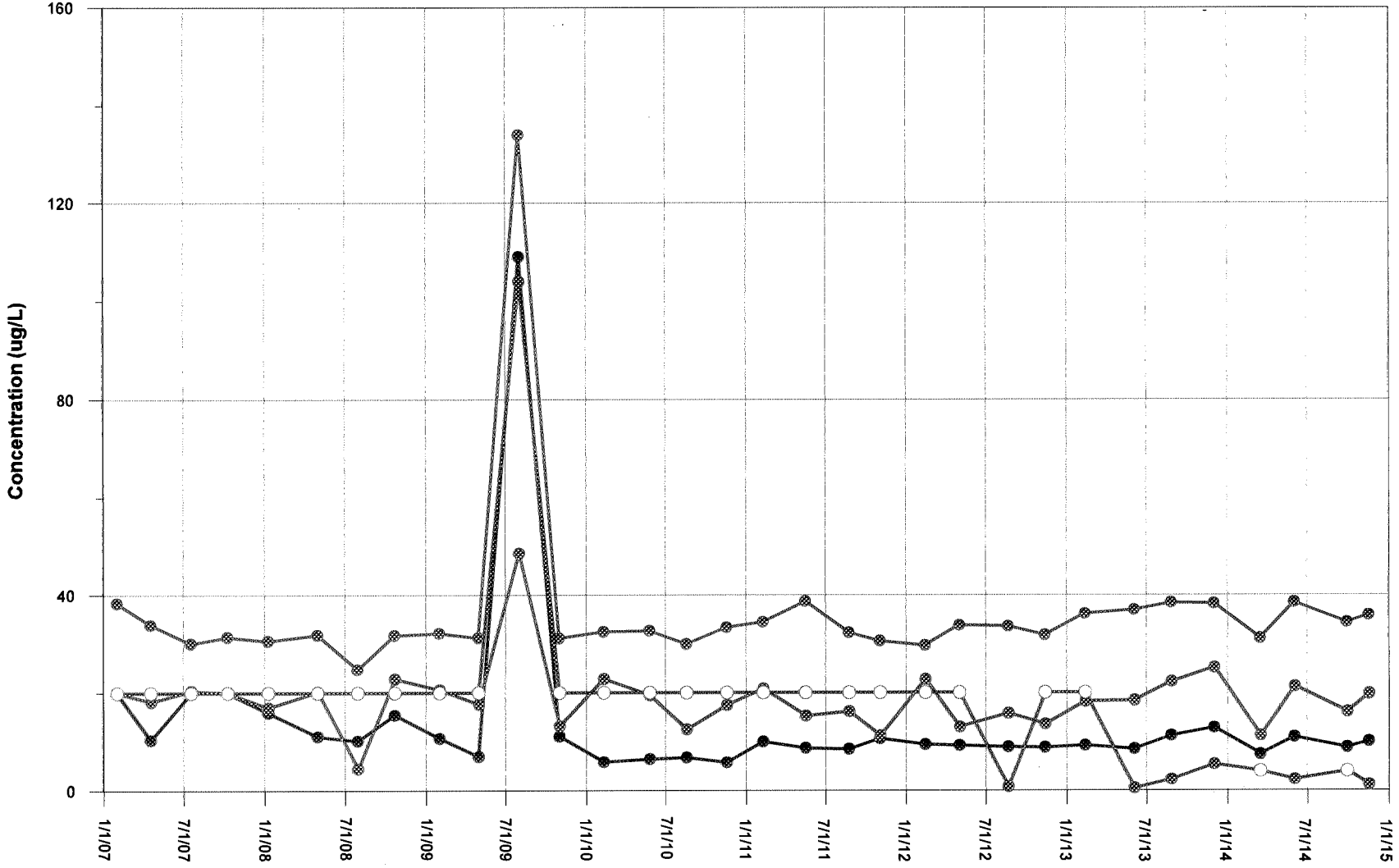
Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:
ug/L = microgram per liter

FIGURE 12
Manganese Concentration Trends
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

GSI Water Solutions, Inc.



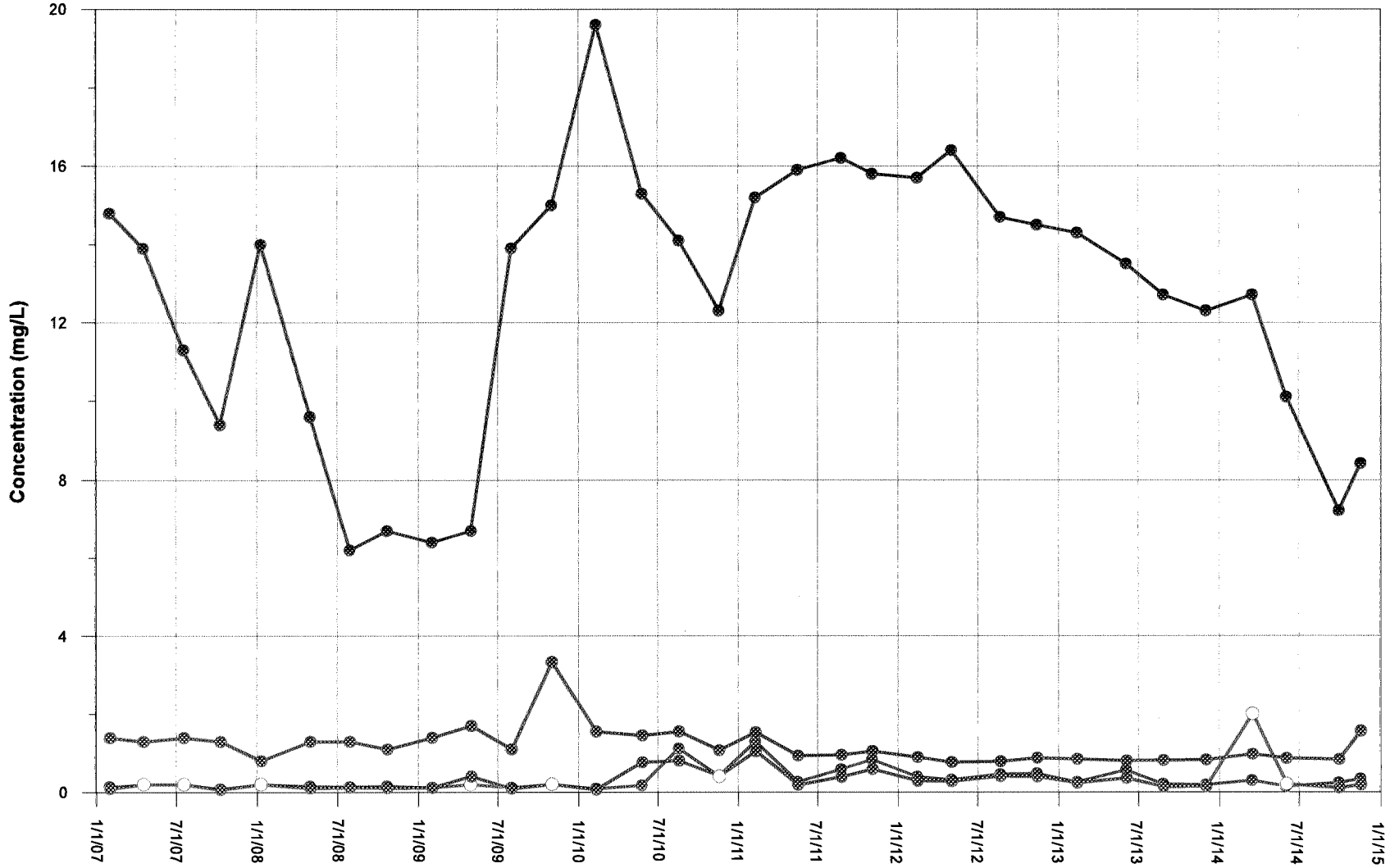
Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:
ug/L = microgram per liter

FIGURE 13
Nickel Concentration Trends
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

GSI Water Solutions, Inc.



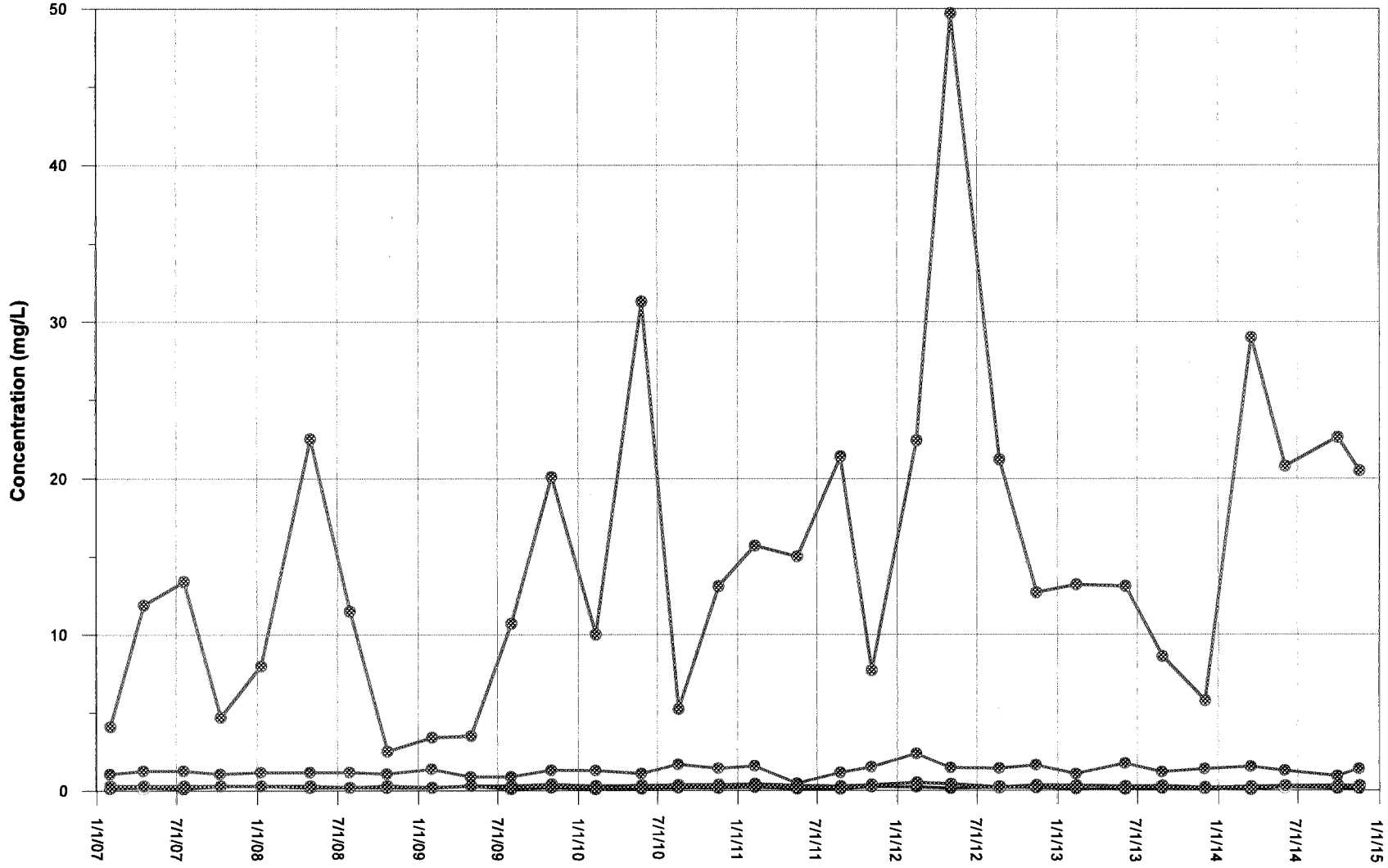
Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:
mg/L = milligram per liter

FIGURE 14
Sulfate Concentration Trends
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

GSI Water Solutions, Inc.



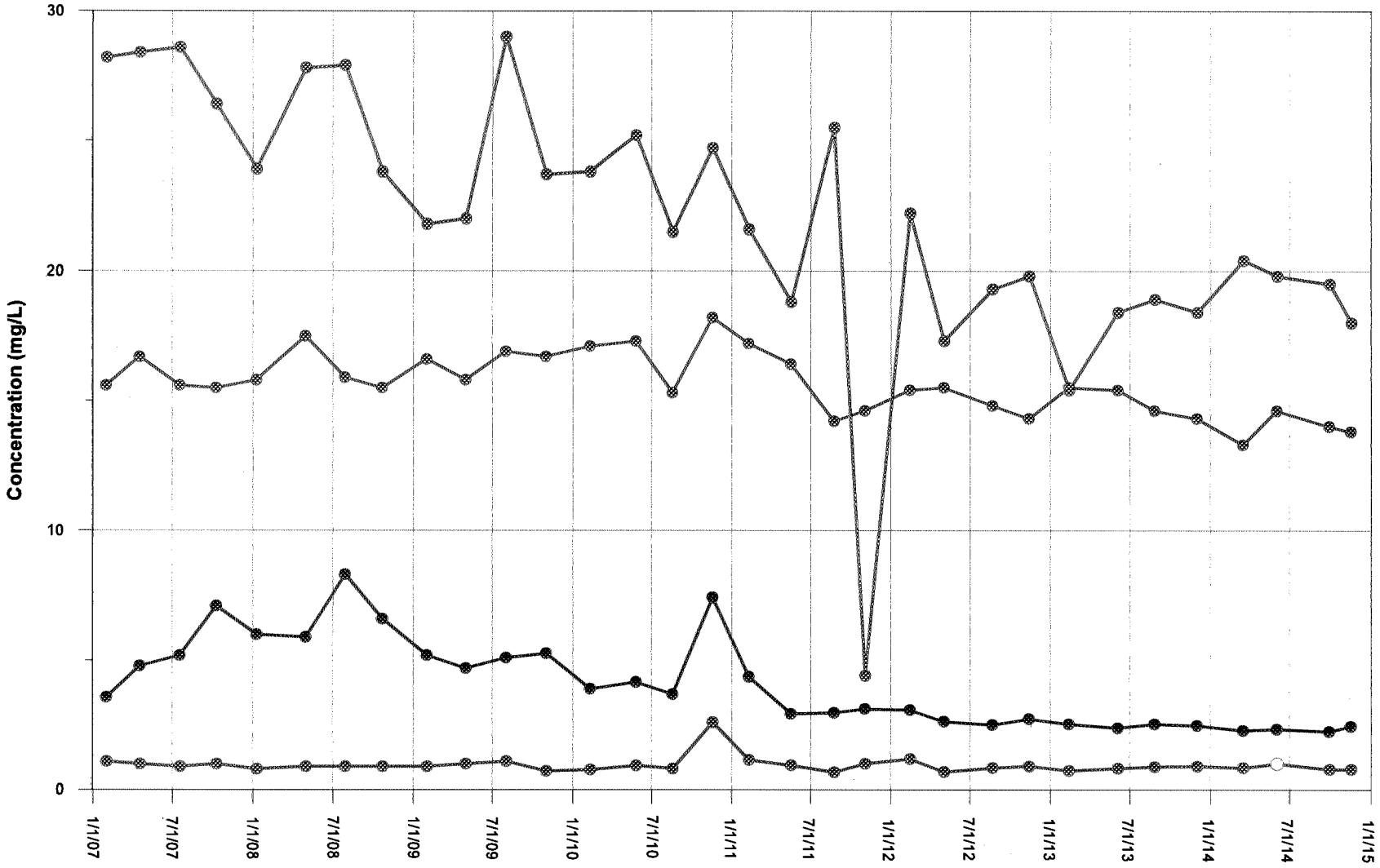
Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:
mg/L = milligram per liter

FIGURE 15
Tannin and Lignin Concentration Trends
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

GSI Water Solutions, Inc.



Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:

mg/L = milligram per liter

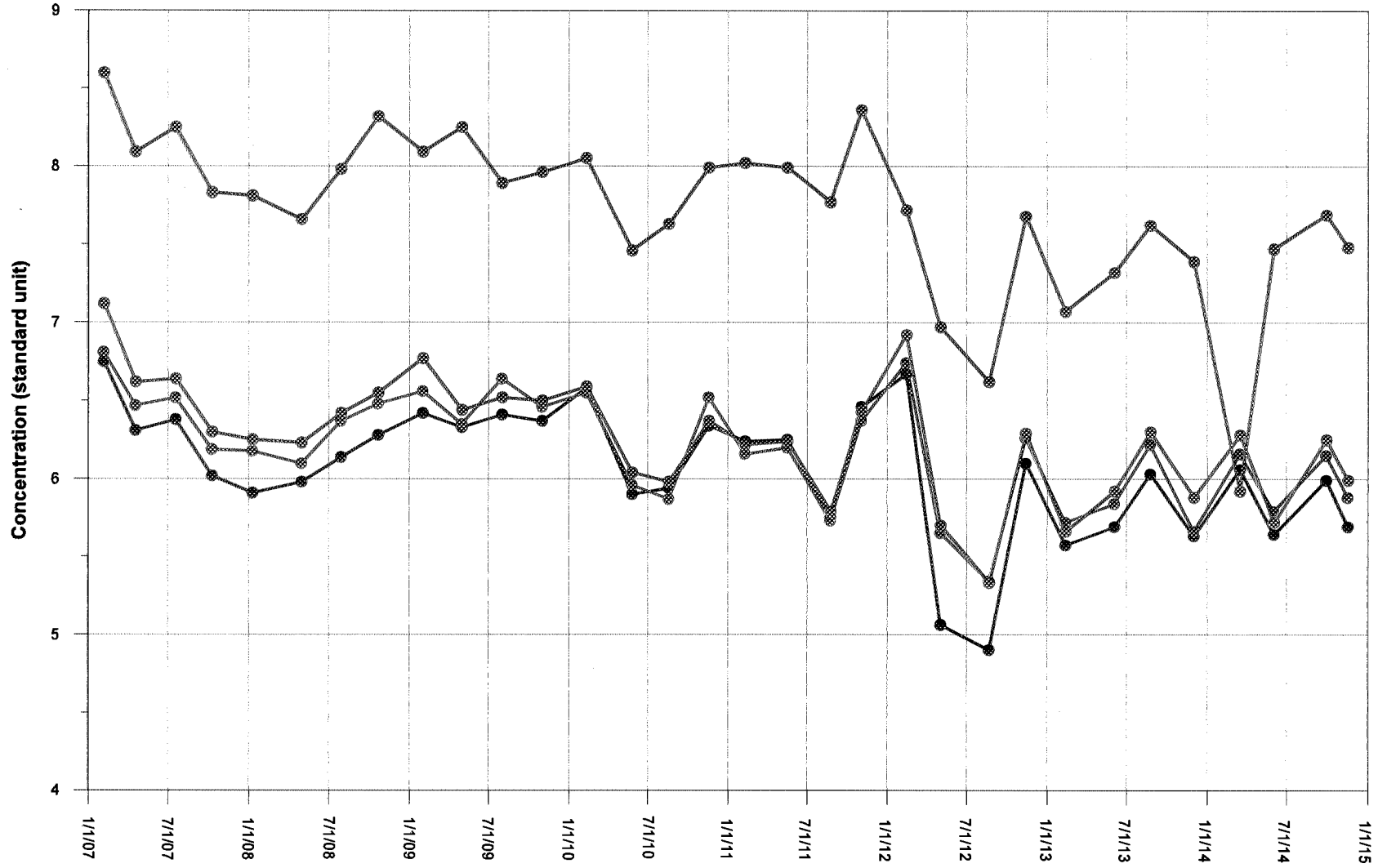
FIGURE 16

Total Organic Carbon Concentration Trends

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

GSI Water Solutions, Inc.

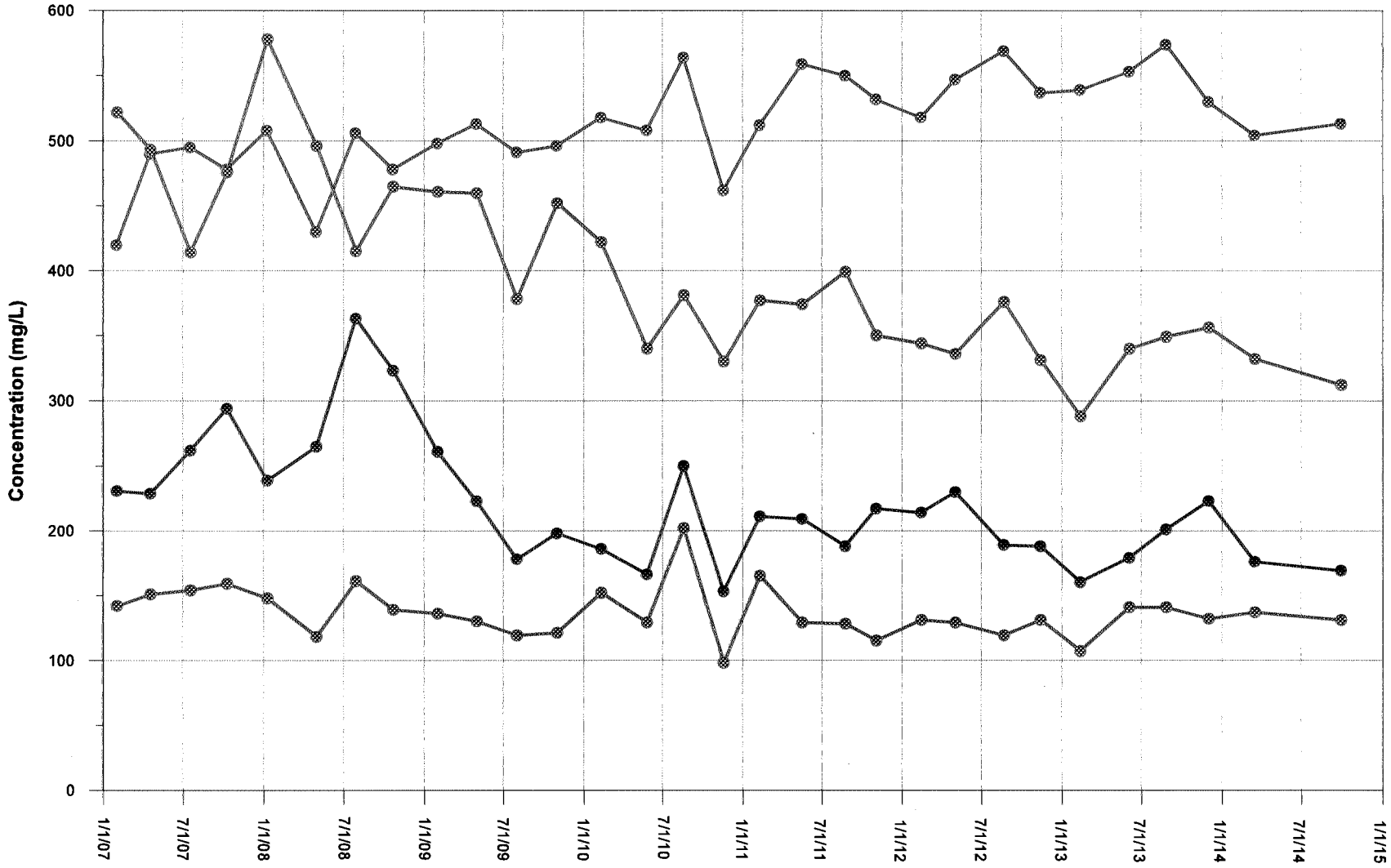


Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

FIGURE 17
Field pH Concentration Trends
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

GSI Water Solutions, Inc.



Legend:

- BXS-1 Detected Value
- BXS-1 Non-Detected Value
- BXS-2 Detected Value
- BXS-2 Non-Detected Value
- BXS-3 Detected Value
- BXS-3 Non-Detected Value
- BXS-4 Detected Value
- BXS-4 Non-Detected Value

Notes:

mg/L = milligram per liter

FIGURE 18

Total Dissolved Solids Concentration Trends

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

GSI Water Solutions, Inc.

Appendix A

JH Baxter & Co.

Groundwater Sampling Field Form

Stella-Jones Corporation

Arlington, WA 98223

(360) 435-2146 FAX (360) 435-3035

Well No. BXS-1	Location **Arlington**	Date 5-17-14
Location: Landfill - South	Field Personnel/Company **W.Krause/C.Baxter**	
Sample Time (2400 hours)	Instrument Calibration Date	

Well Condition Poor (Satisfactory) New (If poor, explain)

Field Conditions/Weather

Equipment Decontamination **Liquinox and D.I. Water Rinse.**

Casing Diameter: (Circle One) (2") 4" 6" Other____

Casing Volume (gallons/ft) for: 2"=0.163; 4"=0.653; 6"=1.47
Multiply Water Column Height by appropriate number above to get proper purge volume.

Depth of Well (feet): 49.0'
Depth to Water (feet): 33.70
Water Column (feet):
Casing Volume (gallons):
Calculated Purge Volume (gallons): 7.4
Actual Purge Volume (gallons):

Sheen / LNAPL / DNAPL present:
Other remarks:

Time 2400 hrs	Cumulative Volume (gal)	pH	Conductivity ms/cm 25°C	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	EH MV	Odor/Color/ Remarks
	0							Purge Start
1331	0	5.99	.317	0.0	9.66	12.65	277	
1340	2.5	6.08	.307	0.0	2.53	12.65	272	
1349	5.0	6.06	.300	0.0	2.12	12.67	269	
1358	7.4	6.06	.299	0.0	2.07	12.73	268	
1400		Sample						

Purging Equipment: **Portable (Dedicated Bladder Pump) Disposable Baler** Sampling Equipment: **Horiba U-52**

Remarks:

Revised 02/23/12

JH Baxter & Co.

JBaxter WOOD PRESERVING

Groundwater Sampling Field Form

Stella-Jones Corporation

Arlington, WA 98223

(360) 435-2146 FAX (360) 435-3035

Well No. BXS-3	Location Arlington	Date 3-17-14
Location: Landfill - South	Field Personnel/Company W.Krause/C.Baxter	
Sample Time (2400 hours)	Instrument Calibration Date	
Well Condition Poor (Satisfactory) New (If poor, explain)		
Field Conditions/Weather		
Equipment Decontamination Liquinox and D.I. Water Rinse.		

Casing Diameter: (Circle One) (2") 4" 6" Other_____

Casing Volume (gallons/ft) for: 2"=0.163; 4"=0.653; 6"=1.47
Multiply Water Column Height by appropriate number above to get proper purge volume.

Depth of Well (feet): 42.5'
Depth to Water (feet): 27.00
Water Column (feet):
Casing Volume (gallons):
Calculated Purge Volume (gallons): 7.57
Actual Purge Volume (gallons):

Sheen / LNAPL / DNAPL present:
Other remarks:

Time 2400 hrs	Cumulative Volume (gal)	pH	Conductivity ms/cm 25°C	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	EH MV	Odor/Color/ Remarks
	0							Purge Start
~~1525~~	~~0~~	~~6.23~~	~~.725~~	~~0.0~~	~~10.60~~	~~11.94~~	~~-53~~	
1528	0	6.23	.725	0.0	10.60	11.94	-53	
1534	2.5	6.54	.730	0.0	10.35	12.14	-82	
1541	5	6.28	.731	0.7	8.88	12.15	-92	
1548	7.5	6.28	.730	1.0	8.84	12.17	-94	
1550		Sample						

Purging Equipment: **Portable** **(Dedicated Bladder Pump)** **Disposable Baler** Sampling Equipment: **Horiba U-52**

Remarks:

Revised 02/23/12

JH Baxter & Co.

Groundwater Sampling Field Form

Stella-Jones Corporation

Arlington, WA 98223

(360) 435-2146 FAX (360) 435-3035

Well No. BXS-1	Location **Arlington**	Date 6-2-14
Location: Landfill - South	Field Personnel/Company **W.Krause/C.Baxter**	
Sample Time (2400 hours) 1532	Instrument Calibration Date	
Well Condition Poor (Satisfactory) New (If poor, explain)		
Field Conditions/Weather		
Equipment Decontamination **Liquinox and D.I. Water Rinse.**		

Casing Diameter:
(Circle One)
(2") 4"
6" Other____

Casing Volume (gallons/ft) for: 2"=0.163; 4"=0.653; 6"=1.47
Multiply Water Column Height by appropriate number above to get proper purge volume.

Depth of Well (feet): 49.0'
Depth to Water (feet): 31.45
Water Column (feet): 17.6
Casing Volume (gallons): 2.868
Calculated Purge Volume (gallons): 8.4
Actual Purge Volume (gallons):

Sheen / LNAPL / DNAPL present:
Other remarks:

Time 2400 hrs	Cumulative Volume (gal)	pH	Conductivity ms/cm 25°C	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	EH MV	Odor/Color/ Remarks
1510	0	5.90	.322	0.4	13.33	14.11	161	Purge Start
1515	2.8	575	325	1.3	.0	13.59	200	Clear
1521	5.6	566	.319	1.7	.0	13.34	207	
1530	8.4	5.64	.318	1.8	0	13.32	213	
1532			Sample					

Purging Equipment: **Portable (Dedicated Bladder Pump) Disposable Baler** Sampling Equipment: **Horiba U-52**

Remarks:

Revised 02/23/12

JH Baxter & Co.

Groundwater Sampling Field Form

Stella-Jones Corporation

Arlington, WA 98223

(360) 435-2146 FAX (360) 435-3035

Well No. BXS-3	Location **Arlington**	Date 10-2-14
Location: Landfill - South	Field Personnel/Company **W.Krause/C.Baxter**	
Sample Time (2400 hours) 1731	Instrument Calibration Date	
Well Condition Poor (Satisfactory) New (If poor, explain)		
Field Conditions/Weather		
Equipment Decontamination **Liquinox and D.I. Water Rinse.**		

Casing Diameter: (Circle One) (2") 4" 6" Other____

Casing Volume (gallons/ft) for: 2"=0.163; 4"=0.653; 6"=1.47
Multiply Water Column Height by appropriate number above to get proper purge volume.

Depth of Well (feet): 42.5'
Depth to Water (feet): 25.71
Water Column (feet): 16.8
Casing Volume (gallons): 2.73
Calculated Purge Volume (gallons): 8.21
Actual Purge Volume (gallons):

Sheen / LNAPL / DNAPL present:
Other remarks:

Time 2400 hrs	Cumulative Volume (gal)	pH	Conductivity ms/cm 25°C	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	EH MV	Odor/Color/ Remarks
1701	0	5.89	.698	19.9	12.47	12.77	-19	Purge Start
1711	2.7	5.90	.789	3.8	0	12.31	-82	
1720	5.4	5.91	.796	4.7	0	12.34	-85	
1790	8.2	5.92	.793	4.8	0	12.31	-86	
1731			Sample					

Purging Equipment: **Portable (Dedicated Bladder Pump) Disposable Baler** Sampling Equipment: **Horiba U-52**

Remarks:

Revised 02/23/12

JH Baxter & Co.

Groundwater Sampling Field Form

Stella-Jones Corporation

Arlington, WA 98223

(360) 435-2146 FAX (360) 435-3035

Well No. BXS-1	Location **Arlington**	Date 9-29-14
Location: Landfill - South	Field Personnel/Company **W.Krause/C.Baxter**	
Sample Time (2400 hours)	Instrument Calibration Date	

Well Condition Poor (Satisfactory) New (If poor, explain) _____

Field Conditions/Weather _____

Equipment Decontamination **Liquinox and D.I. Water Rinse.**

Casing Diameter: (Circle One) (2") 4" 6" Other_____

Casing Volume (gallons/ft) for: 2"=0.163; 4"=0.653; 6"=1.47
Multiply Water Column Height by appropriate number above to get proper purge volume.

Depth of Well (feet): 49.0'
Depth to Water (feet): 35.19
Water Column (feet): 2.26
Casing Volume (gallons): _____
Calculated Purge Volume (gallons): 6.7
Actual Purge Volume (gallons): _____

Sheen / LNAPL / DNAPL present: _____
Other remarks: _____

Time 2400 hrs	Cumulative Volume (gal)	Temp. (°C)	pH	ORP Redox.	Conductivity ms/cm 25°C	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Odor/Color/ Remarks
1402	0	13.19	6.25	289	.285	6.8	8.72	Purge Start
1410	2.2	12.61	5.95	279	.303	4.0	.00	
1419	4.4	12.55	5.98	275	.306	4.8	.00	
1428	6.7	12.54	5.99	273	.306	5.1	.00	
1430			Sample					

Purging Equipment: **Portable (Dedicated Bladder Pump) Disposable Bailer** Sampling Equipment: **Horiba U-52**

Remarks: _____

Revised 02/23/12

JH Baxter & Co.

Groundwater Sampling Field Form

Stella-Jones Corporation

Arlington, WA 98223

(360) 435-2146 FAX (360) 435-3035

Well No. BXS-3	Location **Arlington**	Date 9-19-14
Location: Landfill - South	Field Personnel/Company **W.Krause/C.Baxter**	
Sample Time (2400 hours)	Instrument Calibration Date	

Well Condition Poor (Satisfactory) New (If poor, explain) _____

Field Conditions/Weather _____

Equipment Decontamination **Liquinox and D.I. Water Rinse.**

Casing Diameter: (Circle One) (2") 4" 6" Other_____

Casing Volume (gallons/ft) for: 2"=0.163; 4"=0.653; 6"=1.47
Multiply Water Column Height by appropriate number above to get proper purge volume.

Depth of Well (feet): 42.5'
Depth to Water (feet): 29.6
Water Column (feet):
Casing Volume (gallons): 2.1
Calculated Purge Volume (gallons): 6.3
Actual Purge Volume (gallons):

Sheen / LNAPL / DNAPL present:
Other remarks:

Time 2400 hrs	Cumulative Volume (gal)	Temp. (°C)	pH	ORP Redox.	Conductivity ms/cm 25°C	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Odor/Color/ Remarks
1540	0	12.26	6.21	-46	.729	10.5	.66	Purge Start
1547	2	12.25	6.24	-80	.728	6.8	.00	
1554	4	12.22	6.23	-92	.733	8.5	.00	
1601	6.3	12.26	6.25	-94	.733	8.4	.00	
1603			Sample					

Purging Equipment: **Portable** **(Dedicated Bladder Pump)** **Disposable Bailer** Sampling Equipment: **Horiba U-52**

Remarks: _____

Revised 02/23/12

JH Baxter & Co.

Groundwater Sampling Field Form

Stella-Jones Corporation

Arlington, WA 98223

(360) 435-2146 FAX (360) 435-3035

Well No. BXS-1	Location **Arlington**	Date 11-17-14
Location: Landfill - South	Field Personnel/Company **W.Krause/C.Baxter**	
Sample Time (2400 hours)	Instrument Calibration Date	

Well Condition Poor (Satisfactory) New (If poor, explain) _____

Field Conditions/Weather _____

Equipment Decontamination **Liquinox and D.I. Water Rinse.**

Casing Diameter: (Circle One) (2") 4" 6" Other____

Casing Volume (gallons/ft) for: 2"=0.163; 4"=0.653; 6"=1.47
Multiply Water Column Height by appropriate number above to get proper purge volume.

Depth of Well (feet): 49.0'
Depth to Water (feet): 35.3
Water Column (feet): 13.7
Casing Volume (gallons): 2.233
Calculated Purge Volume (gallons): 6.6
Actual Purge Volume (gallons): _____

Sheen / LNAPL / DNAPL present: _____
Other remarks: _____

Time 2400 hrs	Cumulative Volume (gal)	Temp. (°C)	pH	ORP Redox.	Conductivity ms/cm 25°C	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Odor/Color/ Remarks
1352	0	12.39	5.94	312	.248	0	6.72	Purge Start
1359	2.2	12.24	5.68	299	.281	0	0.12	
1407	4.4	12.23	5.68	291	.285	0	0	
1415	6.6	12.23	5.69	285	.285	0	0	
1416	Sample							

Purging Equipment: **Portable (Dedicated Bladder Pump) Disposable Baler** Sampling Equipment: **Horiba U-52**

Remarks: _____

JH Baxter & Co.

Groundwater Sampling Field Form

Stella-Jones Corporation

Arlington, WA 98223

(360) 435-2146 FAX (360) 435-3035

Well No. BXS-3	Location **Arlington**	Date 11-17-14
Location: Landfill - South	Field Personnel/Company **W.Krause/C.Baxter**	
Sample Time (2400 hours)	Instrument Calibration Date	

Well Condition Poor Satisfactory New (If poor, explain) _____

Field Conditions/Weather _____

Equipment Decontamination **Liquinox and D.I. Water Rinse.**

Casing Diameter: (Circle One) (2") 4" 6" Other____

Casing Volume (gallons/ft) for: 2"=0.163; 4"=0.653; 6"=1.47
Multiply Water Column Height by appropriate number above to get proper purge volume.

Depth of Well (feet): 42.5'
Depth to Water (feet): 28.9
Water Column (feet): 13.6
Casing Volume (gallons): 2.217
Calculated Purge Volume (gallons): 6.6
Actual Purge Volume (gallons):

Sheen / LNAPL / DNAPL present: _____
Other remarks: _____

Time 2400 hrs	Cumulative Volume (gal)	Temp. (°C)	pH	ORP Redox.	Conductivity ms/cm 25°C	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Odor/Color/ Remarks
1510	0	11.82	5.95	-29	.670	0	16.14	Purge Start
1515	2.2	11.93	6.01	-66	.673	0	11.40	
1520	4.4	11.92	5.99	-77	.675	0	10.75	
	6.6							
1523		Sample						

Purging Equipment: **Portable (Dedicated Bladder Pump) Disposable Baler** Sampling Equipment: **Horiba U-52**

Remarks: _____

Appendix B

(provided on CD only)

Appendix C

Table C-1. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Ammonia
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	Ammonia Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	0.528	--	--	--
8/27/2013	0.539	--	--	--
12/2/2013	0.548	--	--	--
3/17/2014	0.55	4	0.54	0.00009
6/2/2014	0.58	4	0.55	0.00026
9/29/2014	0.52	4	0.55	0.00049
11/17/2014	0.55	4	0.55	0.00049

BXS-3 (Downgradient Well)						
Date	Ammonia Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	1.01	--	--	--	--	--
8/27/2013	0.71	--	--	--	--	--
12/2/2013	0.822	--	--	--	--	--
3/17/2014	1.21	4	0.94	0.048	0.22	**3.62**
6/2/2014	0.91	4	0.91	0.046	0.21	**3.35**
9/29/2014	1.24	4	1.04	0.045	0.21	**4.69**
11/17/2014	1.08	4	1.11	0.023	0.15	**7.36**

BXS-2 (Downgradient Well)						
Date	Ammonia Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	0.025	--	--	--	--	--
8/27/2013	0.025	--	--	--	--	--
12/2/2013	0.025	--	--	--	--	--
3/17/2014	0.025	4	0.03	0.000	0.00	-111.39
6/2/2014	0.025	4	0.03	0.000	0.00	-113.98
9/29/2014	0.025	4	0.03	0.000	0.00	-113.07
11/17/2014	0.025	4	0.03	0.000	0.00	-113.07

Table C-1. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Ammonia
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Ammonia Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	0.025	--	--	--	--	--
8/27/2013	0.025	--	--	--	--	--
12/2/2013	0.025	--	--	--	--	--
3/17/2014	0.025	4	0.03	0.000	0.00	-111.39
6/2/2014	0.025	4	0.03	0.000	0.00	-113.98
9/29/2014	0.025	4	0.03	0.000	0.00	-113.07
11/17/2014	0.025	4	0.03	0.000	0.00	-113.07

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-2. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Chloride
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	Chloride Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	1.62	--	--	--
8/27/2013	1.90	--	--	--
12/2/2013	1.54	--	--	--
3/17/2014	1.81	4	1.72	0.02763
6/2/2014	1.64	4	1.72	0.02643
9/29/2014	1.62	4	1.65	0.01289
11/17/2014	2.02	4	1.77	0.03449

BXS-3 (Downgradient Well)						
Date	Chloride Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	1.98	--	--	--	--	--
8/27/2013	1.88	--	--	--	--	--
12/2/2013	1.57	--	--	--	--	--
3/17/2014	2.20	4	1.91	0.068	0.26	1.23
6/2/2014	1.73	4	1.85	0.072	0.27	0.78
9/29/2014	1.71	4	1.80	0.075	0.27	0.94
11/17/2014	1.76	4	1.85	0.055	0.23	0.54

BXS-2 (Downgradient Well)						
Date	Chloride Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	3.00	--	--	--	--	--
8/27/2013	3.39	--	--	--	--	--
12/2/2013	2.65	--	--	--	--	--
3/17/2014	2.90	4	2.99	0.095	0.31	**7.25**
6/2/2014	2.74	4	2.92	0.109	0.33	**6.48**
9/29/2014	2.57	4	2.72	0.020	0.14	**9.73**
11/17/2014	3.16	4	2.84	0.063	0.25	**7.11**

Table C-2. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Chloride

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Chloride Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	3.60	--	--	--	--	--
8/27/2013	4.00	--	--	--	--	--
12/2/2013	3.56	--	--	--	--	--
3/17/2014	5.97	4	4.28	1.305	1.14	**4.44**
6/2/2014	5.23	4	4.69	1.228	1.11	**5.30**
9/29/2014	4.44	4	4.80	1.074	1.04	**6.00**
11/17/2014	5.04	4	5.17	0.398	0.63	**10.42**

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-3. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Total Organic Carbon (TOC)

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	**TOC Concentration[1]**	**Number of Samples (n)**	**Average Concentration (m_0)**	**Sample Variance (s^1)**
6/4/2013	0.82	--	--	--
8/27/2013	0.88	--	--	--
12/2/2013	0.90	--	--	--
3/17/2014	0.84	4	0.86	0.00133
6/2/2014	0.50	4	0.78	0.03547
9/29/2014	0.78	4	0.76	0.03130
11/17/2014	0.78	4	0.73	0.02330

BXS-3 (Downgradient Well)						
Date	**TOC Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	18.40	--	--	--	--	--
8/27/2013	18.90	--	--	--	--	--
12/2/2013	18.40	--	--	--	--	--
3/17/2014	20.40	4	19.03	0.896	0.95	**38.36**
6/2/2014	19.80	4	19.38	0.803	0.90	**41.48**
9/29/2014	19.50	4	19.53	0.703	0.84	**44.75**
11/17/2014	18.00	4	19.43	1.043	1.02	**36.61**

BXS-2 (Downgradient Well)						
Date	**TOC Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	15.40	--	--	--	--	--
8/27/2013	14.60	--	--	--	--	--
12/2/2013	14.30	--	--	--	--	--
3/17/2014	13.30	4	14.40	0.753	0.87	**31.17**
6/2/2014	14.60	4	14.20	0.380	0.62	**43.46**
9/29/2014	14.00	4	14.05	0.310	0.56	**47.65**
11/17/2014	13.80	4	13.93	0.289	0.54	**48.98**

Table C-3. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Total Organic Carbon (TOC)

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**TOC Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	2.39	--	--	--	--	--
8/27/2013	2.54	--	--	--	--	--
12/2/2013	2.48	--	--	--	--	--
3/17/2014	2.29	4	2.43	0.012	0.11	**27.21**
6/2/2014	2.34	4	2.41	0.014	0.12	**26.64**
9/29/2014	2.25	4	2.34	0.010	0.10	**29.69**
11/17/2014	2.45	4	2.33	0.007	0.09	**34.22**

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-4. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Chemical Oxygen Demand (COD)

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	COD Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	2.5	--	--	--
8/27/2013	3.0	--	--	--
12/2/2013	2.5	--	--	--
3/17/2014	2.5	4	2.63	0.06250
6/2/2014	2.5	4	2.63	0.06250
9/29/2014	2.5	4	2.50	0.00000
11/17/2014	2.5	4	2.50	0.00000

BXS-3 (Downgradient Well)						
Date	COD Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	62.6	--	--	--	--	--
8/27/2013	67.9	--	--	--	--	--
12/2/2013	65.2	--	--	--	--	--
3/17/2014	72.9	4	67.15	19.377	4.40	**29.27**
6/2/2014	70.5	4	69.13	11.016	3.32	**39.96**
9/29/2014	68.2	4	69.20	10.793	3.29	**40.49**
11/17/2014	65.2	4	69.20	10.793	3.29	**40.49**

BXS-2 (Downgradient Well)						
Date	COD Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	41.4	--	--	--	--	--
8/27/2013	42.2	--	--	--	--	--
12/2/2013	36.7	--	--	--	--	--
3/17/2014	38.5	4	39.70	6.527	2.55	**28.89**
6/2/2014	39.8	4	39.30	5.353	2.31	**31.52**
9/29/2014	38.5	4	38.38	1.622	1.27	**55.27**
11/17/2014	33.9	4	37.68	6.709	2.59	**27.03**

Table C-4. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Chemical Oxygen Demand (COD)

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**COD Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	5.9	--	--	--	--	--
8/27/2013	7.5	--	--	--	--	--
12/2/2013	6.7	--	--	--	--	--
3/17/2014	6.7	4	6.70	0.427	0.65	**11.65**
6/2/2014	7.1	4	7.00	0.147	0.38	**19.13**
9/29/2014	6.3	4	6.70	0.107	0.33	**20.42**
11/17/2014	5.6	4	6.43	0.409	0.64	**11.43**

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-5. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Total Coliform

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	Total Coliform Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
2/12/2013[3]	0.5	--	--	--
6/4/2013[3]	NT	--	--	--
8/27/2013	0.5	--	--	--
12/2/2013	0.5	--	--	--
3/17/2014	0.5	4	0.50	0.00000
6/2/2014	0.5	4	0.50	0.00000
9/29/2014	0.5	4	0.50	0.00000
11/17/2014	0.5	4	0.50	0.00000

BXS-3 (Downgradient Well)						
Date	Total Coliform Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
2/12/2013[3]	5	--	--	--	--	--
6/4/2013[3]	NT	--	--	--	--	--
8/27/2013	0.5	--	--	--	--	--
12/2/2013	0.5	--	--	--	--	--
3/17/2014	0.5	4	1.63	5.063	2.25	1.00
6/2/2014	0.5	4	0.50	0.000	0.00	*
9/29/2014	0.5	4	0.50	0.000	0.00	*
11/17/2014	0.5	4	0.50	0.000	0.00	*

BXS-2 (Downgradient Well)						
Date	Total Coliform Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
2/12/2013[3]	0.5	--	--	--	--	--
6/4/2013[3]	NT	--	--	--	--	--
8/27/2013	0.5	--	--	--	--	--
12/2/2013	0.5	--	--	--	--	--
3/17/2014	0.5	4	0.50	0.000	0.00	*
6/2/2014	0.5	4	0.50	0.000	0.00	*
9/29/2014	0.5	4	0.50	0.000	0.00	*
11/17/2014	0.5	4	0.50	0.000	0.00	*

Table C-5. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Total Coliform

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Total Coliform Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
2/12/2013[3]	0.5	--	--	--	--	--
6/4/2013[3]	NT	--	--	--	--	--
8/27/2013	0.5	--	--	--	--	--
12/2/2013	40.8	--	--	--	--	--
3/17/2014	0.5	4	10.58	406.023	20.15	1.00
6/2/2014	0.5	4	10.58	406.023	20.15	1.00
9/29/2014	0.5	4	10.58	406.023	20.15	1.00
11/17/2014	4.1	4	1.40	3.240	1.80	1.00

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

NT = not tested.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

[3] Total coliform was not analyzed on 6/4/2013, sample results from 2/12/2013 used in its place for the statistics.

Table C-6. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Field Conductivity

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Student T-Test Formula: $$\frac{\bar{x} - m_0}{\sqrt{[\,(s^1/n) + (s^2/n)\,]}}$$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	Field Conductivity Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	190	--	--	--
8/27/2013	193	--	--	--
12/2/2013	198	--	--	--
3/17/2014	189	4	192.50	16.33333
6/2/2014	213	4	198.25	110.25000
9/29/2014	212	4	203.00	134.00000
11/17/2014	192	4	201.50	163.00000

BXS-3 (Downgradient Well)						
Date	Field Conductivity Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	635	--	--	--	--	--
8/27/2013	709	--	--	--	--	--
12/2/2013	699	--	--	--	--	--
3/17/2014	730	4	693.25	1674.917	40.93	**24.35**
6/2/2014	793	4	732.75	1780.250	42.19	**25.22**
9/29/2014	733	4	738.75	1544.250	39.30	**27.12**
11/17/2014	675	4	732.75	2324.250	48.21	**21.96**

BXS-2 (Downgradient Well)						
Date	Field Conductivity Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	892	--	--	--	--	--
8/27/2013	871	--	--	--	--	--
12/2/2013	882	--	--	--	--	--
3/17/2014	817	4	865.50	1119.000	33.45	**39.95**
6/2/2014	952	4	880.50	3079.000	55.49	**24.53**
9/29/2014	918	4	892.25	3333.583	57.74	**23.82**
11/17/2014	822	4	877.25	4643.583	68.14	**19.80**

Table C-6. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Field Conductivity

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	Field Conductivity Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	271	--	--	--	--	--
8/27/2013	299	--	--	--	--	--
12/2/2013	313	--	--	--	--	--
3/17/2014	299	4	295.50	310.333	17.62	**11.40**
6/2/2014	318	4	307.25	94.917	9.74	**20.67**
9/29/2014	306	4	309.00	68.667	8.29	**22.99**
11/17/2014	285	4	302.00	190.000	13.78	**13.99**

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-7. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Nitrate + Nitrite as Nitrogen

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	$NO_3 + NO_2$ Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	0.025	--	--	--
8/27/2013	0.021	--	--	--
12/2/2013	0.025	--	--	--
3/17/2014	0.025	4	0.02	0.00000
6/2/2014	0.025	4	0.02	0.00000
9/29/2014	0.025	4	0.03	0.00000
11/17/2014	0.025	4	0.03	0.00000

BXS-3 (Downgradient Well)						
Date	$NO_3 + NO_2$ Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	0.052	--	--	--	--	--
8/27/2013	0.033	--	--	--	--	--
12/2/2013	0.198	--	--	--	--	--
3/17/2014	0.181	4	0.12	0.007	0.09	2.15
6/2/2014	0.025	4	0.11	0.009	0.09	1.83
9/29/2014	0.025	4	0.11	0.009	0.10	1.73
11/17/2014	0.025	4	0.06	0.006	0.08	1.00

BXS-2 (Downgradient Well)						
Date	$NO_3 + NO_2$ Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	0.025	--	--	--	--	--
8/27/2013	0.022	--	--	--	--	--
12/2/2013	0.009	--	--	--	--	--
3/17/2014	0.025	4	0.02	0.000	0.01	-0.95
6/2/2014	0.025	4	0.02	0.000	0.01	-0.95
9/29/2014	0.025	4	0.02	0.000	0.01	-0.97
11/17/2014	0.025	4	0.03	0.000	0.00	0.00

Table C-7. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Nitrate + Nitrite as Nitrogen

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	$NO_3 + NO_2$ Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic (t)[2]
6/4/2013	0.087	--	--	--	--	--
8/27/2013	0.125	--	--	--	--	--
12/2/2013	0.033	--	--	--	--	--
3/17/2014	0.067	4	0.08	0.001	0.04	**2.79**
6/2/2014	0.140	4	0.09	0.003	0.05	**2.68**
9/29/2014	0.025	4	0.07	0.003	0.05	1.57
11/17/2014	0.025	4	0.06	0.003	0.05	1.44

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

NO_2 = nitrite.

NO_3 = nitrate.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-8. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Field pH
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	Field pH Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	7.32	--	--	--
8/27/2013	7.62	--	--	--
12/2/2013	7.39	--	--	--
3/17/2014	5.92	4	7.06	0.59656
6/2/2014	7.47	4	7.10	0.62793
9/29/2014	7.69	4	7.12	0.65343
11/17/2014	7.48	4	7.14	0.67180

BXS-3 (Downgradient Well)						
Date	Field pH Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic (t)[2]
6/4/2013	5.92	--	--	--	--	--
8/27/2013	6.30	--	--	--	--	--
12/2/2013	5.88	--	--	--	--	--
3/17/2014	6.28	4	6.10	0.051	0.23	-2.40
6/2/2014	5.72	4	6.05	0.084	0.29	-2.56
9/29/2014	6.25	4	6.03	0.076	0.28	-2.65
11/17/2014	5.99	4	6.06	0.068	0.26	-2.65

BXS-2 (Downgradient Well)						
Date	Field pH Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic (t)[2]
6/4/2013	5.84	--	--	--	--	--
8/27/2013	6.22	--	--	--	--	--
12/2/2013	5.66	--	--	--	--	--
3/17/2014	6.16	4	5.97	0.071	0.27	-2.68
6/2/2014	5.79	4	5.96	0.075	0.27	-2.79
9/29/2014	6.15	4	5.94	0.064	0.25	-2.90
11/17/2014	5.88	4	6.00	0.036	0.19	-2.88

Table C-8. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Field pH

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Field pH Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	5.69	--	--	--	--	--
8/27/2013	6.03	--	--	--	--	--
12/2/2013	5.63	--	--	--	--	--
3/17/2014	6.06	4	5.85	0.050	0.22	-3.01
6/2/2014	5.64	4	5.84	0.056	0.24	-3.12
9/29/2014	5.99	4	5.83	0.052	0.23	-3.20
11/17/2014	5.69	4	5.85	0.044	0.21	-3.23

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-9. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Total Dissolved Solids (TDS)

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	**TDS Concentration[1]**	**Number of Samples (n)**	**Average Concentration (m_0)**	**Sample Variance (s^1)**
6/4/2013	141	--	--	--
8/27/2013	141	--	--	--
12/2/2013	132	--	--	--
3/17/2014	137	4	137.75	18.25000
6/2/2014	NT	--	--	--
9/29/2014[3]	131	4	135.25	21.58333
11/17/2014	NT	--	--	--

BXS-3 (Downgradient Well)						
Date	**TDS Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	340	--	--	--	--	--
8/27/2013	349	--	--	--	--	--
12/2/2013	356	--	--	--	--	--
3/17/2014	332	4	344.25	109.583	10.47	**36.53**
6/2/2014	NT	--	--	--	--	--
9/29/2014[3]	312	4	337.25	384.917	19.62	**20.12**
11/17/2014	NT	--	--	--	--	--

BXS-2 (Downgradient Well)						
Date	**TDS Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	553	--	--	--	--	--
8/27/2013	574	--	--	--	--	--
12/2/2013	530	--	--	--	--	--
3/17/2014	504	4	540.25	906.917	30.12	**26.47**
6/2/2014	NT	--	--	--	--	--
9/29/2014[3]	513	4	530.25	966.917	31.10	**25.17**
11/17/2014	NT	--	--	--	--	--

Table C-9. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Total Dissolved Solids (TDS)

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**TDS Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	179	--	--	--	--	--
8/27/2013	201	--	--	--	--	--
12/2/2013	223	--	--	--	--	--
3/17/2014	176	4	194.75	478.917	21.88	**5.11**
6/2/2014	NT	--	--	--	--	--
9/29/2014[3]	169	4	192.25	608.917	24.68	**4.55**
11/17/2014	NT	--	--	--	--	--

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

NT = not tested.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

[3] The four concentrations used for the 9/29/2014 analysis include concentrations from 3/17/2014, 12/2/2013, and 8/27/2013.

Table C-10. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Sulfate
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	Sulfate Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	0.80	--	--	--
8/27/2013	0.81	--	--	--
12/2/2013	0.82	--	--	--
3/17/2014	0.97	4	0.85	0.00647
6/2/2014	0.86	4	0.87	0.00537
9/29/2014	0.83	4	0.87	0.00473
11/17/2014	1.56	4	1.06	0.11697

BXS-3 (Downgradient Well)						
Date	Sulfate Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	0.35	--	--	--	--	--
8/27/2013	0.13	--	--	--	--	--
12/2/2013	0.14	--	--	--	--	--
3/17/2014	1.00	4	0.41	0.168	0.41	-2.13
6/2/2014	0.10	4	0.34	0.192	0.44	-2.34
9/29/2014	0.10	4	0.34	0.197	0.44	-2.37
11/17/2014	0.18	4	0.35	0.192	0.44	-3.19

BXS-2 (Downgradient Well)						
Date	Sulfate Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	0.56	--	--	--	--	--
8/27/2013	0.20	--	--	--	--	--
12/2/2013	0.18	--	--	--	--	--
3/17/2014	0.29	4	0.31	0.031	0.18	-5.63
6/2/2014	0.14	4	0.20	0.004	0.06	-12.94
9/29/2014	0.23	4	0.21	0.004	0.06	-12.78
11/17/2014	0.33	4	0.25	0.007	0.08	-14.01

Table C-10. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Sulfate
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Sulfate Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	13.50	--	--	--	--	--
8/27/2013	12.70	--	--	--	--	--
12/2/2013	12.30	--	--	--	--	--
3/17/2014	12.70	4	12.80	0.253	0.50	**46.89**
6/2/2014	10.10	4	11.95	1.557	1.25	**17.73**
9/29/2014	7.22	4	10.58	6.324	2.51	**7.72**
11/17/2014	8.42	4	9.61	5.639	2.37	**7.20**

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-11. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Tannin and Lignin

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Student T-Test Formula: $$\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	**Tannin + Lignin Concentration[1]**	**Number of Samples (n)**	**Average Concentration (m_0)**	**Sample Variance (s^1)**
6/4/2013	0.25	--	--	--
8/27/2013	0.28	--	--	--
12/2/2013	0.18	--	--	--
3/17/2014	0.23	4	0.24	0.00177
6/2/2014	0.28	4	0.24	0.00229
9/29/2014	0.30	4	0.25	0.00289
11/17/2014	0.29	4	0.28	0.00097

BXS-3 (Downgradient Well)						
Date	**Tannin + Lignin Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	13.10	--	--	--	--	--
8/27/2013	8.60	--	--	--	--	--
12/2/2013	5.75	--	--	--	--	--
3/17/2014	29.00	4	14.11	107.661	10.38	**2.67**
6/2/2014	20.80	4	16.04	117.286	10.83	**2.92**
9/29/2014	22.60	4	19.54	96.869	9.84	**3.92**
11/17/2014	20.50	4	23.23	15.682	3.96	**11.59**

BXS-2 (Downgradient Well)						
Date	**Tannin + Lignin Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	1.73	--	--	--	--	--
8/27/2013	1.18	--	--	--	--	--
12/2/2013	1.38	--	--	--	--	--
3/17/2014	1.52	4	1.45	0.054	0.23	**10.34**
6/2/2014	1.27	4	1.34	0.021	0.15	**14.36**
9/29/2014	0.92	4	1.27	0.066	0.26	**7.89**
11/17/2014	1.37	4	1.27	0.065	0.25	**7.70**

Table C-11. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Tannin and Lignin

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Tannin + Lignin Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	0.06	--	--	--	--	--
8/27/2013	0.13	--	--	--	--	--
12/2/2013	0.10	--	--	--	--	--
3/17/2014	0.03	4	0.08	0.002	0.04	-5.10
6/2/2014	0.10	4	0.09	0.002	0.04	-5.11
9/29/2014	0.10	4	0.08	0.001	0.04	-6.03
11/17/2014	0.11	4	0.09	0.001	0.04	-6.79

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-12. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Arsenic
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	Arsenic Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	6.80	--	--	--
8/27/2013	6.30	--	--	--
12/2/2013	6.40	--	--	--
3/17/2014	6.00	4	6.38	0.10917
6/2/2014	6.00	4	6.18	0.04250
9/29/2014	5.86	4	6.07	0.05423
11/17/2014	5.70	4	5.89	0.02040

BXS-3 (Downgradient Well)						
Date	Arsenic Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	138.00	--	--	--	--	--
8/27/2013	140.00	--	--	--	--	--
12/2/2013	164.00	--	--	--	--	--
3/17/2014	175.00	4	154.25	330.917	18.19	**16.26**
6/2/2014	157.00	4	159.00	215.333	14.67	**20.82**
9/29/2014	191.00	4	171.75	219.583	14.82	**22.36**
11/17/2014	174.00	4	174.25	192.917	13.89	**24.24**

BXS-2 (Downgradient Well)						
Date	Arsenic Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	1.50	--	--	--	--	--
8/27/2013	1.00	--	--	--	--	--
12/2/2013	1.30	--	--	--	--	--
3/17/2014	0.78	4	1.15	0.101	0.32	-22.79
6/2/2014	0.70	4	0.95	0.072	0.27	-24.57
9/29/2014	0.69	4	0.87	0.085	0.29	-23.61
11/17/2014	0.70	4	0.72	0.002	0.04	-31.06

Table C-12. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Arsenic

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Arsenic Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	2.50	--	--	--	--	--
8/27/2013	2.50	--	--	--	--	--
12/2/2013	2.50	--	--	--	--	--
3/17/2014	0.25	4	1.94	1.266	1.13	-7.57
6/2/2014	0.20	4	1.36	1.726	1.31	-7.11
9/29/2014	0.25	4	0.80	1.285	1.13	-8.92
11/17/2014	0.30	4	0.25	0.002	0.04	-33.88

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-13. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Barium
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	**Barium Concentration[1]**	**Number of Samples (n)**	**Average Concentration (m_0)**	**Sample Variance (s^1)**
6/4/2013	26.1	--	--	--
8/27/2013	27.5	--	--	--
12/2/2013	26.0	--	--	--
3/17/2014	27.4	4	26.75	0.65667
6/2/2014	28.1	4	27.25	0.79000
9/29/2014	27.6	4	27.28	0.80917
11/17/2014	27.7	4	27.70	0.08667

BXS-3 (Downgradient Well)						
Date	**Barium Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	85.5	--	--	--	--	--
8/27/2013	115.0	--	--	--	--	--
12/2/2013	124.0	--	--	--	--	--
3/17/2014	140.0	4	116.13	523.729	22.89	**7.81**
6/2/2014	127.0	4	126.50	107.000	10.34	**19.13**
9/29/2014	135.0	4	131.50	53.667	7.33	**28.28**
11/17/2014	130.0	4	133.00	32.667	5.72	**36.48**

BXS-2 (Downgradient Well)						
Date	**Barium Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	53.0	--	--	--	--	--
8/27/2013	54.4	--	--	--	--	--
12/2/2013	47.3	--	--	--	--	--
3/17/2014	50.3	4	51.25	9.830	3.14	**15.13**
6/2/2014	52.8	4	51.20	9.607	3.10	**14.95**
9/29/2014	50.0	4	50.10	5.060	2.25	**19.09**
11/17/2014	49.6	4	50.68	2.089	1.45	**27.73**

Table C-13. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Barium

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Barium Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	13.3	--	--	--	--	--
8/27/2013	16.1	--	--	--	--	--
12/2/2013	15.1	--	--	--	--	--
3/17/2014	15.4	4	14.98	1.423	1.19	-16.33
6/2/2014	15.2	4	15.45	0.203	0.45	-25.45
9/29/2014	14.9	4	15.15	0.043	0.21	-28.98
11/17/2014	15.3	4	15.20	0.047	0.22	-29.81

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-14. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Copper
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[\,(s^1/n) + (s^2/n)\,]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	Copper Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	2.0	--	--	--
8/27/2013	2.0	--	--	--
12/2/2013	2.0	--	--	--
3/17/2014	2.0	4	2.00	0.00000
6/2/2014	2.0	4	2.00	0.00000
9/29/2014	2.0	4	2.00	0.00000
11/17/2014	2.0	4	2.00	0.00000

BXS-3 (Downgradient Well)						
Date	Copper Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic (t)[2]
6/4/2013	2.0	--	--	--	--	--
8/27/2013	2.0	--	--	--	--	--
12/2/2013	2.0	--	--	--	--	--
3/17/2014	2.0	4	2.00	0.000	0.00	*
6/2/2014	2.0	4	2.00	0.000	0.00	*
9/29/2014	2.0	4	2.00	0.000	0.00	*
11/17/2014	2.0	4	2.00	0.000	0.00	*

BXS-2 (Downgradient Well)						
Date	Copper Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic (t)[2]
6/4/2013	2.8	--	--	--	--	--
8/27/2013	2.3	--	--	--	--	--
12/2/2013	3.6	--	--	--	--	--
3/17/2014	2.0	4	2.68	0.489	0.70	1.93
6/2/2014	2.6	4	2.63	0.483	0.69	1.80
9/29/2014	2.0	4	2.55	0.570	0.75	1.46
11/17/2014	2.0	4	2.15	0.090	0.30	1.00

Table C-14. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Copper

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Copper Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	2.1	--	--	--	--	--
8/27/2013	2.0	--	--	--	--	--
12/2/2013	2.6	--	--	--	--	--
3/17/2014	2.0	4	2.18	0.083	0.29	1.22
6/2/2014	2.0	4	2.15	0.090	0.30	1.00
9/29/2014	2.0	4	2.15	0.090	0.30	1.00
11/17/2014	2.0	4	2.00	0.000	0.00	*

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-15. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Iron
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	Iron Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	58.4	--	--	--
8/27/2013	64.6	--	--	--
12/2/2013	55.5	--	--	--
3/17/2014	69.3	4	61.95	38.41667
6/2/2014	52.4	4	60.45	61.61667
9/29/2014	72.7	4	62.48	100.42917
11/17/2014	70.0	4	66.10	85.56667

BXS-3 (Downgradient Well)						
Date	Iron Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	93500.0	--	--	--	--	--
8/27/2013	109000.0	--	--	--	--	--
12/2/2013	107000.0	--	--	--	--	--
3/17/2014	127000.0	4	109125.00	189395833.333	13762.12	**15.85**
6/2/2014	118000.0	4	115250.00	84250000.000	9178.78	**25.10**
9/29/2014	111000.0	4	115750.00	76916666.667	8770.21	**26.38**
11/17/2014	120000.0	4	119000.00	43333333.333	6582.81	**36.13**

BXS-2 (Downgradient Well)						
Date	Iron Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	416.0	--	--	--	--	--
8/27/2013	416.0	--	--	--	--	--
12/2/2013	400.0	--	--	--	--	--
3/17/2014	424.0	4	414.00	101.333	10.07	**59.56**
6/2/2014	421.0	4	415.25	114.250	10.69	**57.43**
9/29/2014	409.0	4	413.50	123.000	11.09	**55.26**
11/17/2014	421.0	4	418.75	44.250	6.65	**77.57**

Table C-15. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Iron

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Iron Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	3.7	--	--	--	--	--
8/27/2013	10.0	--	--	--	--	--
12/2/2013	10.0	--	--	--	--	--
3/17/2014	10.0	4	8.43	9.922	3.15	-15.40
6/2/2014	10.0	4	10.00	0.000	0.00	-16.28
9/29/2014	10.0	4	10.00	0.000	0.00	-16.93
11/17/2014	10.0	4	10.00	0.000	0.00	-18.10

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-16. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Manganese

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	**Manganese Concentration[1]**	**Number of Samples (n)**	**Average Concentration (m_0)**	**Sample Variance (s^1)**
6/4/2013	118.0	--	--	--
8/27/2013	119.0	--	--	--
12/2/2013	111.0	--	--	--
3/17/2014	119.0	4	116.75	14.91667
6/2/2014	116.0	4	116.25	14.25000
9/29/2014	118.0	4	116.00	12.66667
11/17/2014	115.0	4	117.00	3.33333

BXS-3 (Downgradient Well)						
Date	**Manganese Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	14800.0	--	--	--	--	--
8/27/2013	14200.0	--	--	--	--	--
12/2/2013	NT	--	--	--	--	--
3/17/2014	10400.0	4	13133.33	5693333.333	2386.07	**10.91**
6/2/2014	12300.0	4	12300.00	3610000.000	1900.00	**12.82**
9/29/2014	7310.0	4	10003.33	6343033.333	2518.54	**7.85**
11/17/2014	8620.0	4	9657.50	4707091.667	2169.58	**8.79**

BXS-2 (Downgradient Well)						
Date	**Manganese Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	1680.0	--	--	--	--	--
8/27/2013	1700.0	--	--	--	--	--
12/2/2013	1580.0	--	--	--	--	--
3/17/2014	1640.0	4	1650.00	2800.000	52.92	**57.80**
6/2/2014	1680.0	4	1650.00	2800.000	52.92	**57.82**
9/29/2014	1650.0	4	1637.50	1758.333	41.93	**72.26**
11/17/2014	1680.0	4	1662.50	425.000	20.62	**147.37**

Table C-16. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Manganese

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Manganese Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	212.0	--	--	--	--	--
8/27/2013	224.0	--	--	--	--	--
12/2/2013	217.0	--	--	--	--	--
3/17/2014	287.0	4	235.00	1226.000	35.01	**6.71**
6/2/2014	253.0	4	245.25	1017.583	31.90	**8.03**
9/29/2014	240.0	4	249.25	854.917	29.24	**9.04**
11/17/2014	265.0	4	261.25	398.917	19.97	**14.18**

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-17. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Nickel
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	**Nickel Concentration[1]**	**Number of Samples (n)**	**Average Concentration (m_0)**	**Sample Variance (s^1)**
6/4/2013	0.4	--	--	--
8/27/2013	2.2	--	--	--
12/2/2013	5.4	--	--	--
3/17/2014	2.0	4	2.50	4.38667
6/2/2014	2.2	4	2.95	2.67667
9/29/2014	2.0	4	2.90	2.78667
11/17/2014	1.1	4	1.83	0.24250

BXS-3 (Downgradient Well)						
Date	**Nickel Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	18.4	--	--	--	--	--
8/27/2013	22.2	--	--	--	--	--
12/2/2013	25.1	--	--	--	--	--
3/17/2014	11.2	4	19.23	36.149	6.01	**5.25**
6/2/2014	21.2	4	19.93	36.569	6.05	**5.30**
9/29/2014	16.1	4	18.40	36.620	6.05	**4.84**
11/17/2014	19.7	4	17.05	19.790	4.45	**6.19**

BXS-2 (Downgradient Well)						
Date	**Nickel Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic $(t)^2$**
6/4/2013	36.9	--	--	--	--	--
8/27/2013	38.4	--	--	--	--	--
12/2/2013	38.2	--	--	--	--	--
3/17/2014	31.0	4	36.13	12.116	3.48	**16.55**
6/2/2014	38.5	4	36.53	13.583	3.69	**15.84**
9/29/2014	34.3	4	35.50	12.660	3.56	**15.79**
11/17/2014	35.8	4	34.90	9.780	3.13	**17.58**

Table C-17. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Nickel

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Nickel Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	8.5	--	--	--	--	--
8/27/2013	11.2	--	--	--	--	--
12/2/2013	12.8	--	--	--	--	--
3/17/2014	7.4	4	9.98	6.096	2.47	**4.62**
6/2/2014	10.9	4	10.58	5.176	2.28	**4.93**
9/29/2014	8.8	4	9.98	5.616	2.37	**4.47**
11/17/2014	10.0	4	9.28	2.302	1.52	**5.76**

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).

Table C-18. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Zinc
Former J.H. Baxter South Woodwaste Landfill
Arlington, Washington

Student T-Test Formula: $\frac{\bar{x} - m_0}{\sqrt{[(s^1/n) + (s^2/n)]}}$ Critical Statistic: $t_c = 2.447$

BXS-4 (Upgradient Well)				
Date	Zinc Concentration[1]	Number of Samples (n)	Average Concentration (m_0)	Sample Variance (s^1)
6/4/2013	2.0	--	--	--
8/27/2013	2.0	--	--	--
12/2/2013	2.0	--	--	--
3/17/2014	2.0	4	2.00	0.00000
6/2/2014	2.0	4	2.00	0.00000
9/29/2014	0.5	4	1.63	0.56250
11/17/2014	2.5	4	1.75	0.75000

BXS-3 (Downgradient Well)						
Date	Zinc Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	2.7	--	--	--	--	--
8/27/2013	2.9	--	--	--	--	--
12/2/2013	1.9	--	--	--	--	--
3/17/2014	0.8	4	2.08	0.909	0.95	0.16
6/2/2014	1.3	4	1.73	0.816	0.90	-0.61
9/29/2014	1.7	4	1.43	0.236	0.49	-0.82
11/17/2014	2.3	4	1.53	0.403	0.63	-0.71

BXS-2 (Downgradient Well)						
Date	Zinc Concentration[1]	Number of Samples (n)	Average Concentration ($\bar{x}$)	Sample Variance (s^2)	Sample Standard Deviation (s)	Student T-Test Statistic $(t)^2$
6/4/2013	3.8	--	--	--	--	--
8/27/2013	3.6	--	--	--	--	--
12/2/2013	3.7	--	--	--	--	--
3/17/2014	4.4	4	3.88	0.129	0.36	**10.43**
6/2/2014	3.4	4	3.78	0.189	0.43	**8.16**
9/29/2014	5.6	4	4.28	0.956	0.98	**5.42**
11/17/2014	4.4	4	4.45	0.810	0.90	**6.00**

Table C-18. Statistical Analysis of Groundwater Quality Results for Downgradient Wells: Zinc

Former J.H. Baxter South Woodwaste Landfill

Arlington, Washington

BXS-1 (Downgradient Well)						
Date	**Zinc Concentration[1]**	**Number of Samples (n)**	**Average Concentration ($\bar{x}$)**	**Sample Variance (s^2)**	**Sample Standard Deviation (s)**	**Student T-Test Statistic (t)[2]**
6/4/2013	2.4	--	--	--	--	--
8/27/2013	2.7	--	--	--	--	--
12/2/2013	3.1	--	--	--	--	--
3/17/2014	2.8	4	2.75	0.083	0.29	**5.20**
6/2/2014	2.2	4	2.70	0.140	0.37	**3.74**
9/29/2014	3.2	4	2.83	0.202	0.45	**5.33**
11/17/2014	2.1	4	2.58	0.269	0.52	**3.18**

Notes

$\bar{x}$ = average concentration for downgradient well.

m_0 = average concentration for upgradient well.

n = number of samples.

s^1 = sample variance in upgradient well.

s^2 = sample variance in downgradient well.

s = sample standard deviation.

t = Student T-Test statistic.

-- = analysis not applicable.

* = statistic with no/zero difference.

[1] For non-detect concentrations, half of the reporting limit is used.

[2] Statistic in **bold** or *gray* is a statistically valid detection (according to the Student T-Test).