

August 22, 2002

Mike Young, R.S. Environmental Health Specialist Snohomish Health District 3020 Rucker Avenue, Suite 104 Everett, Washington 98201

Re:

2001 Groundwater Monitoring Reports, North and South Woodwaste Landfills J.H. Baxter & Co. Facility, Arlington, Washington

Dear Mr. Young:

Please find enclosed copies of the 2001 Groundwater Monitoring Report - North Woodwaste Landfill and the 2001 Groundwater Monitoring Report - South Woodwaste Landfill for J.H. Baxter & Company's (Baxter) two closed woodwaste landfills in Arlington, Washington. These reports are being submitted to you in accordance with Washington Administrative Code (WAC) 173-304-490.

If you have any questions or comments regarding these reports, please do not hesitate to contact me at (541)

Sincerely.

RueAnn Thomas

**Environmental Programs Director** 

CC:

Mary Larson, J.H. Baxter & Co.

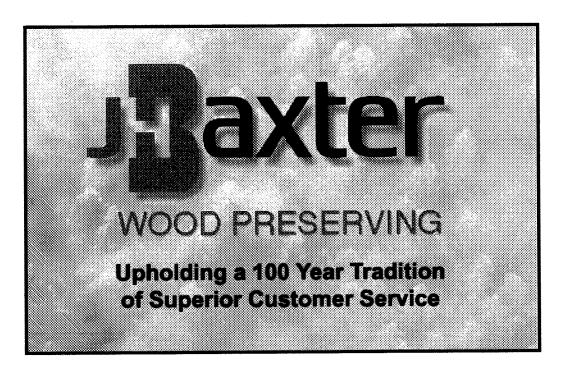
J. Stephen Barnett, Premier Environmental Services, Inc.



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# 2001 Groundwater Monitoring Report South Woodwaste Landfill

J.H. Baxter & Company Arlington, Washington



Prepared for:

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

Prepared by:

J.H. Baxter & Company P.O. Box 10797 Eugene, Oregon 97440

August 2002



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#### 1 INTRODUCTION

This report presents a summary of quarterly groundwater data collected during the 2001 calendar year for the J. H. Baxter & Company (Baxter) closed South Woodwaste Landfill (South Landfill) located at 6520 – 188th Street NE in the City of Arlington, Snohomish County, Washington (Figure 1). The South Landfill is closed with a vegetated soil cap. The facility borders on the south side of 188th Street NE, west of 67th Avenue NE, and east of Arlington Airport and 59th Drive NE. Groundwater sampling was performed on monitoring wells BXS-1, BXS-2, BXS-3, and BXS-4 during quarterly monitoring events conducted in January, April, July, and October 2001. All of the monitoring wells were installed in 1988. Monitoring wells BXS-1, BXS-2, and BXS-3 are located hydraulically downgradient of the South Landfill. Monitoring well BXS-4 is located hydraulically upgradient of the South Landfill (Figure 2). Monitoring well BXS-4 is the source of background groundwater analytical data to which the analytical data from the downgradient wells are compared. 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 for Baxter in 1989 (EMCON 1989). Information on historical monitoring data is provided in biannual and annual monitoring reports previously submitted (IT 1999, IT 2000, Hart Crowser 2001).

#### 2 HYDROGEOLOGY

As discussed, quarterly groundwater monitoring events were performed during January, April, July, and October 2001 for the South Landfill. Monitoring activities included well purging, groundwater sampling, laboratory analysis, and water level measurement.

Groundwater samples were collected from monitoring well locations BXS-1, BXS-2, BXS-3, and BXS-4 during each quarterly sampling event.

#### 2.1 Groundwater Elevations

Groundwater levels were measured in each well during each of the four monitoring events. The elevation of the groundwater surface was calculated relative to the Baxter plant datum by subtracting the depth to water from the surveyed top of casing elevation. Measured groundwater levels throughout the 2001 monitoring period are summarized in Table 1.

The groundwater surface elevations measured during 2001 were within their historical range. The static groundwater level in wells BXS-1, BXS-2, and BXS-3 fluctuated throughout the year by 3.02 feet, 1.76 feet, and 2.21 feet, respectively. The groundwater level in well BXS-4 fluctuated 4.20 feet. Groundwater surface elevations measured during the wet season in January 2001 (Figure 2) and the dry season in October 2001 (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). The average gradient remained approximately the same (0.023 ft/ft in January, 0.020 ft/ft in October) throughout 2001.

#### 2.2 Groundwater Velocities

Groundwater velocities  $(\mathbf{v}_{\mathbf{x}})$  for the January and October monitoring events were estimated using Darcy's Law.

$$\mathbf{v_x} = -\mathbf{K}i/\mathbf{n_e}$$

Hydraulic conductivity ( $\mathbf{K}$ ) in the fine sand unit beneath the landfill was estimated at  $2 \times 10^3$  to  $3 \times 10^{-3}$  centimeters per second (cm/sec) based on slug tests performed in BXS-2 and BXS-4 (EMCON 1989). Porosity ( $\mathbf{n_e}$ ) was assumed to be 0.3 (i.e., 30%).

The average head gradient (*i*) in January 2001 was 0.023 ft/ft resulting in velocity estimates of 0.435 to 0.653 ft/day. The average head gradient in October 2001 was 0.020 ft/ft resulting in velocity estimates of 0.386 to 0.580 ft/day.

#### 3 GROUNDWATER QUALITY

Groundwater samples were collected on January 17, April 3, July 9, and October 4, 2001 using sampling procedures originally described in Appendix C of the Hydrogeologic Report (EMCON 1989). Field sampling records are located in Appendix A. All groundwater samples were submitted to Columbia Analytical Services, Inc. (CAS) in Kelso, Washington for analysis of analytical parameters. Groundwater levels were measured in each well immediately prior to purging the wells.

#### 3.1 Groundwater Sampling

Groundwater sampling was performed using dedicated submersible pumps (bladder pumps) in the downgradient wells BXS-1, BXS-2, and BXS-3. Well BXS-4, the upgradient well, was sampled using a disposable polyethylene bailer. A field duplicate, labeled BXS-5, was collected from well BXS-1 during each monitoring event. A field blank of deionized water, labeled BXS-6, was also collected during each sampling event.

The analytical data for the groundwater samples are summarized by well in the following tables:

- Well BXS-1 in Table 2;
- Well BXS-2 in Table 3;
- Well BXS-3 in Table 4;
- Well BXS-4 in Table 5;
- Field Duplicate BXS-5 in Table 6; and
- Field Blank BXS-6 in Table 7.

Laboratory analytical reports and chain-of-custody forms for the 2001 groundwater monitoring events are presented in Appendix B.

#### 4 DATA VALIDATION

This section describes the data validation process used to determine the adequacy and quality of laboratory analytical data collected for groundwater monitoring in 2001. The objective of data validation was to identify any unreliable or invalid measurements and qualify that data for interpretive use. These validations were performed according to guidelines prepared by United State Environmental Protection Agency (EPA)(1994).

#### 4.1 Field Quality Assurance/Quality Control (QA/QC)

During the quarterly sampling events, deionized water blanks and field duplicates were prepared and containerized by Baxter field personnel in accordance with standard practice. Field duplicate and field blank samples collected/prepared during each of the quarterly 2001 groundwater monitoring events were designated as sample numbers BXN-5 and BXN-6, respectively.

Field duplicate results aid in the assessment of sampling and analytical accuracy. Analytical results for the original and duplicate samples collected from each sampling event were evaluated using the relative percent difference (RPD) and absolute value difference. The RPD between the two samples was calculated when both values of the natural/duplicate pair were greater than five times the practical quantitation limit (PQL) for a given analyte. The absolute value difference (AVD) between the natural and duplicate sample for a given analyte was calculated when one or both values were less than five times the PQL. Analytical results of parameters where the RPD was greater than 20 percent are considered estimated concentrations. One parameter, total dissolved solids (TDS), exhibited an RPD greater than 20 percent in the 2001 sample events (July 2001 groundwater sample collected from well BXS-6). The results of that test are therefore considered "estimate only".

Field Blank results (deionized water blanks) for all sampling events were evaluated using the following criteria to determine if any parameter was measured in the samples at detectable concentrations. All results greater than or equal to the PQL but less than five times the concentration of the contaminated blank are considered estimated and are likely biased towards the high end.

#### 4.2 Laboratory QA/QC

All Baxter groundwater samples received by CAS arrived at the laboratory with proper chain-of-custody documentation and chilled in a cooler. All groundwater and QA/QC samples were analyzed by CAS within the required holding time for the parameters of interest.

CAS's QA coordinator reviewed calibration standards, calibration verification, laboratory controls, laboratory duplicates, and laboratory spikes on a daily basis. Review of these quality indicators showed that all inorganic analyses were in compliance with CAS's QA/QC Criteria and within the precision and accuracy guidelines specified in CAS's laboratory QA Plan.

Accuracy was measured as the ability of the analytical procedure to determine the actual or known quantity of a particular substance in a sample. Accuracy acceptance or rejection was based on the percent recovery (%R) of the laboratory matrix spike for water samples. To determine accuracy, the %R for each matrix spike was compared to the acceptable range as specified in the applicable laboratory method. Natural results associated with percent recoveries outside acceptable limits are considered estimated. Natural results associated with percent recoveries of less than 50% were considered rejected, as recommended by EPA (1994). Under the above-mentioned criterion, all groundwater data collected in 2001 data were acceptable.

#### 4.3 Statistical Analysis of Data

Groundwater sample chemical analysis results were statistically evaluated to assess if there was a significant difference between the downgradient wells and the upgradient background well. The following approach was used for performing the statistical analysis:

- Non-detect results were replaced with a value of half of the laboratory method reporting limit (MRL).
- A key assumption of Student's t-test was that the data are normally distributed.
   Shapiro and Wilk's W-test (Shapiro and Wilk 1965) was used to determine if data could be assumed to be normally distributed at a significance level of 0.05. Data that failed the W-test and could not be assumed to be normally distributed were logarithmically transformed and re-tested.
- Parametric hypothesis testing was performed using Student's t-test for all parameters that were normally or lognormally distributed in both the upgradient and downgradient well. 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 one-tailed test at a significance level of 0.05. The t-test statistic t\* 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\* was greater than the critical test statistic t<sub>c</sub>.
- Statistically significant detections using the above method are shown in **bold** in the tables presented in Appendix C for parameters detected "above" background. Statistically significant detections for items detected "below" background are shown in *gray italics* in the accompanying tables (Appendix C).

- If an analytical parameter detected in the groundwater sample collected from the well showed a statistically significant detection in any quarter during the year, the results for all four quarters were averaged. The yearly mean concentration was then entered into the historical table (Table 8) and the historic trend for that parameter was plotted (see Figures 5 through 17).
- If an analytical parameter detected in the groundwater sample collected from the well did not show a statistically significant detection in <u>any</u> quarter during the year, no result was entered into the historical table and the historic trend for that parameter was not plotted.
- Nonparametric hypothesis testing was not performed for the parameters that could not be represented by normal or lognormal distributions. Parameters that failed the Wilk's W-test typically had limited detections and statistical comparison would be unjustified.

#### 5 DISCUSSION OF RESULTS

#### 5.1 Statistical Results

Results from the statistical analysis, including average concentration, variance, and Student's t-test statistic, are shown in Appendix C for wells BXS-1 through BXS-4. Parameters that were statistically different from background are listed in Table 8, which also includes a history of statistical differences since 1988. Twelve analytical parameters in the groundwater samples were statistically different from background in one or more downgradient wells, for at least one quarter during 2001 as shown:

	BXS-1				BXS-2				BXS-3			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
pH	L	L	L	L	L	L	L	L	L	L	L	L
Conductivity	Н	Η	Η	Η	Η	Η	Η	Η		Η	Н	H
Ammonia as Nitrogen										Η	Η	
Chemical Oxygen Demand					Η	Η	Η	Η	Н	Η	Η	Η
Chloride	Н	Η			Н	H	Η	Η	Η	Η	Η	Η
Total Dissolved Solids	Н	Н										
Sulfate	Н	Η	Η	Η								
Total Organic Carbon	Н	Η	Η	Н	Η	Η	Η	Η			Η	Н
Barium					Η	Η	Η	Н			Η	Η
Iron					Н	Η	Η	Н			Η	
Manganese	Η	Η	Η		Η	Η	Η	Н	Η	Η	Η	Η
Nickel					Н	Η	Η	Η				

Q - Quarter

L - Indicates value was statistically LOWER than background.

H - Indicates value was statistically HIGHER than background.

Blank Space - Indicates value was statistically within background range

#### 5.2 Concentration Trends over Time

Concentration trends over time are presented as Figures 5 through 18 for each of the parameters discussed in the paragraphs below. Each figure contains data for a single parameter from 1988 through 2001 for all four wells.

- Ammonia as Nitrogen (Figure 5). The highest concentrations of ammonia as nitrogen were detected in groundwater collected from the downgradient well BXS-3 during the January and April 2001 monitoring events. Ammonia as nitrogen in the groundwater samples collected from well BXS-3 has fluctuated since 1995 between 0.1 and 0.6 mg/L with no apparent trend. Concentrations of ammonia as nitrogen have been near or below the laboratory instrument detection limit in groundwater samples collected from wells BXS-1 and BXS-2 since 1992.
- Arsenic (Figure 6). Arsenic concentrations detected in the groundwater well samples were not statistically higher than those detected in the BXS-4 background well during the 2001 monitoring year. Arsenic has not been detected at concentrations exceeding laboratory instrument limits in groundwater collected from wells BXS-1 and BXS-2. None of the groundwater collected from the wells exceeded the arsenic EPA Primary Maximum Contaminant Level (MCL) of 50 μg/L.
- **Barium** (Figure 7). Consistent with groundwater data collected since 1993, barium concentrations continue to be in the range of 27μg/L in the background well BXS-4. Barium concentrations were elevated above background concentrations in groundwater from well BXS-3 followed by well BXS-2. The concentration of barium detected in the groundwater sample collected from well BXS-1 was approximately at background. Concentrations of barium in all of the groundwater samples were below the barium MCL of 2,000 μg/L.
- Chemical Oxygen Demand (COD) (Figure 8). levels were highest in groundwater collected from well BXS-3, followed by BXS-2. COD levels in all downgradient wells have remained stable throughout the period of record. The concentration of

barium in groundwater collected from background well BXS-4 was varied in the early 1990s followed by more minor fluctuations at lower concentrations. There is no current MCL or secondary MCL (SMCL) established for COD.

- Chloride (Figure 9). Chloride concentrations were highest in the groundwater collected from the downgradient wells BXS-1, BXS-2, and BXS-3 but have shown a decreasing trend since monitoring began in 1988. Chloride concentrations appear to be stabilizing in the wells since October 1999. Groundwater samples collected from the wells did not contain chloride at concentrations at or above the chloride SMCL of 250,000 μg/L.
- Conductivity (Figure 10). Conductivity in the groundwater samples collected from the downgradient wells trended upwards during the 2001 monitoring period.

  Groundwater collected from wells BXS-2 and BXS-3 had conductivity values consistently above the SMCL of 700 µmhos/cm during 2001. Conductivity in the groundwater collected from the BXS-4 background well was the lowest of the four wells and has remained stable throughout monitoring events.
- Iron (Figure 11). The iron concentration was more elevated in groundwater collected from well BXS-3 than the other three wells. Iron concentrations in wells BXS-2 and BXS-3 were above the iron SMCL of 300 μg/L. Concentrations of iron in groundwater collected from wells BXS-1 and BXS-4 have remained stable and below the 300 μg/L SMCL established for iron.
- Manganese (Figure 12). The most elevated downgradient concentrations of manganese were present in the groundwater collected from wells BXS-3 followed in order by wells BXS-2, and BXS-1. The concentration of manganese detected in groundwater from the downgradient well BXS-3 has increased annually since 1994. The manganese concentrations detected in wells BXS-1, BXS-2, and BXS-4 have remained fairly stable. Concentrations of manganese in the groundwater samples collected from the four wells were above the manganese SMCL of 50 μg/L.

- Nickel (Figure 13). The concentration of nickel was the most elevated in groundwater collected from well BXS-2 followed successively by wells BXS-1, BXS-3, and BXS-4. None of the groundwater samples collected from the wells exceeded the nickel MCL of 100 μg/L.
- Sulfate (Figure 14). The concentration of sulfate was the most elevated in groundwater collected from well BXS-1 followed by well BXS-4 and wells BXS-2 and BXS-3. The sulfate concentration in well BXS-1 has decreased since 1996. The sulfate concentrations detected in the groundwater collected from the remaining wells appear stable. Concentrations of sulfate in all the wells have remained below the sulfate SMCL of 250,000 μg/L.
- Tannin and Lignin (Figure 15). The most elevated concentrations of tannin and lignin were present in groundwater collected from well BXS-3 followed successively by wells BXS-2, BXS-1 and BXS-4. There is no MCL or SMCL for tannin or lignin.
- Total Organic Carbon (TOC)(Figure 16). Concentrations of TOC in the
  groundwater samples collected from the three downgradient wells (BXS-3, BXS-2,
  BXS-1) were more elevated than TOC detected in background well BXS-4. The TOC
  concentration in well BXS-3 has decreased since 1999. There is no MCL or SMCL
  for TOC.
- Laboratory pH (Figure 17). Laboratory pH concentrations in the upgradient well BXS-4 have remained stable and slightly basic in the past few years. Increasing concentrations of [H<sup>+</sup>] ions (i.e., decreasing pH/ more acidic pH) were indicated by laboratory pH measurements for the three downgradient wells. The pH measured from groundwater collected from downgradient wells BXS-1 and BXS-2 was below the pH SMCL range of 6.5 to 8.5. Most of the pH measurements have remained stable since 1992.
- Total Dissolved Solids (TDS)(Figure 18). TDS measured in all four wells has been decreasing since the 2000 monitoring events. None of the TDS concentrations

measured in the wells during the 2001monitoring event exceeded the TDS SMCL of 500,000  $\mu g/L$ .

#### 5.3 Comparison to Standards

MCLs for groundwater are set in WAC 173-304-9901 as equal to the primary drinking water standards set forth in WAC 246-290-310. MCLs are enforceable standards regulating the maximum permissible concentration of a contaminant in drinking water supplies. SMCLs are guidelines related to aesthetics (e.g., taste and odor) rather than adverse health effects and are not enforceable. MCLs and SMCLs are shown on the time series plots on Figures 5 through 18 for reference.

#### 5.3.1 Comparison to MCLs

Of the monitored parameters, MCLs apply to arsenic, barium, cadmium, copper, nickel, and nitrate and nitrite as nitrogen. There were no exceedences of the respective arsenic, barium, cadmium, copper, nickel, nitrate and nitrite as nitrogen MCLs in the 2001 monitoring period.

#### 5.3.1 Comparison to SMCLs

Of the monitored parameters, SMCLs apply to pH, conductivity, chloride, TDS, sulfate, iron, manganese, and zinc. There were no exceedences of the chloride and sulfate, TDS, and zinc SMCLs in the 2001 monitoring period.

There were exceedences of the laboratory pH, conductivity, iron, and manganese SMCLs in the 2001 monitoring period. The SMCL exceedences are described below:

 Laboratory pH measurements were below the SMCL threshold of 6.5 for groundwater samples collected from wells BXS-1 and BXS-2 during the four 2001 monitoring events. The groundwater sample from well BXS-3 was below the pH threshold for the October 2001 monitoring event. Groundwater from well BXS-4 was within the SMCL pH range.

- Conductivity values exceeded the SMCL of 700 µmhos/cm for groundwater collected from wells BXS-2 and BXS-3 during each of the quarterly 2001 monitoring events.
- Iron concentrations detected in groundwater samples from wells BXS-2 and BXS-3
  exceeded their 300 μg/L SMCL in all four monitoring events conducted in 2001.
  Groundwater collected from wells BXS-1 and BXS-4 had no SMCL exceedences for iron.
- Manganese concentrations detected in groundwater samples from the four wells exceeded the 50  $\mu$ g/L SMCL during the 2001 monitoring period.

#### 6 SUMMARY

Concentrations of twelve of the constituents analyzed were statistically higher (or lower in the case of pH) in groundwater samples collected from one or more downgradient monitoring wells in at least one of the quarterly 2001 groundwater monitoring events. There were no MCL exceedences for any analytical parameters during the monitoring events conducted during 2001. There were no exceedences of the chloride, sulfate, TDS, and zinc SMCLs in the groundwater samples collected during the quarterly 2001 groundwater monitoring events. There were exceedences of the pH, conductivity, iron, and manganese SMCLs in the groundwater samples collected during the quarterly 2001 groundwater monitoring events.

## 7 LIMITATIONS

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of J. H. Baxter for specific application to the referenced property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

#### 8 REFERENCES

EMCON. 1989. Hydrogeologic Report, J. H. Baxter South Woodwaste Landfill, Arlington, Washington. Prepared for J. H. Baxter by EMCON, Bothell, Washington. January.

EPA 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. EPA-540/R-94-013.

IT 1999. Summary Report, 1998 Groundwater Sampling Results. J. H. Baxter South Woodwaste Landfill. Prepared for J. H. Baxter by IT Corporation, Bothell, Washington.

IT 2000. Summary Report, 1999 Groundwater Sampling Results. J. H. Baxter South Woodwaste Landfill. Prepared for J. H. Baxter by IT Corporation, Bothell, Washington.

Hart Crowser 2001. Summary Report, 2000 Groundwater Monitoring Results. J. H. Baxter South Woodwaste Landfill. Prepared for J. H. Baxter by HartCrowser, Seattle, Washington.

Shapiro and Wilk 1965. An Analysis of Variance Test for Normality (Complete Samples). Biometrika. 52:591-611.

40 CFR 141, Code of Federal Regulations, Title 40, Part 141. National Primary Drinking Water Regulations.

40 CFR 143, Code of Federal Regulations, Title 40, Part 143. National Secondary Drinking Water Regulations.

WAC 173-200, Washington Administrative Code. Water Quality Standards for Ground Waters of the State of Washington. Olympia, Washington.

WAC 173-216, Washington Administrative Code. State Waste Discharge Program. Olympia, Washington.

WAC 173-304, Washington Administrative Code. Minimum Functional Standards for Solid Waste Handling. Olympia, Washington.

# **Figures**

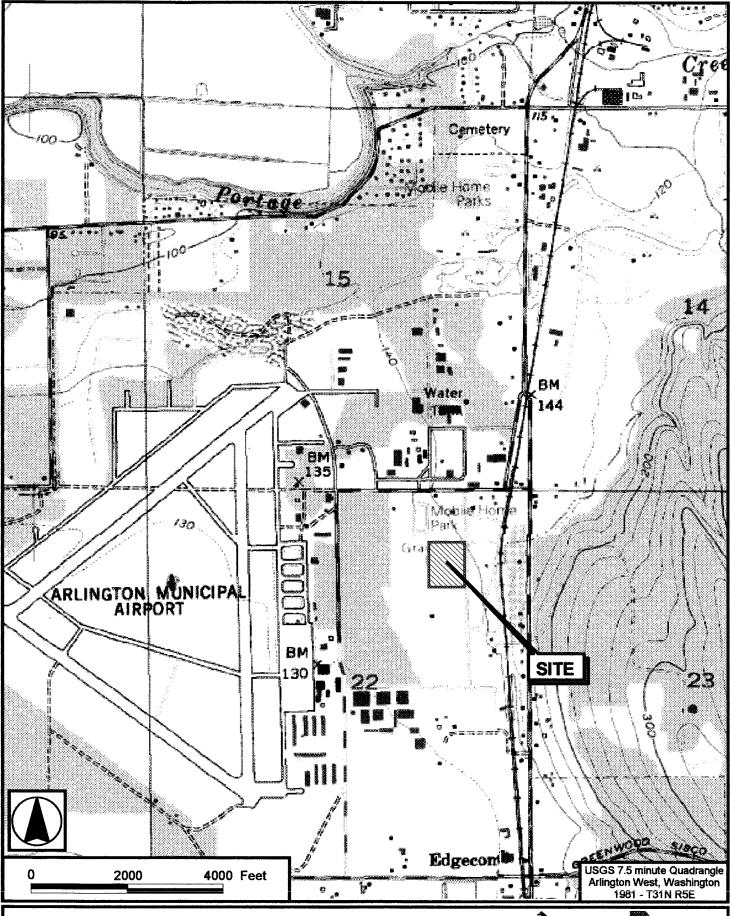


Figure 1. Site Location Map - South Landfill





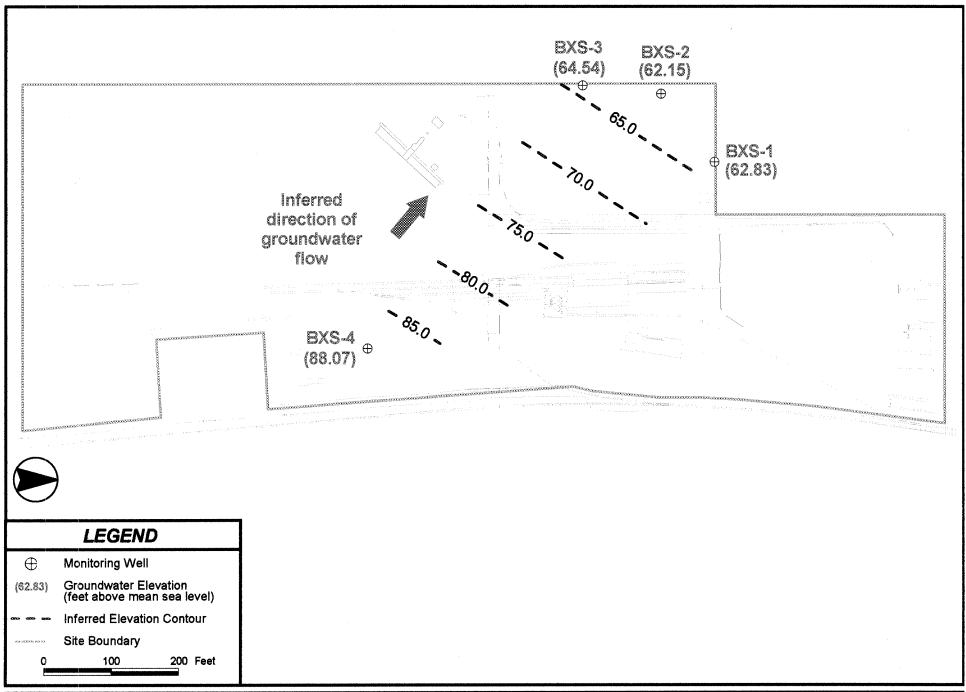


Figure 2. Groundwater Elevation Contour Map - January 2001 - South Landfill





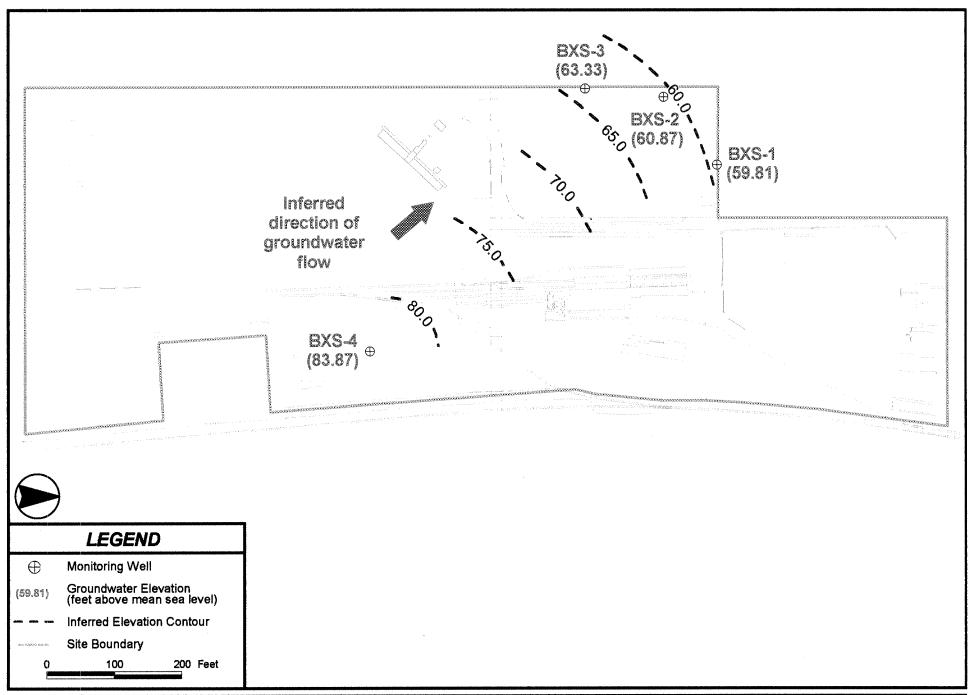
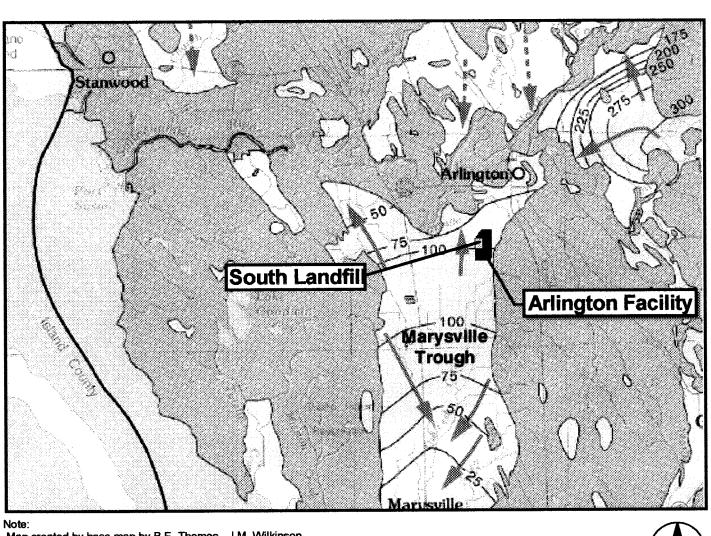


Figure 3. Groundwater Elevation Contour Map - October 2001 - South Landfill







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 Prinicpal Auqifers, Western Snohomish County, Washington,"

dated 1997



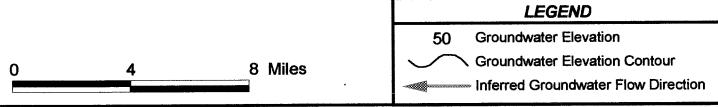


Figure 4. Regional Groundwater Flow Directions





Figure 5. Concentration Trend Over Time
South Woodwaste Landfill Monitoring Well Data

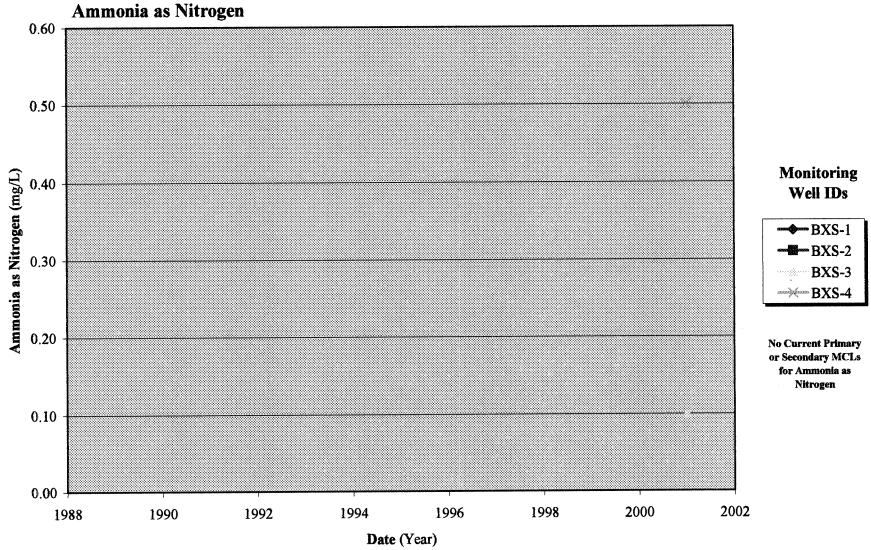


Figure 6. Concentration Trend Over Time
South Woodwaste Landfill Monitoring Well Data
Dissolved Arsenic

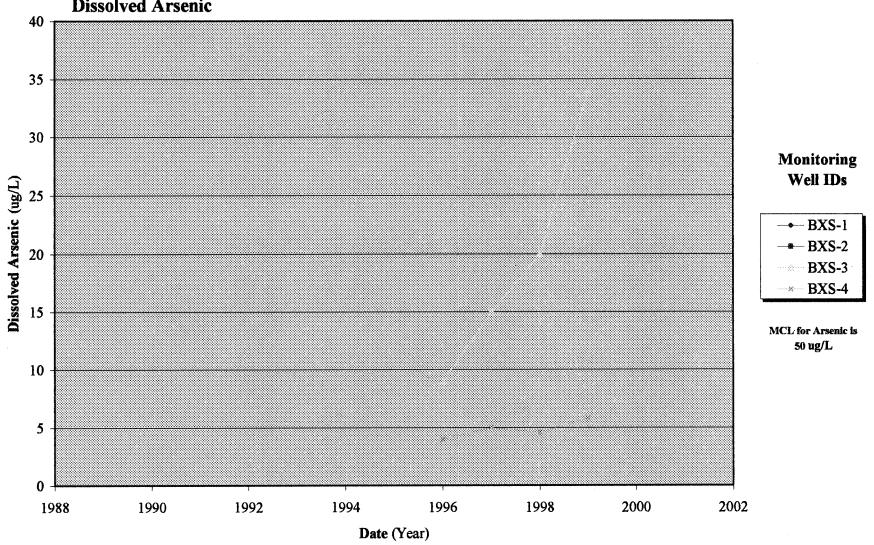


Figure 7. Concentration Trend Over Time
South Woodwaste Landfill Monitoring Well Data
Dissolved Barium

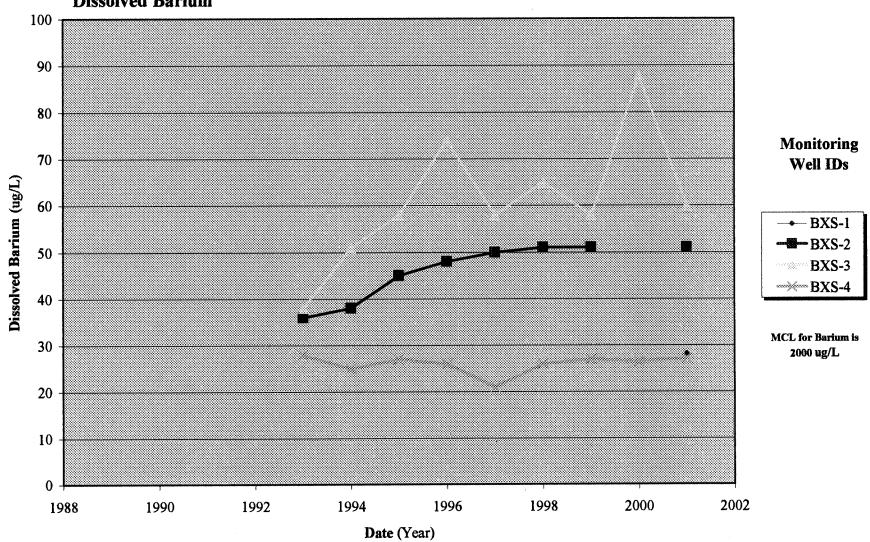


Figure 9. Concentration Trend Over Time
South Woodwaste Landfill Monitoring Well Data
Chloride

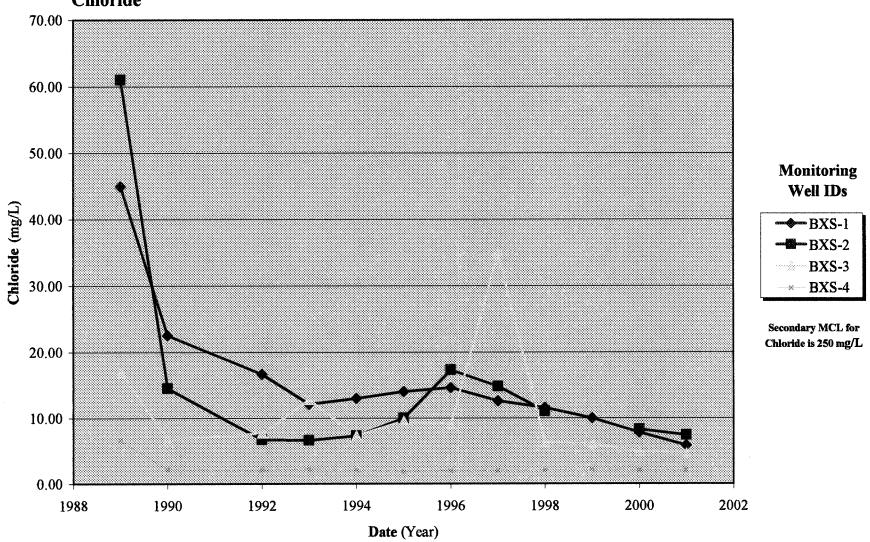


Figure 10. Concentration Trend Over Time South Woodwaste Landfill Monitoring Well Data Conductivity

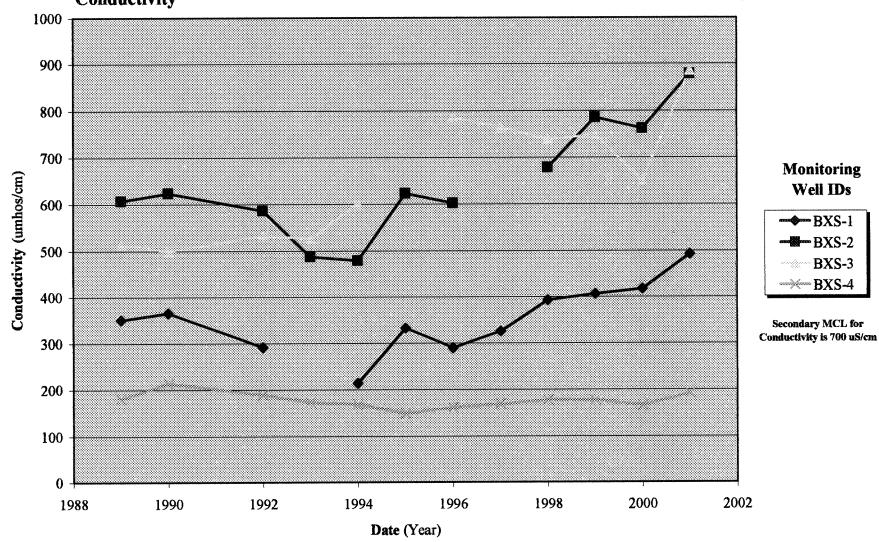


Figure 11. Concentration Trend Over Time
South Woodwaste Landfill Monitoring Well Data
Dissolved Iron

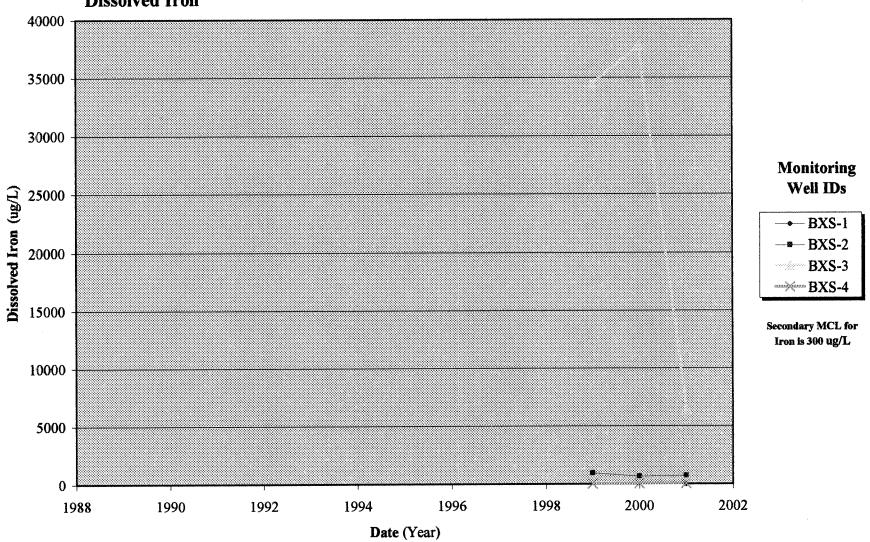


Figure 12. Concentration Trend Over Time
South Woodwaste Landfill Monitoring Well Data
Dissolved Manganese

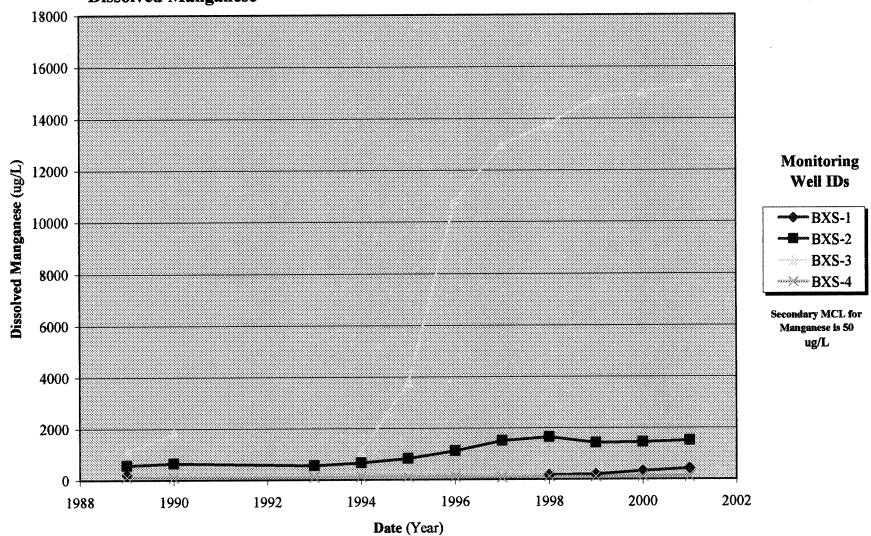


Figure 13. Concentration Trend Over Time
South Woodwaste Landfill Monitoring Well Data
Dissolved Nickel

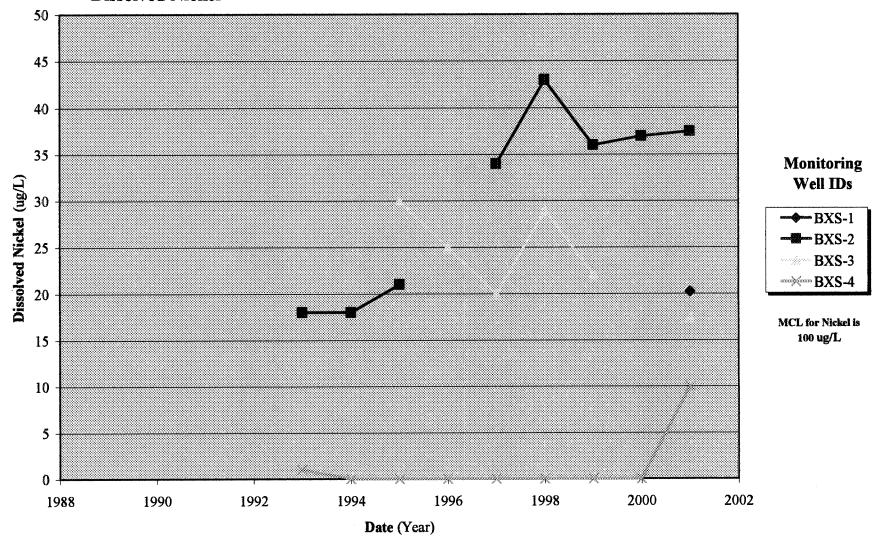


Figure 14. Concentration Trend Over Time
South Woodwaste Landfill Monitoring Well Data
Sulfate

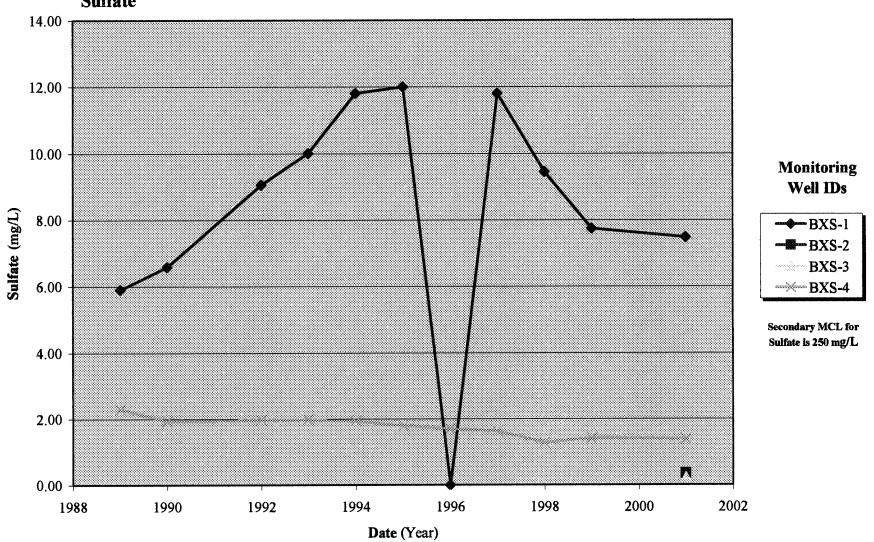


Figure 15. Concentration Trend Over Time South Woodwaste Landfill Monitoring Well Data Tannin and Lignin

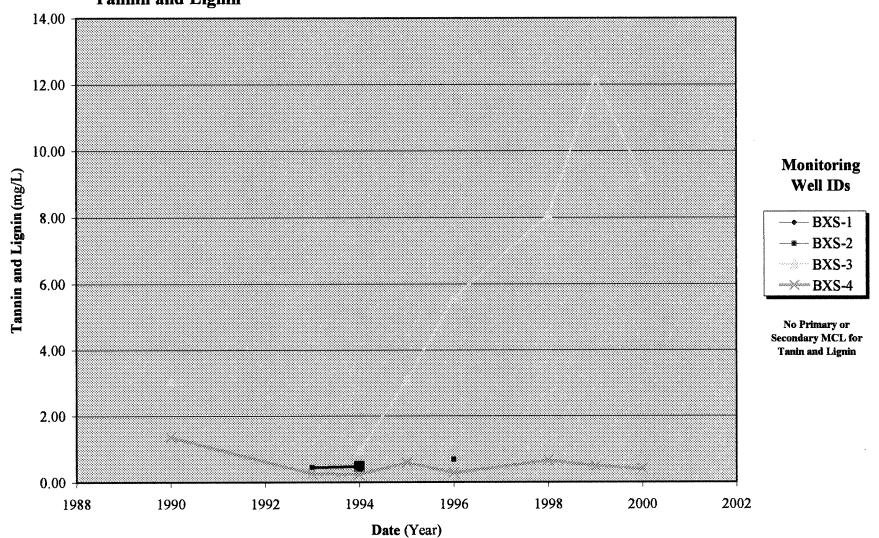


Figure 16. Concentration Trend Over Time
South Woodwaste Landfill Monitoring Well Data
Total Organic Carbon

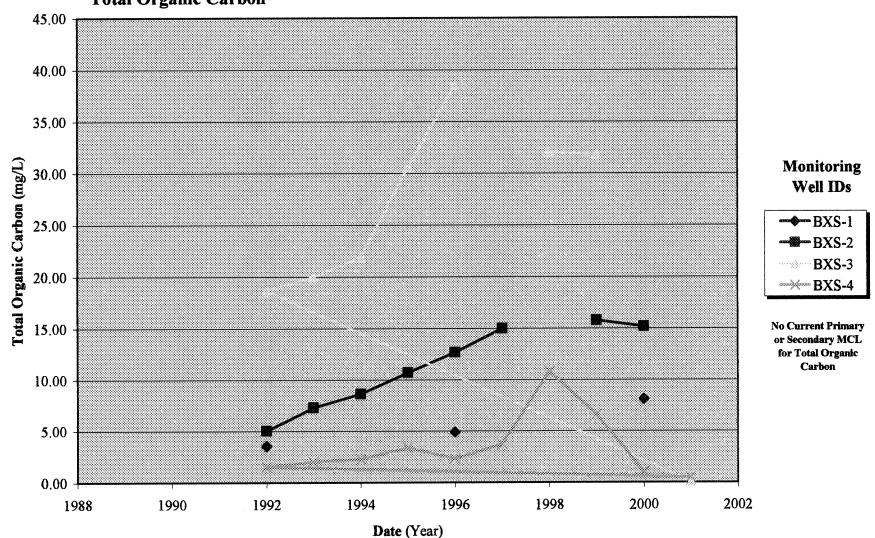


Figure 17. Concentration Trend Over Time South Woodwaste Landfill Monitoring Well Data Laboratory pH

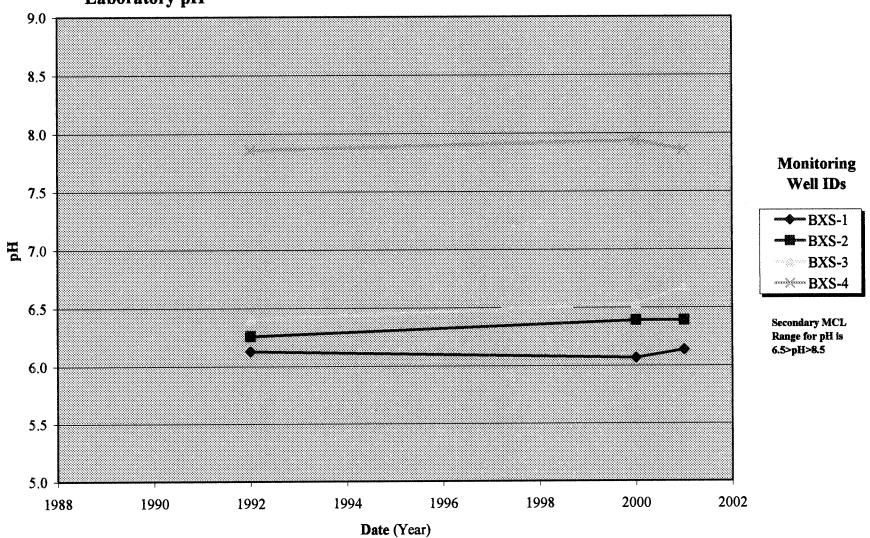
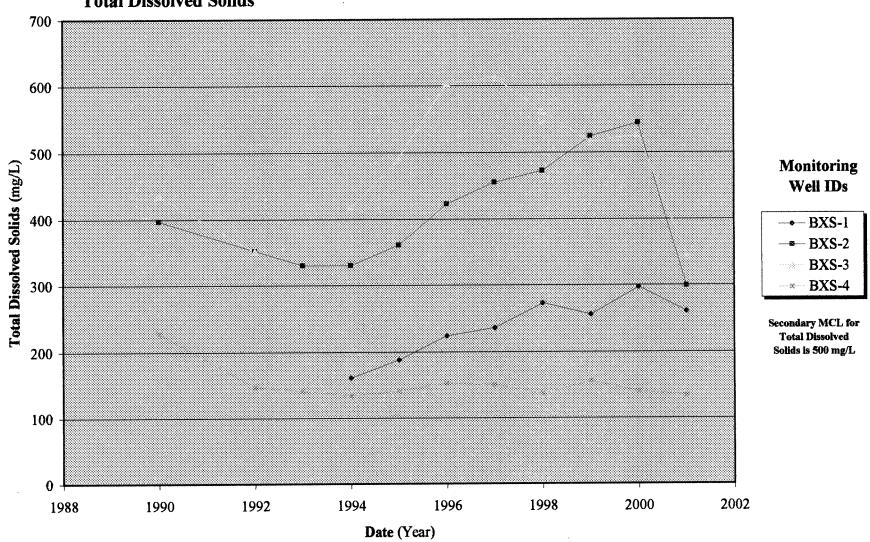


Figure 18. Concentration Trend Over Time
South Woodwaste Landfill Monitoring Well Data
Total Dissolved Solids



### **Tables**

Table 1. Summary of Groundwater Elevations (South Landfill)

	Type of Well	Inner Casing (inches)	Depth of Well (ft)	Length of Screen (ft)	TOC Elevation (ft)		ed Interval ft)	Date	Depth to GW from TOC (ft)	GW Elevation (ft)
								1/17/01	36.76	62.83
								4/03/01	TOP	N/A
BXS-1	111	2	47.90	10	99.59	3 <b>7</b> .90	47.90	<b>7</b> /09/01	TOP <sup>a</sup>	N/A
æ	"'	-	.,,,,,	10	99.59	07.50	41.50	10/04/01	39.78	59.81
								1/17/01	37.62	62.15
Ŋ								4/03/01	37.69	62.08
BXS-2	HI	2	45.40	10	99.77	35.40	45.40	7/09/01	37.14	62.63
0								10/04/01	38.90	60.87
							0.11.111111	1/17/01	34.45	64.54
								4/03/01	33.94	65.05
BXS-3	111	2	44.15	10	98.99	34.15	44.15	7/09/01	33.45	65.54
<u> </u>		_			55.50	01110	10	10/04/01	35.66	63.33
								1/17/01	12.27	88.07
								4/03/01	13.45	86.89
BXS-4	- III	2	47.40	10	100.34	37.40	47.40	7/09/01	14.92	85.42
8	•••	_		. 5		J40	71,70	10/04/01	16.47	83.87

#### Notes:

a) Water level was below Top of Pump (TOP). Measurement could not be obtained. Pump was pulled to obtain these readings on 10/4/01.

b) Depth to GW readings shown in bold indicate GW detected outside screened interval and may lead to anomolous results.

Table 2. Groundwater Quality Data Summary (BXS-1)

Applytical Tark	Primary MCL (a)	Secondary MCL (a)								
Analytical Test	MOL		20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
		6.5-8.5	7.50	6.18	6.22	6.22	6.55	6.07	7.26	5.71
Field Conductivity (uS/cm)		700	431	464	502	522	522	476	477	495
Temperature (C)			15.2	14.4	12.6	9.6	9.6	14.0	13.8	14.0
EH			120	135	130	110	110	100	120	115
DO (mg/L)			0.00	0.76	5.89	6.96	6.98	1.22	0.33	0.86
pH		6.5-8.5	6.15	5.96	6.15	6.06	6.06	6.33	6.09	6.07
Conductivity (umhos/cm)		700	342	401	414	473	473	506	489	504
Ammonia as Nitrogen		3	////\$/\$\$\$//	////\$/\$\$\$	////\$/\$\$\$\$/	///MMH,	0.100 🖇	///\$\$\$\$//	///8/8/28//	////\$/\$\$.
Chemical Oxygen Demand			24	29	26	21	21	27	23	18
를 Chloride		250	8.2	8.3	6.7	7.7	7.7	5.9	5.6	4.3
💆 Nitrate + Nitrite as Nitrogen	10		0.4	0.5	/////%%.	0.3	0.3	0.2	0.4	0.4
Nitrate as Nitrogen										0.3
Nitrite as Nitrogen										/////\$\$\
Solids, Total Dissolved		500	330	323	281	286	286	284	212	262
Solids, Total Suspended							6			
Sulfate		250	7.7	7.8	6.1	7.7	7.7	8.3	7.2	6.7
Tannin and Lignin			0.3	0.3	0.5	0.6	0.6	0.4	0.5	0.6
Carbon, Total Organic			6.6	7.7	9.7	8.6	8.6	7.5	6.8	7.1
Total Coliforms (MPN/100mL)	<5% <sup>(c)</sup>		11	2	2	2				
Arsenic	50									
g Barium	2000		29	28	34	30	30	25	27	31
Cadmium	5									
□ Copper	1300	3					/////\\$/			
₹ Iron		300 /	///////////////////////////////////////		///////////////////////////////////////					///////////////////////////////////////
Manganese		50	264	307	346	409	409	341	396	556
Nickel	100	3	////////	20 /	//////	20 /	//////%	20	27	24
Zinc		5000		///// <del>////////////////////////////////</del>	10	10		//////	10	10

**Notes:**/////Indicates Not Detected at indicated detection limit (and value is estimated as a fraction of detection limit.

Blank indicates no MCL established.

- (a) Primary and secondary MCLs (maximum contaminant levels) per WAC 246-290-310.
- (b) Milligrams per liter, unless otherwise noted.
- (c) <5% criteria indicates less than 5 percent of total coliform samples can be positive in a month.

Table 3. Groundwater Quality Data Summary (BXS-2)

A	Primary MCL (a)	Secondary MCL (a)								
Analytical Test	MICL		20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
Field pH		6.5-8.5	7.53	6.52	6.45	6.73	6.73	6.47	8.37	6.0
Field Conductivity (uS/cm)		700	875	905	833	893	893	860	850	84
Temperature (C)			16.1	15.9	19.4	10.6	10.6	15.3	14.1	15.
EH			80	120	0	90	90	105	0	5
DO (mg/L)			0.00	2.33	5.22	1.28	1.28	1.11	1.32	0.9
pH		6.5-8.5	6.39	6.31	6.37	6.48	6.48	6.36	6.44	6.2
Conductivity (umhos/cm)		700	685	767	719	878	878	884,	890	86
Ammonia as Nitrogen		3	///////////////////////////////////////	///////////////////////////////////////	////\$\$\$\$/	///////////	///8/84/	///848284/	///8/828/	///8/82
Chemical Oxygen Demand			44	49	41	40	40	47	46	3
Chloride		250	7.4	8.8	8.1	8.7	8.7	7.6	6.7	6.
Nitrate + Nitrite as Nitrogen	10				/////88//	/////88/	//////	///////////////////////////////////////	///////////////////////////////////////	0.
Nitrate as Nitrogen		•						,,,,,,,,,,,,	,,,,,,,,,,	0.
Nitrite as Nitrogen									3	
Solids, Total Dissolved		500	500	598	532	501		456	320	<i>42</i>
Solids, Total Suspended								,,,,		
Sulfate		250	0.3	0.2	0.3	0.4	0.4	0.4	0.3	0.3
Tannin and Lignin			1.1	1.1	1.0	1.7	1.7	0.9	1.4	2.
Carbon, Total Organic			13.5	16.8	15.5	14.8	14.8	14.6	15.1	13.
Total Coliforms (MPN/100mL)	<5% <sup>(c)</sup>		2	6	11	4		,-		.0.
Arsenic	50	- /	///////////////////////////////////////	///////////////////////////////////////	///////////////////////////////////////	///////////////////////////////////////		///////////////////////////////////////		
Barium	2000	,	56	51	<i>5</i> 6	51	51	50	53	<i>/////<del>//</del>/</i> 5
Cadmium	5	3						///////////////////////////////////////	///////////////////////////////////////	
Copper	1300	3								
Iron	1000	300	<i>////////////</i> 690	////////////720	<i>//////////</i> 630	<i>(/////////</i> 620	<i>(////////////////////////////////////</i>	<i>/////////////////////////////////////</i>	<i>//////////</i> 740	//////// 78
Manganese		50	1450	1500	1390	1460	1460	1470		
Nickel	100	50	1450 40						1540	158
Zinc	100	5000 8	///////////////////////////////////////	38 /////////	30 /////////	40 /////////	40	30	40	4 1

**Notes:** ////////Indicates Not Detected at indicated detection limit (and value is estimated as a fraction of detection limit.

Blank indicates no MCL established.

- (a) Primary and secondary MCLs (maximum contaminant levels) per WAC 246-290-310.
- (b) Milligrams per liter, unless otherwise noted.
- (c) <5% criteria indicates less than 5 percent of total coliform samples can be positive in a month.

Table 4. Groundwater Quality Data Summary (BXS-3)

Analytical Test	Primary MCL (a)	Secondary MCL (s)								
	WOL		20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
Field pH		6.5-8.5	7.51	6.58	6.39	7.11	7.11	6.49	7.87	6.70
Field Conductivity (uS/cm)		700	831	822	855	925	925	860	833	872
Temperature (C)			15.3	19.9	16.2	11.4	11.4	14.9	17.3	15.4
置 EH			-70	-45	0	-20	-20	45	1	20
DO (mg/L)			0.80	1.62	5.24	2.54	2.54	1.37	0.99	0.83
pH		6.5-8.5	6.47	6.34	6.47	6.83	6.83	6.90	6.64	6.36
Conductivity (umhos/cm)		700	568	589	614	872	872	901	885	887
Ammonia as Nitrogen			0.300	0.310	0.160	0.120	0.120	0.140	0.110	///8/895
Chemical Oxygen Demand			91	49	77	68	68	79	71	60
Chloride		250	3.9	5.5	5.0	5.5	5.5	4.8	4.4	4.1
Nitrate + Nitrite as Nitrogen	10		/////88/		/////88/	/////88/	///////////////////////////////////////	///////////////////////////////////////	//////	0.5
Nitrate as Nitrogen										0.3
Nitrite as Nitrogen										0.2
Solids, Total Dissolved		500	500	561	517	503		556	420	408
Solids, Total Suspended										
Sulfate		250	0.3	///////////////////////////////////////	///////////////////////////////////////	///////	0.2	0.4	0.2	0.2
Tannin and Lignin			9.1	7.1	8.2	12.2	12.2	3.2	6.4	21.6
Carbon, Total Organic			28.8		///////////////////////////////////////	27.1	27.1	26.1	25.9	21.6
Total Coliforms (MPN/100mL)	<5% <sup>(c)</sup>		2	110	80	14	27.1	20.1	23.9	21.0
Arsenic	50		50.0	46.0	49.0	5.0	8.0	16.0	9.0	5.0
Barium	2000		83	105	103	60	60	67	64	49
E Cadmium	5	3		///////////////////////////////////////						
Copper	1300	1								
B Iron		300	56600	52600	34200	7560	7560	5320	8530	4740
Iron Manganese		50	15900	13900	15800	14500	14500	16200	17100	13600
Nickel	100	30%	/////////	///////////////////////////////////////				////////	40 <sup>%</sup>	////////
Zinc	.50	5000	///////////////////////////////////////	15 <i>////////////////////////////////////</i>				, ( <i>((()))</i> 201		///////////////////////////////////////

Notes: ////////Indicates Not Detected at indicated detection limit (and value is estimated as a fraction of detection limit.

Blank indicates no MCL established.

- (a) Primary and secondary MCLs (maximum contaminant levels) per WAC 246-290-310.
- (b) Milligrams per liter, unless otherwise noted.
- (c) <5% criteria indicates less than 5 percent of total coliform samples can be positive in a month.
- (d) Dissolved metals results for Apr. 20 / 2000 BXS-3 and BXS-5 have been switched to resolve a likely labelling error in the field or laboratory

Table 5. Groundwater Quality Data Summary (BXS-4)

Analytical Test	Primary MCL <sup>(a)</sup>	Secondary MCL (a)	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
Field pH		6.5-8.5	7.59	7.74	7.92	8.07	8.07	7.52	6.89	6.9
Field Conductivity (uS/cm)		700	187	182	185	182	182	184	183	20
Temperature (C)			10.8	13.5	9.9	8.0	8.0	9.4	8.6	11.
EH			-80	-70	· -1			-65	-1	18
DO (mg/L)			0.00	2.22	4.99	4.30	4.30	0.75	1.46	0.9
pH		6.5-8.5	7.97	7.78	7.99	8.03	8.03	7.87	7.96	7.5
Conductivity (umhos/cm)		700	150	165	159	189	189	193	193	19
Ammonia as Nitrogen			0.510	0.540	0.460	0.630	0.630	0.480	0.530	0.37
Chemical Oxygen Demand			16		29	7	7	14	38	1
Chloride		250	2.0	2.0	2.0	2.2	2.2	2.0	2.0	2.
Nitrate + Nitrite as Nitrogen	10		/////88/	///////////////////////////////////////			///////////////////////////////////////		///////////////////////////////////////	0.
Nitrate as Nitrogen						•		,,,,,,,,,,,,	,,,,,,,,,,,	0.
Nitrite as Nitrogen									1	///////
Solids, Total Dissolved		500	180	156	94	131	131	134	134	14
Solids, Total Suspended										
Sulfate		250	1.6	1.7	1.6	1.2	1.2	1.6	1.6	1.
Tannin and Lignin			0.3	0.3	0.4	0.6	0.6	0.2	0.4	0.
Carbon, Total Organic			0.7	1.1	1.3	1.0	1.0	1.2	9.3	0.
Total Coliforms (MPN/100mL)	<5% <sup>(c)</sup>		2	2	4	2				
Arsenic	50		5.0	6.0	5.0	//////	5.0	5.0	5.0	5.
Barium	2000		26	26	29	25	25	26	32	2
Cadmium	5									
Copper	1300	3								
Iron		300	40	40	60	50	50	40	40	4
Manganese		50	123	120	129	123	123	116	123	11
Nickel	100	3	///////////////////////////////////////	///////////////////////////////////////	//////	///////////////////////////////////////	//////	///////////////////////////////////////	///////////////////////////////////////	
Zinc		5000		///////////////////////////////////////						

**Notes:** ////////Indicates Not Detected at indicated detection limit (and value is estimated as a fraction of detection limit.

Blank indicates no MCL established.

- (a) Primary and secondary MCLs (maximum contaminant levels) per WAC 246-290-310.
- (b) Milligrams per liter, unless otherwise noted.
- (c) <5% criteria indicates less than 5 percent of total coliform samples can be positive in a month.

Table 6. Groundwater Quality Data Summary (BXS-5) Field Blank

Analytical Test	Primary MCL <sup>(a)</sup>	Secondary MCL (a)	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
Field pH		6.5-8.5			<u> </u>					
Field Conductivity (uS/cm)		700								
Temperature (C)										
EH										
DO (mg/L)										
»pH ·		6.5-8.5					5.52	5.40	5.53	5.92
Conductivity (umhos/cm)		700				•	2,	3	1	
Ammonia as Nitrogen							0.060		///8/8/25/	/////////
Chemical Oxygen Demand										
Chloride		250								
Nitrate + Nitrite as Nitrogen	10								/////8/8/.	0.4
Nitrate as Nitrogen										0.3
Nitrite as Nitrogen							,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
Solids, Total Dissolved		500					//////##/	///////////////////////////////////////	////////	8
Solids, Total Suspended										
Sulfate		250					<i>/////////////////////////////////////</i>	0.3	0.3	
Tannin and Lignin								/////\$\$//		
Carbon, Total Organic							/////shi	///////////////////////////////////////	////%/%/	//////
Total Coliforms (MPN/100mL)	<5% <sup>(c)</sup>							<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>	*********	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Arsenic	50									
Barium	2000									
Cadmium	5		•							
Copper	1300									
Iron		300			•					
Manganese		50								
Nickel	100									
Zinc		5000					//////////////////////////////////////			

**Notes:**/////Indicates Not Detected at indicated detection limit (and value is estimated as a fraction of detection limit.

Blank indicates no MCL established.

- (a) Primary and secondary MCLs (maximum contaminant levels) per WAC 246-290-310.
- (b) Milligrams per liter, unless otherwise noted.
- (c) <5% criteria indicates less than 5 percent of total coliform samples can be positive in a month.

Table 7. Groundwater Quality Data Summary (BXS-6) Duplicate

Analytical Test	MRL	Primary MCL (a)	Secondary MCL (a)	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
Field pH			6.5-8.5				,				7 300 01
Field Conductivity (uS/cm)			700								
Temperature (C)											
EH											
DO (mg/L)											
рН			6.5-8.5	6.08	5.93	6.12	6.10	6.10	6.01	6.12	5.96
Conductivity (umhos/cm)	2		700	344.00	429.00	436.00	494.00	494.00	474.00	490.00	500.00
Ammonia as Nitrogen	0.05		3	///###s.	0.050	0.050	0.070	0.070	///////////////////////////////////////	///8/8/8/	//////////
Chemical Oxygen Demand	5			21.00	14.00	27.00	23.00	23.00	27.00	24.00	19.00
Chloride	0.2		250	8.20	8.20	7.00	7.70	7.70	5.80	5.50	4.30
Nitrate + Nitrite as Nitrogen	0.2	10		0.40	0.50	0.20	0.30	0.30	0.40	0.40	0.40
Nitrate as Nitrogen										;	0.30
Nitrite as Nitrogen	_		500	040.00	004.00	075.00					/////9799/
Solids, Total Dissolved	5		500	318.00	291.00	275.00	272.00	272.00	258.00	262.00	274.00
Solids, Total Suspended Sulfate	0.2		050	7.00	7.00	0.40	7.00	7.00	0.00		
			250	7.60	7.20	6.10	7.80	7.80	8.00	7.10	6.50
Tannin and Lignin	0.2			0.30	0.40	0.50	0.70	0.70	0.40	0.50	0.80
Carbon, Total Organic Total Coliforms (MPN/100mL)	0.5	<5% <sup>(c)</sup>		6.60 7.00	7.10 2.00	9.70 2.00	8.60 2.00	8.60	7.50	7.30	7.10
Arsenic	5	50			7/////////	7/////////////////////////////////////					/////////
Barium	5 5	_	6	//// <i>HPM</i> /	////KPY/	//////////////////////////////////////	/////HPM/	//// <i>///</i> /////////////////////////////	/////499//	///////	/////4994.
Cadmium		2000	1	27.00 //////////	27.00 /////////	33.00 //////////	30.00 /////////	30.00 //////////	· 25.00 ///////////	27.00 /////////	28.00 ////////
	4	5	3								
Copper	10	1300	200				//// <i>//</i> //////////////////////////////	///////////////////////////////////////			
Iron	20		300 /	///////////////////////////////////////	///////////////////////////////////////	///////////	30.00	30.00%	,,,,,,,,,,,	///////////////////////////////////////	////>>>
Manganese	5	400	50	272.00 /////////	308.00	348.00	397.00	397.00	345.00	400.00	534.00
Nickel Zinc	20	100	E000		20.00 <i>/</i> //////////////////////////////////		20.00	20.00 /	,,,,,,,,,,	30.00	20.00
M ZINC	10		5000 /	[[[[]]]]]]]	[[[]]]	<u> </u>	10.00	10.00	10.00 /	<u> </u>	10.00

Notes:

Indicates Not Detected at indicated detection limit (and value is estimated as a fraction of detection limit.

Indicates this value exceeds 20 % of the Relative Percent Difference for BXS-1 **AND** both values of the natural/duplicate pair were greater than five times the Method Reporting Limit (MRL) for a given analyte.

Indicates one or both values of the natural/duplicate pair were less than than five times the MRL 0.05 for a given analyte AND the absolute value difference for the analyte was greater than the MRL. Blank indicates no MCL established.

- (a) Primary and secondary MCLs (maximum contaminant levels) per WAC 246-290-310.
- (b) Milligrams per liter, unless otherwise noted.
- (c) <5% criteria indicates less than 5 percent of total coliform samples can be positive in a month.

Table 8. Parameters Statistically Higher than Background (1988-2001)

Mean Value Mean Value Upgradient

Test Type	Parameter	Monitoring Period	BXS-1	BXS-2	BXS-3	BXS-4
Conventionals	Ammonia as Nitrogen	2001			0.10	0.50
Conventionals	Carbon, Total Organic	1992	3.55	5.03	18.70	1.53
Conventionals	Carbon, Total Organic	1993		7.30	20.00	2.03
Conventionals	Carbon, Total Organic	1994		8.60	21.90	2.30
Conventionals	Carbon, Total Organic	1995		10.70	30.60	3.40
Conventionals	Carbon, Total Organic	1996	4.90	12.70	38.50	2.33
Conventionals	Carbon, Total Organic	1997		15.00		3.75
Conventionals	Carbon, Total Organic	1998			32.10	10.80
Conventionals	Carbon, Total Organic	1999		15.80	31.80	6.55
Conventionals	Carbon, Total Organic	2000	8.10	15.20		1.00
Conventionals	Carbon, Total Organic	2001	7.50	14.55	25.18	3.10
Conventionals	Chemical Oxygen Demand	1990	27.9	41.2	97.8	2.2
Conventionals	Chemical Oxygen Demand	1993			106.0	30.5
Conventionals	Chemical Oxygen Demand	1994		30.0	83.0	22.0
Conventionals	Chemical Oxygen Demand	1995			90.0	32.0
Conventionals	Chemical Oxygen Demand	1996		41.0	98.0	16.0
Conventionals	Chemical Oxygen Demand	1997		43.0	87.0	19.0
Conventionals	Chemical Oxygen Demand	1998		51.0	98.0	20.1
Conventionals	Chemical Oxygen Demand	1999			92.0	40.5
Conventionals	Chemical Oxygen Demand	2000		43.5	71.3	13.6
Conventionals	Chemical Oxygen Demand	2001	22.25	42.50	69.50	17.25
Conventionals	Chloride	1989	45.00	61.00	17.00	6.60
Conventionals	Chloride	1990	22.50	14.50	6.78	2.20
Conventionals	Chloride	1992	16.67	6.73	7.70	2.17
Conventionals	Chloride	1993	12.10	6.63	12.80	2.28
Conventionals	Chloride	1994	13.00	7.35	7.38	2.08
Conventionals	Chloride	1995	14.00	10.00	9.60	1.90
Conventionals	Chloride	1996	14.60	17.30	9.10	2.00
Conventionals	Chloride	1997	12.60	14.80	35.00	2.03
Conventionals	Chloride	1998	11.58	11.03	6.28	2.13
Conventionals	Chloride	1999	10.00		6.10	2.20
Conventionals	Chloride	2000	7.80	8.30	5.00	2.10
Conventionals	Chloride	2001	5.88	7.43	4.70	2.05

Table 8. Parameters Statistically Higher than Background (1988-2001)

Mean Value
Mean Value Downgradient
Upgradient

Test Type	Parameter	Monitoring Period	BXS-1	BXS-2	BXS-3	BXS-4
Conventionals	Conductivity (umhos/cm)	1989	351	607	514	180
Conventionals	Conductivity (umhos/cm)	1990	366	624	500	214
Conventionals	Conductivity (umhos/cm)	1992	292	586	533	189
Conventionals	Conductivity (umhos/cm)	1993		487	526	173
Conventionals	Conductivity (umhos/cm)	1994	214	479	602	169
Conventionals	Conductivity (umhos/cm)	1995	333	623		149
Conventionals	Conductivity (umhos/cm)	1996	290	602	787	161
Conventionals	Conductivity (umhos/cm)	1997	326		765	169
Conventionals	Conductivity (umhos/cm)	1998	393	678	738	177
Conventionals	Conductivity (umhos/cm)	1999	406	786	748	177
Conventionals	Conductivity (umhos/cm)	2000	417	762	651	166
Conventionals	Conductivity (umhos/cm)	2001	493.00	878.25	886.25	192.50
Conventionals	Nitrate + Nitrite as Nitrogen	1990	0.720			0.100
Conventionals	Nitrate + Nitrite as Nitrogen	1993	0.788			0.175
Conventionals	Nitrate + Nitrite as Nitrogen	1994	0.500			ND
Conventionals	Nitrate + Nitrite as Nitrogen	1996	1.650			ND
Conventionals	Nitrate + Nitrite as Nitrogen	1997	0.750			ND
Conventionals	Nitrate + Nitrite as Nitrogen	1999	0.430			ND
Conventionals	Nitrate + Nitrite as Nitrogen	2000	0.330			0.100
Conventionals	Nitrate + Nitrite as Nitrogen	2001				
Conventionals	pH	1992	6.13	6.26	6.41	7.86
Conventionals	pH	2000	6.07	6.39	6.53	7.94
Conventionals	pH	2001	6.14	6.39	6.68	7.86
Conventionals	Solids, Total Dissolved	1990		397	436	228
Conventionals	Solids, Total Dissolved	1992		352	351	147
Conventionals	Solids, Total Dissolved	1993		330		141
Conventionals	Solids, Total Dissolved	1994	161	330	418	134
Conventionals	Solids, Total Dissolved	1995	188	361	492	141
Conventionals	Solids, Total Dissolved	1996	224	423	604	153
Conventionals	Solids, Total Dissolved	1997	236	456	613	150
Conventionals	Solids, Total Dissolved	1998	273	473	562	137
Conventionals	Solids, Total Dissolved	1999	256	524	517	156
Conventionals	Solids, Total Dissolved	2000	297	544	527	140
Conventionals	Solids, Total Dissolved	2001	261.00	299.00	346.00	134.75

Table 8. Parameters Statistically Higher than Background (1988-2001)

Mean Value Downgradient Upgradient

Test Type	Parameter	Monitoring Period	BXS-1	BXS-2	BXS-3	BXS-4
Conventionals	Sulfate	1989	5.90			2.30
Conventionals	Sulfate	1990	6.58			1.93
Conventionals	Sulfate	1992	9.07			1.97
Conventionals	Sulfate	1993	10.01			1.98
Conventionals	Sulfate	1994	11.80		•	1.93
Conventionals	Sulfate	1995	12.00			1.80
Conventionals	Sulfate	1996	10.70			1.70
Conventionals	Sulfate	1997	11.80			1.63
Conventionals	Sulfate	1998	9.46			1.28
Conventionals	Sulfate	1999	7.75			1.43
Conventionals	Sulfate	2001	7.48	0.35	0.25	1.40
Conventionals	Tannin and Lignin	1990			3.08	1.36
Conventionals	Tannin and Lignin	1993		0.45		0.25
Conventionals	Tannin and Lignin	1994		0.48	0.98	0.23
Conventionals	Tannin and Lignin	1995			3.10	0.60
Conventionals	Tannin and Lignin	1996		0.68	5.60	0.28
Conventionals	Tannin and Lignin	1998			8.08	0.65
Conventionals	Tannin and Lignin	1999			12.20	0.50
Conventionals	Tannin and Lignin	2000		9.11	9.20	0.40
Conventionals	Tannin and Lignin	2001				
Metals	Arsenic	1996			9	4
Metals	Arsenic	1997			15	5
Metals	Arsenic	1998			20	4.6
Metals	Arsenic	1999			34	5.8
Metals	Arsenic	2001				÷
Metals	Barium	1993		36	38	28
Metals	Barium	1994		38	51	25
Metals	Barium	1995		45	58	27
Metals	Barium	1996		48	74	26
Metals	Barium	1997		50	58	21
Metals	Barium	1998		51	65	26
Metals	Barium	1999		51	58	27
Metals	Barium	2000			87.8	26.5
Metals	Barium	2001	28.25	51.00	60.00	27.25

Table 8. Parameters Statistically Higher than Background (1988-2001)

Mean Value
Mean Value Downgradient
Upgradient

Test Type	Parameter	Monitoring Period	BXS-1	BXS-2	BXS-3	BXS-4
Metals	Copper	1993			8	5
Metals	Copper	2001				
Metals	Iron	1990		140	1950	48
Metals	Iron	1994		748	1950	45
Metals	Iron	1995		1120	341	50
Metals	Iron	1996		1520	9490	46
Metals	Iron	1997		1220	17800	50
Metals	Iron	1998		1130	20700	56
Metals	Iron	1999		950	34500	30
Metals	Iron	2000		665	37740	47.5
Metals	Iron	2001	10	714.75	6537.5	42.5
Metals	Lead	1993			2	1
Metals	Manganese	1989	210	580	1100	120
Metals	Manganese	1990		650	1820	99
Metals	Manganese	1993		570		110
Metals	Manganese	1994		670	1110	120
Metals	Manganese	1995		834	3780	122
Metals	Manganese	1996		1120	10800	121
Metals	Manganese	1997		1510	13000	90
Metals	Manganese	1998	175	1650	13800	126
Metals	Manganese	1999	200	1420	14800	116
Metals	Manganese	2000	331	1450	15025	124
Metals	Manganese	2001	425.5	1512.5	15350.0	119.0
Metals	Nickel	1993		18		1
Metals	Nickel	1994		18		ND
Metals	Nickel	1995		21	30	ND
Metals	Nickel	1996			25	ND
Metals	Nickel	1997		34	20	ND
Metals	Nickel	1998		43	29	ND
Metals	Nickel	1999		36	22	ND
Metals	Nickel	2000		37		ND
Metals	Nickel	2001	20.25	37.5	17.5	10.0

### Appendix A

Field Groundwater Sampling Records

BOTTOM 1-11 WATER 25,46 41.021 8 4" - MW-Z- 4394+ 51.23 4" - MW-3- 41.23 - 51,96 - MWG- DUP. 2" - MW-4- 9,20, - 41,92/ MW-S- FIELD BLANTE. BXS-1- 36.76-FP- 47.90 / BXS-6 Dup. 2"+ BX5-2-37-62 -45,40/ 00 2" - BXS-3- 34,45 - 44,15/ 2" - BXS-4-12.27 - 47,40 BXS-S- FIELD BLANK BXN-1651.6196 8 81.82 BXN-G-DUE 2"-BXN-2-47,26 -57,24 2" - BXM -3-48.89 - 58.66 00 2" - BXN-4-46.59 - 51,74. BXN1-6- FIELD BLANK & - NEW pumps @ METHANE GAS Check

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CATEGORIES TO ARTHOUGH THAT FRANCISCO TRANSPORTS AND STREET AND ARTHOUGH A PARTY OF THE PARTY AND ARTHOUGH A	and the second s	Bottom	
8 MW 5 =	28117 =	35,43	
		Shipper	1-18-01
O MW le	39.46 TP-	46.62 Constitue WA	+ER_
Mw 7 =	413.46	55.08 Gar Hitial	
9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9		<u></u> <u></u> <u></u> <u></u>	Cap
Ø pumps		Order Number	
		Contract Number _	
		Lot Number	
		Marks Pa	aint Daub
		Hammer Brand	
		Inspector	:
			otion of Material
			h.
		Paragraph Number	
	397)		
	NATION AND ADDRESS OF THE PARTY	Tallied By	
macaman conversation about the second	one when a hand when the selection when the selection has	FORM NO. 7-WC	J. L. DARLING CORP. TACCHA, WA 88124 (253) 922-5000 - F.AX (253) 922-5300

### J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: BXS - | Ø

SAMPLING LOCATION: Arlington, WA Plant DATE: 1-16-01
COLLECTED BY: Jim Clawson TIME: 2:00 pm WEATHER 40° Pt. Cloudy
WEATHER 40° Pt. cloudy
MONITORING WELL CONDITION:  LOCKED X UNLOCKED WELL NO. IS IS NOT APPARENT  OUTER CASING CONDITION:  OCO TYPE:  O' Steel  INNER CASING CONDITION:  OCO TYPE:  O' Steel  INNER CASING CONDITION:  OCO TYPE:  OTHER  CASING  DEPTH OF WELL:  OTHER  FT. MEASURED WITH: 100' fiberglass tape  WATER LEVEL:  OCOMMENTS DEPTH: 47790—36.76 = 11.14 ** 100 = 6.6 9 91.7.10
FIELD EQUIPMENT CLEANED BEFORE USE: ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO +rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:  APPEARANCE: CLEAR ★ SL.CLOUDY CLOUDY V.CLOUDY  ODOR: NO ★ YES SLIGHT STRONG  COMMENTS:
WELL EVACUATION:  VOLUME OF WATER IN WELL BORE: 11, 1 FT. GALLONS: 6, 6  TOTAL VOLUME REMOVED: 2, 2 GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Qt PUMP TYPE  COMMENTS:
OBSERVATIONS DURING EVACUATION:  APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO Y YES SLIGHT STRONG COMMENTO: SLIGHT ROSE SLIGHT ROSE COMMENTO: SLIGHT ROSE COMMENTO: SLIGHT ROSE SLIGHT ROSE COMMENTO: SLIGHT ROSE SLIGHT ROSE COMMENTO: SLIGHT ROSE SLIG
RAN meter down to the Top of pump in Well.

SAMPLING SAMPLE I BAILER MA	EXTRACTI	ON METH	IOD:			(5-1	
PUMP TYPE OTHER: SAMPLE OB	:		-	~	PUMP IPOSITE		- <del></del>
ON SITE MI	EASUREMI						•
Extraction	Temp FC	pН	Conduct. uS	DO % 02	ЕН	Methane	DO MG/2
Measured	Corning	Corning	Coming		ORP Testr		1012
1	10,1	6.55	577.	73,0	155.		7,92
3	5.01	6.60	539,	65.4	115.		7,37
3	9.6/	6.55	522.	66/8	110V		6.98
APPEARANC ODOR: NO COMMENTS	YES	······	SLIG	HTS	TRONG		
SAMPLE CONUMBER, SITE ALONG  ON-SITE SAMPLE COMMENTS:	AMPLE FII ON-SITE_	LTRATION	V:		Piss.	Metail	<u>5, )</u> 
ON-SITE SANONECOMMENTS:	AMPLE PR ADDEI		TON DRATORY T	ГО СОПТА	INERS X		 -
CONTAINE CONTAINER CONTAINER CONTAINER CHAIN OF CU	SIDES LAB LIDS TAPE PLACED IN	ELED ANI D I ICE CHES	ST		X X X X	-	<del></del>
OTHER COM	MENTS  O Dog				:		 
CAMDIED CO	ם מו זיי א די ו	$\Omega$	(1)		D. 1 = 1 =	- i/	- \

SAMPLERS SIGNATURE: Jun Clauson DATE 1-16-01

### J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: BXS-4

SAMPLING LOCATION: Arlington, WA Plant DATE: 1-16-01
COLLECTED BY: Jim Clawson IIME: III & O IA NO
WEATHER 29° Goggie
MONITORING WELL CONDITION:
LOCKED X UNLOCKED WELL NO. IS X IS NOT APPARENT
OUTER CASING CONDITION: Q cod TYPE: 6" Steel
LOCKED WELL CONDITION:  LOCKED WELL NO. IS X IS NOT APPARENT OUTER CASING CONDITION:  OCCUPATION:  TYPE: 6" Steel INNER CASING CONDITION:  WATER DEPTH MEASUREMENT DATUM: TOP OF INNER X OTHER
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER X OTHER
CASING
DEPTH OF WELL: 47.40 FT. MEASURED WITH: 100' fiberglass tape
CASING DEPTH OF WELL: 47.40 FT. MEASURED WITH: 100' fiberglass tape WATER LEVEL: 12.27 FT. MEASURED WITH: Electronic Sounder COMMENTS DEPTH 47.40-12.127 = 35.1 ** 16 = 21.0 ghl. P. L.
COMMENTS DE 044 47,40-12 07 = 35 1 4,6 = 21.0 91, P.V
FIELD EQUIPMENT CLEANED BEFORE USE:
TTEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO X YES SLIGHT STRONG
ODOR: NO X YES SLIGHT STRONG
COMMENTS:
WELL EVACUATION:
VOLUME OF WATER IN WELL BORE: 35, FT. GALLONS: 21, 0
VOLUME OF WATER IN WELL BORE: 35,   FT. GALLONS: 21, 0  TOTAL VOLUME REMOVED: 7, 0 GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
COMMENTS:
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR SL.CLOUDY X V.CLOUDY V.CLOUDY
ODOR: NO YES K SLIGHT X STRONG
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE
COMMENTS:
· ·

	neconn	(CONTINE)		West s with	mber <u>B</u>	XS-L	j
SAMPLING SAMPLE I	EXTRACTI	ON METH	OD:				
BAILER MA PUMP TYPE	:	POIY	ematerie ma	Phosunie)			
OTHER: SAMPLE OB	TAINED IS	<u> </u>	GRAB_	X COM	IPOSITE		
ON SITE MI	FASIIREM				F		
			-0-1				I - 4 -
Extraction	Temp <b>F</b> C	pН	Conduct. uS	DO, 02	EH	Methane	00 MG/1
Measured	Corning	Corning	Corning	Coming	ORP Testr		101612
1	87	7.63	178.8	14.2	760		1.68
2	8.3	7,83	186.4	1/3	OR:		2.19
3	8.0/	8.07	191.6	38,0	OR.		4.30
				<u> </u>			
APPEARAN	CE: CLEA	R SL.C	CLOUDY	CLOUD	YV.C	LOUDY	
APPEARANG ODOR: NO COMMENTS	O YES S:	<del></del>	SLIG	HT S	TRONG	_	
							<del>***********</del>
	CONTAINE		•				
NUMBER, S	IZE, MATE	KIAL;			· · · · · · · · · · · · · · · · · · ·		
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ON-SITE S				Micron			
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COMMENTS	S:						
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CONTAINER CONTAINER	LIDS TAP	ED N ICE CHE	ST	<del>-</del>	<del>X</del>		<del></del>
CHAIN OF C	CUSTODY C	COMPLETE	D		Ŷ		
OTHER CO	MMENTS						
		$\overline{}$	0.0				<del>-</del>
SAMPLERS	SIGNATUR	E:	a Clau	son	DATE 1	-16-0	71

### J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: BXS-5

SAMPLING LOCATION: Arlington, WA Plant DATE: 1-16-01 COLLECTED BY: Jim Clawson TIME: 9:00 Am
COLLECTED BY: Jim Clawson TIME: 9:00 Am
WEATHER 18° CLOAR
MONITORING WELL CONDITION:
I OCKED Y LINI OCKED WELL NO IS IS NOT APPADENT
OUTER CASING CONDITION: Cond TYPE: Steel
INNER CASING CONDITION: TYPE: PVC
LOCKED WELL NO. IS IS NOT APPARENT OUTER CASING CONDITION: GOOD TYPE: Steel INNER CASING CONDITION: TYPE: PVC WATER DEPTH MEASUREMENT DATUM: TOP OF INNER X OTHER
CACINIC **
DEPTH OF WELL:  FT. MEASURED WITH: 100' fiberglass tape WATER LEVEL:  FT. MEASURED WITH: Electronic Sounder COMMENTS Depth:  GASING  FT. MEASURED WITH: Electronic Sounder  GASING  FT. MEASURED WITH: Electronic Sounder  GASING  FT. MEASURED WITH: Electronic Sounder  GASING  FT. MEASURED WITH: 100' fiberglass tape  FT. MEASURED WITH: Electronic Sounder  GASING  FT. MEASURED WITH: 100' fiberglass tape  FT. MEASURED WITH: Electronic Sounder  GASING  FT. MEASURED WITH: Electronic Sounder  FT. MEASURED WITH: Electronic Sounder  GASING  FT. MEASURED WITH: Electronic Sounder  FT. MEASURED WITH: Electroni
WATER LEVEL: FT. MEASURED WITH: Electronic Sounder
COMMENTS DEDTH: - = = ani.P.V
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
ADDEAD ANCE CLEAD SLCLOUDY CLOUDY V.CLOUDY
ODOP: NO VES SEIGHT STRONG
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG COMMENTS:
COMMENTS.
WELL EVACUATION:
VOLUME OF WATER IN WELL BORE: FT. GALLONS:_
TOTAL VOLUME REMOVED: GALLONS (3 times casing volume)
VOLUME OF WATER IN WELL BORE: FT. GALLONS: TOTAL VOLUME REMOVED: GALLONS (3 times casing volume) EVACUATION METHOD: BAILER X SIZE 1 Qt PUMP TYPE
COMMENTS:
ODGEDYLLETONG DUDYLG TYLL GYLLETON
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY
ODOR: NOYES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE
WAIER LEVEL: NO CHANGE FELL RUSE
COMMENTS:
,

FEILD BLANK

SAMPLING RECORD (CON'T) WELL NUMBER  SAMPLE EXTRACTION METHOD:  BAILER MADE OF: Polyethylene (Disposable)  PUMP TYPE:							
OTHER: SAMPLE OBTAINED IS: GRAB X COMPOSITE							
ON SITE ME	EASUREMI	ENTS					
Extraction	Temp FC	pН	Conduct. uS	DO 9002	EH	Methane	00 MG/L
Measured	Corning	Corning	Corning	Corning	ORP Testr		
1							
2				<u>'.</u>	:		
3							
					-		<u> </u>
APPEARANCODOR: NC COMMENTS  SAMPLE C NUMBER, SI  ON-SITE S NONE COMMENTS	CONTAINE ZE, MATER AMPLE FI ON-SITE	RS: RIAL: LTRATION X MET	N: THOD: <u>0.45 1</u>	Micron	I KUNG		
ON-SITE S NONE_ COMMENTS	ADDE	RESERVAT D BY LAB	TION ORATORY	TO CONTA	AINERS X		<del></del>
CONTAINER CONTAINER CONTAINER CONTAINER CHAIN OF C	SIDES LA LIDS TAP PLACED I USTODY C	BELED AN ED N ICE CHE	ST	  	X X X X		
SAMPLERS	SIGNATUR	E: Jin	Clau	war.	DATE 1	-16-0	<u></u>



### CHAIN OF CUSTODY

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PAGE	1	OF	}	COC#	

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068 PROJECT NAME PROJECT NUMBER 270 ganics by GC/MS PROJECT MANAGER OrthmeyER COMPANY/ADDRESS/ 1-435-3035 lousen SAMPLE I.D. DATE TIME LAB I.D. MATRIX **REMARKS** 1-17-0191304 WARR 1-17-01 11/30 A **INVOICE INFORMATION** REPORT REQUIREMENTS Circle which metals are to be analyzed: I. Routine Report: Method BILL TO: J.H. BANTER & CO. Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg Blank, Surrogate, as Dissolved Metals AI (As Sb (Ba) Be B Ca (Cd) Co Cr (Cu) Fe Pb Mg (Mn) Mo (Ni) K Ag Na Se Sr TI Sn V (Zn) Hg required SANMATEO, CA194402 \*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORHTWEST OTHER: \_\_ II. Report Dup., MS, MSD as **TURNAROUND REQUIREMENTS** SPECIAL INSTRUCTIONS/COMMENTS: required 24 hr. \_\_\_\_\_48 hr. Field FilterEd \_\_\_\_ III. Data Validation Report \_5 Day (includes all raw data) Standard (10-15 working days) ATTN: MARY LARSON \_\_\_ IV. CLP Deliverable Report Provide FAX Results \_\_\_ V. EDD Requested Report Date **RELINQUISHED BY:** Clauson 1-17-01 3:15pm RECEIVED BY: **RELINQUISHED BY:** RECEIVED BY: Signature Date/Time Signature Date/Time Signature Date/Time

## J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: BXS-Z

SAMPLING LOCATION: Arlington, WA Plant DATE: 1-17-01
COLLECTED BY: Jim Clawson TIME: 4,30 AM
COLLECTED BY: Jim Clawson TIME: 9:30 Am WEATHER 33° Cloudy
•
MONITORING WELL CONDITION:
LOCKED WELL NO. IS X IS NOT APPARENT
OUTER CASING CONDITION: Q cod TYPE: 6" Steel
LOCKED WELL CONDITION:  LOCKED WELL NO. IS X IS NOT APPARENT  OUTER CASING CONDITION:  TYPE: 6" Steel  INNER CASING CONDITION:  TYPE: 2" PYC
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER_X_OTHER
CASING
DEPTH OF WELL: 45,40 FT MEASURED WITH: 100' fiberglass tape
WATER LEVEL: 34,45 FT. MEASURED WITH: Electronic Sounder COMMENTS DEpth: 45,40-34,45 = 10,9 * 6 = 6,5 gal. P. V.
COMMENTS DE 0th: 45,40-34,45 = 10,9 * 6 = 6,5 and P.V.
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO X YES SLIGHT STRONG
COMMENTS:
COMMIDITATION.
WELL EVACUATION:
VOLUME OF WATER IN WELL BORE: 10,9 FT GALLONS: 6,5
VOLUME OF WATER IN WELL BORE: 10.9 FT. GALLONS: 6,5  TOTAL VOLUME REMOVED: 2,1 GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
EVACUATION METHOD: BAILER X SIZE 1 Of PUMP TYPE
COMMENTS:
COMMENTO.
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY
ODOR NO X YES SLIGHT STRONG
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO Y YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE
COMMENT

SAMPLING RECORD (CON'T)  SAMPLE EXTRACTION METHOD:  BAILER MADE OF: Polyethylene (Disposable)  PUMP TYPE:  OTHER: PVC BLATEZ PUMP  SAMPLE OBTAINED IS: GRAB X COMPOSITE							
PUMPIYPE	:	0:16				· - ·	-
SAMPLE OF	TAINED IS	PVC	GRAR	er po	MORITE		
ON SITE MI	EASUREM	ENTS	GRAB_	ACON	ar ostre <sub>i</sub>		<del></del>
Extraction	Temp	pН	Conduct.	DO	ЕН	Methane	00
	PC	•	uS	9002	1		MG/2
Measured	Corning	Corning	Corning		ORP Testr		116/2
1	12.0	6.62	910	127			1 1 1 2
2	9.9	6,70	909.	12 0	180.		1,42
3	10.6	6.73	893.	13,9	110.		1.21
	10.10	6.15	0-13.	12.0	90.		1.28
APPEARANC ODOR: NO	l						
ON-SITE SANONE_COMMENTS:	ZE, MATER  AMPLE FII  ON-SITE	TRATION	l:	dicron	į.		
ON-SITE SANONECOMMENTS:	ADDEL	ESERVATI BY LABO	ION PRATORY 1	O CONTA	INERS <u>X</u>	·•	<del></del>
CONTAINE ONTAINER I CONTAINER I CONTAINER I CHAIN OF CU	SIDES LAB LIDS TAPE PLACED IN STODY CO	ELED AND  ICE CHES	т		X X X		  
SAMPLEES SI	GNATURE:	Din	Claw	von_	DATE <u>/</u> -	17-01	<b>-</b>

#### J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: <u>GX5</u>-3

SAMPLING LOCATION: Arlington, WA Plant DATE:
COLLECTED BY: Jim Clawson TIME: 11:30 Am
WEATHER 34° Cloudy
•
MONITORING WELL CONDITION:
LOCKED WELL CONDITION:  LOCKED WELL NO. IS X IS NOT APPARENT OUTER CASING CONDITION:  TYPE: 6" Steel INNER CASING CONDITION: TYPE: 2" PVC
OUTER CASING CONDITION: Good TYPE: G Steel
INNER CASING CONDITION: COOO IT YPE: Z PYC
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER X OTHER
CASING DEPTH OF WELL: 44,15 FT. MEASURED WITH: 100' fiberglass tape
WATER I EVEL: 27 /-7 FT MEASURED WITH: Flactronic Sounder
WATER LEVEL: 37,62 FT. MEASURED WITH: Electronic Sounder COMMENTS DEPTH: 44,15-37.62 = 6.5 * 6 = 3.9 9H.P. I
COMMENTS DEPTH. 34115-37:62-31-4 9HILLI
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY
ODOR: NO X YES SLIGHT STRONG
APPEARANCE: CLEAR SL.CLOUDY CLOUDY X_ V.CLOUDY ODOR: NO X_ YES SLIGHT STRONG COMMENTS: OR ANG E
WELL EVACUATION:
VOLUME OF WATER IN WELL BORE: 6.5 FT. GALLONS: 3.9  TOTAL VOLUME REMOVED: 1.3 GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
TOTAL VOLUME REMOVED: 1, 3 GALLONS (3 times casing volume)
EVACIATION METHOD: BAILER X SIZE 1 Of PLIMP TYPE
COMMENTS:
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES X SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE
ODOR: NO YES X SLIGHT X STRONG
WATER LEVEL: NO CHANGE FELL ROSE
OMMENTS:

SAMPLING	RECORD	(CON'T)		WELL NI	MRER B	X5-2	•
SAMPLE I BAILER MA	EXTRACTI DE OF:	ON METH <del>Poly</del>	IOD:				
PUMP TYPE OTHER:	·	- ७४८	•	•			
SAMPLE OB	TAINED IS		GRAB	X COM	nP IPOSITE		<del></del>
ON SITE MI	EASUREM	ENTS					
Extraction	Temp	pН	Conduct.	DO	EH	Methane	00
	PC		uS	9002	, ,		MG/L
Measured	Corning	Corning	Corning		ORP Testr		10/-
1	10.9	7,22	938	27.4	~3/1		2,62
2	10.8	7.14	923.	21.8	-25		2.39
3	11.4	1.11	926.	23.2	-20.		264
		V	7		V :		0
SAMPLE C NUMBER, SIZ ON-SITE SA NONE_ COMMENTS:	ONTAINE ZE, MATER AMPLE FII ON-SITE	RS: RIAL: LTRATION X MET	N: 'HOD: <u>0,45 N</u>				
ON-SITE SANONECOMMENTS:	ADDEI	ESERVAT DBY LABO	ION DRATORY 1	TO CONTA	INERS X		· 
CONTAINE CONTAINE CONTAINER CONTAINER CHAIN OF CU OTHER COM	GIDES LAB LIDS TAPE PLACED IN ISTODY CO MENTS	BELED ANI D I ICE CHES DMPLETED	ST )		X X X		  
			0.0				- - -

SAMPLERS SIGNATURE: Jun Clauson DATE 1-17-01

<u>Case</u>	Well Number	Water LEVEL	Bottom Depth	Comments
4"	MW-1	27.62'	41.02'	
4"	MW-2	44.00'	51.23	
4"	MW-3	41.31'	51.96	
	MW-A			Duplicate MW-3
	MW-B			Field Blank
2"	HCMW-5	28.45'	35.43'	
2"	HCMW-6	Top of Pump	46.62'	No Water-Did not Test
2"	HCMW-7	43.67'	55.08'	
2"	EIXS-1	Top of Pump	47.90'	
2"	BXS-2	37.69'	45.40'	
2"	BXS-3	33.94'	44.15'	
2"	EXS-4	13.45'	47.40'	
	EXS-5			Field Blank
	EXS-6			Duplicate BXS-1
2"	BXN-1	51.33'	58.18'	
2"	EXN-2	47.68'	57.24	
2"	BXN-3	49.23'	58.66'	
2"	EXN-4	47.00'	51.74'	
	EIXN-5			Duplicate BXN-1
	EXN-6			Field Blank

All Water Lang, Taken April 3, 2001

## J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: BXS-1 &

SAMPLING LOCATION: Arlington, WA Plant DATE:
COLLECTED BY: Jim Clawson TIME: //:00 pm WEATHER 42 C/608
MONITORING WELL CONDITION:  LOCKED WELL NO. IS IS NOT APPARENT OUTER CASING CONDITION:  OCCUPATION:  OCCUPATI
CASING DEPTH OF WELL: 47.90 FT. MEASURED WITH: 100' fiberglass tape WATER LEVEL: FT. MEASURED WITH: Electronic Sounder COMMENTS DEPTH: 47.90 SALOW THE TOP OF PUMP, TOOK OUT A GAI OF WATER IS BELOW THE TOP OF PUMP, TOOK OUT A GAI OF WATER IS BELOW THE TOP OF PUMP, TOOK OUT A GAI OF WATER OF CHANGE AND METHOD WAY AND METHOD WAY.
FIELD EQUIPMENT CLEANED BEFORE USE: ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO +rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:  APPEARANCE: CLEAR \( \subseteq \) SL.CLOUDY CLOUDY V.CLOUDY  ODOR: NO \( \subseteq \) YES SLIGHT STRONG  COMMENTS:
WELL EVACUATION:  VOLUME OF WATER IN WELL BORE: FT. GALLONS:  TOTAL VOLUME REMOVED: GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Qt PUMP TYPE  COMMENTS:
OBSERVATIONS DURING EVACUATION:  APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE COMMENTS: BX5-6 Dup: 12 pm

BAILER MA	EXTRACTI DE OF:	ON METH	IOD: <del>'ethylene (D</del>	icnocable)	mber <u>B</u>		
PUMP TYPE	:						
PUMP TYPE OTHER: SAMPLE OB	TAINED IS	<u> </u>	GRAB	X COM	IPOSITE		<del></del>
ON SITE MI							
Extraction	Temp	pН	Conduct.	DO	EH	Methane	100
	PC		uS	9002			MG/L
Measured	Corning	Corning	Corning		ORP Testr		101-
1	13,1	6,18	537.	12,6	125.		1.33
2	12.9	6.15	474.	10.9	120.		1.17
3	14.0	6.07	476,	11.1	100.		1,2
				V			
ON-SITE SONONECOMMENTS:	ZE, MATER	LTRATION	V: THOD:0 45 N				  
ON-SITE SA NONE_ COMMENTS:	ADDE	ESERVAT DBYLABO	TON DRATORY	TO CONTA	INERS X	·	·
CONTAINE CONTAINER CONTAINER CONTAINER CHAIN OF CU	SIDES LAE LIDS TAPE PLACED IN JSTODY CO	BELED ANI ED NICE CHES	ST		X X X		- - - -
OTHER COM	- Co Duf	<b>\</b>					<del>-</del>
SAMPLERS S	IGNATURE	J.m	()	SAN	DATE 4.	10-12	-

#### J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: <u>BKS</u>-2

SAMPLING LOCATION: Arlington, WA Plant DATE: 4-01  COLLECTED BY: Jim Clawson TIME: 1:00 pm  WEATHER 51 Pt. Cloud 4
COLLECTED BY: Jim Clawson TIME: 1:00pm
WEATHER SI PT. Cloudy
MONITORING WELL CONDITION:
LOCKED WELL NO. IS IS NOT APPARENT OUTER CASING CONDITION:  OCCUPATION:  OCCUPATION
OUTER CASING CONDITION: Q cod TYPE: 6" Steel
INNER CASING CONDITION: TYPE: PVC
CASING CASING
DEPTH OF WELL: 45.40 FT. MEASURED WITH: 100' fiberglass tape
WATER LEVEL: 37.69 FT. MEASURED WITH: Electronic Sounder
CASING DEPTH OF WELL: 45,40 FT. MEASURED WITH: 100' fiberglass tape WATER LEVEL: 37,69 FT. MEASURED WITH: Electronic Sounder COMMENTS Depth: 45,40-37,69 = 7,7 * 6 = 4,6 gh, P. L
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES X SLIGHT X STRONG COMMENTS:
COMMENTS:
WELL EVACUATION:
VOLUME OF WATER IN WELL BORE: 7,7 FT. GALLONS: 4,6  TOTAL VOLUME REMOVED: 1.5 GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
TOTAL VOLUME REMOVED: 1.5 GALLONS (3 times casing volume)
EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE COMMENTS:
COMMENTS:
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE
COMMENTS:

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	EXTRACTI	ON METH	HOD:	ı	mber <u>B</u>	(5-2	parameter of the latest state of the latest st
BAILER MA PUMP TYPE	DE OF:	dere Ou	yethylene (D	isposable)	<u> </u>		
OTHER:							
SAMPLE OB	TAINED IS	<b>:</b>	GRAB_	X COM	IPOSITE	<del></del>	<del></del>
ON SITE ME	EASUREM	ENTS					
Extraction	Temp	pН	Conduct.	DO	EH	Methane	00
	PC		uS	9002	t t		MG/L
Measured	Corning	Corning	Coming	Corning	ORP Testr		
1	14.5	6.32	871.	20,2	190.		1.85
2	15.2	6.92	863.	15.9	110.		1.57
3	15.3	6.47	860.	11.2	105.		1.11
COMMENTS	ZE, MATER  AMPLE FI  ON-SITE	RIAL: LTRATIO X MET	ΓΗΟD: <u>0.45 1</u>	Micron			  
ON-SITE SANONECOMMENTS:	ADDE		PION ORATORY	TO CONTA	INERS X	•	<del></del>
CONTAINE CONTAINER CONTAINER CONTAINER CHAIN OF CU	SIDES LAE LIDS TAPE PLACED II JSTODY CO	BELED AN ED NICE CHE	ST	-	X X X X		
SAMPLERS S	IGNATURE	Jim	Claus	on	DATE 4	-4-01	  

37.65

# J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: BX5-3

SAMPLING LOCATION: Arlington, WA Plant DATE: 4-4-01	
COLLECTED BY: Jim Clawson TIME: 2:00 pm WEATHER 54° Pt. Cloudy	
WEATHER 54° Pt. Cloudy	
MONITORING WELL CONDITION:	
LOCKED WELL NO. IS IS NOT APPARENT	
LOCKED WELL NO. IS IS NOT APPARENT OUTER CASING CONDITION:  OCH TYPE:  OCH TY	
INNER CASING CONDITION: YOUR TYPE: 2" PVC	
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER_X_OTHER	
CASING	-
DEPTH OF WELL: 49.15 FT. MEASURED WITH: 100' fiberglass tape	
CASING DEPTH OF WELL: 44.15 FT. MEASURED WITH: 100' fiberglass tape WATER LEVEL: 33.91 FT. MEASURED WITH: Electronic Sounder COMMENTS Depth: 44.15-33.91 = 10.2 * .6 = 6.1 gal. P.	
COMMENTS DEPTH: 44.15-33.41 = 10.67.60 = 6.1 9ALP.	Ŀ
	_
FIELD EQUIPMENT CLEANED BEFORE USE:	
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR	
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO	
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water	
Rinse- Air Dry	
WATER CONDITION BEFORE EVACUATION:	
APPEARANCE: CLEAR SL.CLOUDY V.CLOUDY V.CLOUDY	
ODOR: NO X YES SLIGHT STRONG	_
APPEARANCE: CLEAR SL.CLOUDY _K_ CLOUDY V.CLOUDY ODOR: NO _K_ YES SLIGHT STRONG COMMENTS:	
	_
YIMY Y TIYL OUL MYON	
WELL EVACUATION:	
VOLUME OF WATER IN WELL BORE: 10, Z FT. GALLONS: 6, 1  TOTAL VOLUME REMOVED: 2, O GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE	_
EVACIATION METHOD, BALLER V. SIZE 1.0: DUMB. TXDE	i
COMMENTS: TYPE	
COMMENTS.	_
	—
OBSERVATIONS DURING EVACUATION:	
APPEARANCE: CLEAR SL.CLOUDY X CLOUDY V.CLOUDY	
ODOR: NO X YES SLIGHT STRONG	_
APPEARANCE: CLEAR SL.CLOUDY _K CLOUDY V.CLOUDY ODOR: NO _K YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE	
COMMENTS:	
	_

	•				•		•
SAMPLING SAMPLE I		(CON'T) ION METH	IOD:	WELL NU	mber B	<u> </u>	· ·
BAILER MA	DE OF:	- Poly	ethylene (Di	sposable)			
PUMP TYPE OTHER:	: Blade	er tump	)	<del></del>			
SAMPLE OB	TAINED IS	S:	GRAB_	X COM	IPOSITE		
ON SITE MI	EASUREM	ENTS			•		
Extraction	Temp	pН	Conduct.	DO	ЕН	Methane	00
,	PC		uS	9002	•		MG/1
Measured	Corning	Corning	Corning	Corning	ORP Testr		
1	11.5	6.01	891.	24.2	<b>a</b> 5.		2.3
2	15.1	6.54	870.	134	40.		1.40
3	14.9	4.49	860.	12.5	45.		1.3
					V:		V
SAMPLE ON NUMBER, SINUMBER, SINUMBER	ZE, MATER	RIAL:		<u> Micron</u>			
ON-SITE SANONE_ COMMENTS:	ADDE	RESERVAT D BY LABO	TON DRATORY	ΓΟ CONTA	INERS <u>X</u>		_
CONTAINE CONTAINER CONTAINER CONTAINER CHAIN OF CU	SIDES LAI LIDS TAPE PLACED II JSTODY CO	BELED ANI ED NICE CHES	ST		× × × X		  
· · · · · · · · · · · · · · · · · · ·							<del></del>
							_
SAMPLERS S	IGNATURE	: Jam	Claus	>0-1	DATE 4	-4-01	

### J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: 3x5-4

SAMPLING LOCATION: Arlington, WA Plant DATE: 4-4-01
WEATHER 38° CLEDE
WEATHER 38° CLEDER
MONITORING WELL CONDITION:  LOCKED_X_UNLOCKEDWELL NO. ISIS NOTAPPARENT OUTER CASING CONDITION:OTYPE:O'Steel INNER CASING CONDITION:COOOTYPE:O'PVC WATER DEPTH MEASUREMENT DATUM: TOP OF INNER_X_OTHER CASING DEPTH OF WELL:T
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION: APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES X SLIGHT STRONG COMMENTS:
WELL EVACUATION:  VOLUME OF WATER IN WELL BORE: 33,9 FT. GALLONS: 20,3  TOTAL VOLUME REMOVED: 6,7 GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Qt PUMP TYPE  COMMENTS:
ODSEDWATIONS DUDDIS EXACULATION
OBSERVATIONS DURING EVACUATION:  APPEARANCE: CLEAR X SL CLOUDY CLOUDY V.CLOUDY
ODOR: NO YES SLIGHT X STRONG
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT X STRONG WATER LEVEL: NO CHANGE FELL ROSE
COMMENTS:

	•						•
SAMPLING SAMPLE I BAILER MA	EXTRACTI	ON METH	IOD:		mber <u>B</u>		<del></del>
PUMP TYPE OTHER:	:			apronute.			· · · · · · · · · · · · · · · · · · ·
SAMPLE OB	TAINED IS	:	GRAB_	X COM	IPOSITE		
ON SITE MI	EASUREM	ENTS				_	
Extraction	Temp	pН	Conduct.	DO	EH	Methane	00
	PC		uS	9002	· · · · · · · · · · · · · · · · · · ·		MG/L
Measured	Corning	Corning	Corning	Corning	ORP Testr		-
1	10,4	7.32	188.2	-0.9	-35.		0.12
2	9.3	7,43	183.1	4,5	-70.	-	0,52
3	9.4	7.52	184,2	6.5	-65.		0.75
<u> </u>							
ON-SITE SONONE_COMMENTS:	ZE, MATER	RIAL: LTRATION X MET	N: HOD:0.45 N	· ·			
ON-SITE SANONE_COMMENTS:	ADDEI	ESERVAT D BY LABO	TON DRATORY 7	ГО СОПТА	INERS <u>X</u>		
CONTAINE CONTAINER CONTAINER CONTAINER CHAIN OF CU	SIDES LAE LIDS TAPE PLACED IN	BELED ANI ED NICE CHES	ST		X X X		  
OTHER COM	IMENTS						
							<del></del>
SAMPLERS S	IGNATURÉ	Juni	70000	<b>~</b>	DATE 4-	-CI - NI	_

### J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: 5×5-5

SAMPLING LOCATION: Arlington, WA Plant DATE: 4-4-01
COLLECTED BY: Jim Clawson TIME: 8:00 mm WEATHER 36 Cogg: E
MONITORING WELL CONDITION:
LOCKED WELL NO. IS IS NOT APPARENT
LOCKED WELL NO. IS IS NOT APPARENT OUTER CASING CONDITION: TYPE: Steel INNER CASING CONDITION: TYPE: PVC
INNER CASING CONDITION: TYPE: PVC
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER_X_OTHERCASING
DEPTH OF WELL: FT. MEASURED WITH: 100' fiberglass tape
DEPTH OF WELL:  WATER LEVEL:  FT. MEASURED WITH: 100' fiberglass tape FT. MEASURED WITH: Electronic Sounder COMMENTS Depth:  GASING  FT. MEASURED WITH: 100' fiberglass tape FT. MEASURED WITH: Electronic Sounder FT. MEASURED WITH: 100' fiberglass tape FT. MEASURED WITH: Electronic Sounder FT. MEASU
COMMENTS Depth: - = = and P.V
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG COMMENTS:
ODOR: NO YES SLIGHT STRONG
COMMENTS:
WELL EVACUATION:
VOLUME OF WATER IN WELL BORE: FT. GALLONS: TOTAL VOLUME REMOVED: GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
TOTAL VOLUME REMOVED: GALLONS (3 times casing volume)
EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
COMMENTS:
ODCEDIATIONS DUDING EXACTLATION
OBSERVATIONS DURING EVACUATION:
ODOP: NO VES SLICHT STRONG
WATER I EVEL: NO CHANGE FELL DOSE
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE COMMENTS: FIELD BLANK
TELL PETINIC

	i •				0.		
SAMPLING	RECORD	(CON'T)		WELL NU	mber $\underline{\mathcal{B}}$	<u> </u>	
SAMPLE I BAILER MA		ION METH Poly		sposable)		•	_
· PUMP TYPE	:		. 8711 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- Tantonias			
OTHER: SAMPLE OB	TAINED IS	·	GRAR	X CON	IPOSITE		<del></del>
		•	GIAID	A_ CON	ii OSITE;		
ON SITE MI	EASUREM	ENTS					
Extraction	Temp	pН	Conduct.	DO	EH	Methane	00
	PC	-	uS	9002	; ;		MG/L
Measured	Corning	Corning	Corning		ORP Testr		10)-
1							
2							
3				<del></del>			<del></del>
					:		
A DDE AD ANG	DE CLEA	D CI C		OI OIID	77.0	CIIDII	
APPEARANCODOR: NO	LE: CLEAR —— YES	K SL.C	LOUDYSLIG	CLOUD HT S	Y V.C. TRONG	LOUDY	_
COMMENTS	•						
		· · · · · · · · · · · · · · · · · · ·					
SAMPLE C	ONTAINE	CRS:					
NUMBER, SI	ZE, MATEI	RIAL:		· · · · · · · · · · · · · · · · · · ·		<del></del>	
ON-SITE S.	AMPLE FI	LTRATIO	N:				
NONE	ON-SITE	X MET	THOD: 0.45 N	<u>Micron</u>	1		•
COMMENTS:	·			· · · · · · · · · · · · · · · · · · ·			
							<del></del>
ON-SITE SANONE			T <b>ION</b> ORATORY 7	TO CONTLA	TNIEDC V		
COMMENTS:		D DT LIND	JKIII JKI	TO CONTA	MINERS_X	<b></b> -	
		,					_
CONTAINE	ER HANDL	ING:			i		
CONTAINER			D TAPED	-	X_		
CONTAINER CONTAINER			ST	-	<u>X</u>	<u> </u>	<del>-</del>
CHAIN OF CU					$\hat{\mathbf{x}}$		_ _
OTHER COM	IMENTS	~ i	1 0	1			
		FIELD	BLAN	vtc			
			· · · · · · · · · · · · · · · · · · ·				
		()+	00	<del></del>			<del></del>
SAMPLERS S	IGNATURI	E: Jam	Value	JAM .	DATE W.	-U-01	

Case	Well Number	Water Level	<u>Bottom</u>	Comments
2"	BXS-1	Top of Pump	47.90'	Duplicate BXS-6
2"	BXS-2	37.14'	45.40'	
2"	BXS-3	33.45'	44.15'	
2"	BXS-4	14.92'	47.40'	
	BXS-5			Field Blank
2"	BXN-1	50.97'	58.18'	Duplicate BXN-5
2"	BXN-2	47.25'	57.24'	•
2"	BXN-3	48.81'	58.66'	
2"	BXN-4	46.59'	51.74'	
	BXN-6			Field Blank
4"	MW-2	43.58'	51.23'	
2"	HCMW-5	28.19'	35.43'	
2"	HCMW-6	41.30'	46.62'	Before Redevelopement
		41.45'	51.10'	After Redevelopement
2"	HCMW-7	43.18'	55.08'	
	MW-A			Duplicate MW-2
	MW-B			Field Blank
4"	MW-1	27.87'	41.02'	
4"	MW-3	40.88'	51.96'	
2"	MW-4	13.18'	41.92'	

Water Levels Taken 7/09/01

# J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: BX5-

SAMPLING LOCATION: Arlington, WA Plant DATE: /-ID-0/
COLLECTED BY: Jim Clawson TIME: 1:00 pm
COLLECTED BY: Jim Clawson TIME: 1:00 pm WEATHER 80° SUNNY
MONITORING WELL CONDITION:
LOCKED X UNLOCKED WELL NO. IS X IS NOT APPARENT
OUTER CASING CONDITION: Q cod TYPE: 6" Steel
LOCKED WELL NO. IS X IS NOT APPARENT OUTER CASING CONDITION: Good TYPE: 6" Steel INNER CASING CONDITION: TYPE: Z" PVC
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER_X_OTHER
CASING "
DEPTH OF WELL: FT. MEASURED WITH: 100' fiberglass tape
WATER LEVEL: FT. MEASURED WITH: Electronic Sounder
COMMENTS DEDTH: - = X 6 = 9ALPL
Checked Water Down to THE TOP OF THE DUMP
WATER LEVEL:  FT. MEASURED WITH: Electronic Sounder  COMMENTS Depth!  Checked Water Down to THE Top of THE DUMP  I pomped but ABOUT A GALLOW of WHEN PER MEASUREMENTS!  FIELD EQUIPMENT CLEANED BEFORE USE:
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO X YES SLIGHT STRONG
COMMENTS:
WELL EVACUATION:  VOLUME OF WATER IN WELL BORE: FT. GALLONS:  TOTAL VOLUME REMOVED: GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER_X_SIZE_1 Ot PUMP TYPE  COMMENTS:
VOLUME OF WATER IN WELL BURE: F1. GALLONS:
TOTAL VOLUME REMOVED: GALLONS (3 times casing volume)
EVACUATION METHOD: BAILER X SIZE TOT PUMP 1 YPE
COMMENTS:
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY STRONG
ODOR: NO X YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE COMMENTS: & BXS-6 Dup. 12:00 pm
COMMENTS: O 18X5 - O 19'AS O 04
COMMENTS. W SIND WITH AND DITTE

DATED MAA	EXTRACTI	ON METH	OD:	innoschia)	mber <u>2</u>		<b>-,</b> -
PUMP TYPE OTHER: SAMPLE OB	: TAINED IS	PVC:	Bladder GRAB_	Pume X CON	POSITE_		
ON SITE MI							-
Extraction	Temp	pН	Conduct.	DO	EH	Methane	00
-	PC		uS	9002	, , , , , , , , , , , , , , , , , , ,		MG/L
Measured	Corning	Corning	Coming	Coming.	ORP Testr		
1	14,1	6,19	511,	12.2	180.		1124
2	16,2	6.76	498.	5.5	115.		0.55
3	13.8/	7.26	477.	3,1	120.		0,33
					1/:		
SAMPLE ON NUMBER, SI ON-SITE SI COMMENTS ON-SITE SI	ZE, MATER  AMPLE FI  ON-SITE	RIAL: LTRATION X_ MET	N: HOD: <u>0.45 N</u>				
NONE_COMMENTS			ORATORY '	TO CONTA	AINERS_X_		
CONTAINER CONTAINER CONTAINER CONTAINER CHAIN OF CO	SIDES LAI LIDS TAPE PLACED II USTODY CO	BELED AND ED NICE CHES	ST	·	X X X X		  
SAMPLERS S	IGNATURE	() [2:00	Danso	~	DATE 7	- /\\ -\\\ i	_ _ _

 $/\!\!/$ 

## J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: 13×5-2

SAMPLING LOCATION: Arlington, WA Plant DATE: 7-10-01
WEATHER SG SUNNY TIME: 2:00 pm
MONITODING MELL CONDITION.
LOCKED WELL CONDITION:  LOCKED Y UNLOCKED WELL NO. IS Y IS NOT APPARENT  OUTER CASING CONDITION:  COOD TYPE:  TYPE:  TYPE:  PVC
INNER CASING CONDITION: Q cod TYPE: Q' Steel
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER_X_OTHER
CASING *
DEPTH OF WELL: 45.40 FT. MEASURED WITH: 100' fiberglass tape
DEPTH OF WELL: 45.40 FT. MEASURED WITH: 100' fiberglass tape WATER LEVEL: 37.14 FT. MEASURED WITH: Electronic Sounder COMMENTS Depth: 45.40 — 37.14 = 8.2 * 16 = 4.9 ghl. P. L.
General State Stat
ENTER DECEMBER OF TAXABLE PROPERTY.
FIELD EQUIPMENT CLEANED BEFORE USE: ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY
ODOR: NO X YES SLIGHT STRONG
COMMENTS:
WELL EVACUATION:  VOLUME OF WATER IN WELL BORE: 8.2 FT. GALLONS: 4.9
TOTAL VOLUME REMOVED: / GALLONS (3 times casing volume)
TOTAL VOLUME REMOVED: 1.6 GALLONS (3 times casing volume) EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
COMMENTS:
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR SL.CLOUDY X CLOUDY V.CLOUDY
ODOR: NO X YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE
COMMENTS: SANGY ROSE

SAMPLING	RECORD	(CON'T)		WELL NU	mber B	XS-Z	·
SAMPLE E BAILER MA	EXTRACTI DE OF:	ION METH Poly	OD:	sposable)			
PUMP TYPE OTHER:							
SAMPLE OB	TAINED IS	S:	BLANDE GRAB_	X COM	POSITE		<del>_</del>
ON SITE MI	EASUREM						·
Extraction	Temp	pН	Conduct.	DO	EH	Methane	00
	FC		uS	7002			MG/L
Measured	Corning	Corning	Corning	Corning Cornin			
1	12.5	7.71	857.	17.2	.120		1.48
2	15.9	18.04	847.	10.1	.75		0,94
3	14.1	8,37	850.	15,3	105		1:32
	V				la de la companya de		
ON-SITE SON-SITE SON-	AMPLE FI	LTRATION X MET	<b>V:</b> HOD: <u>0.45 N</u>	Micron			<b>-</b>
NONE_COMMENTS:	ADDE	D BY LABO	DRATORY '	TO CONTA	INERS X		<del>_</del>
CONTAINER CONTAINER CONTAINER CONTAINER CHAIN OF CO	SIDES LAT LIDS TAPI PLACED I	BELED ANI ED N ICE CHES	ST		X X X X	-	
OTHER COM	IMENTS						<del>-</del> 
SAMDI EDG S	CN ATTID	E.( ) * (	10 aug	۸.۵	DATE 7	_10_01	

### J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: 13X5-3

SAMPLING LOCATION: Arlington, WA Plant DATE: 7-10-01
COLLECTED BY: Jim Clawson TIME: 3:000m
WEATHER 80° Sunny
MONITORING WELL CONDITION:
LOCKED WELL NO. IS IS NOT APPARENT OUTER CASING CONDITION: TYPE: 6" Steel INNER CASING CONDITION: TYPE: 2" PYC
OUTER CASING CONDITION: Q cod TYPE: 6" Steel
INNER CASING CONDITION: YOUR TYPE: Z' PYC
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER_X_OTHER
CASING
DEPTH OF WELL: 44.15 FT. MEASURED WITH: 100' fiberglass tape
WATER LEVEL: 33.45 FT. MEASURED WITH: Electronic Sounder
DEPTH OF WELL: 44.15 FT. MEASURED WITH: 100' fiberglass tape WATER LEVEL: 33.45 FT. MEASURED WITH: Electronic Sounder COMMENTS Depth: 44.15 - 33.45 = 10.7 ** .6 = 6.4 gal. P. I
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
APPEARANCE CLEAR Y SLCLOUDY CLOUDY VCLOUDY
ODOR: NO X YES SLIGHT STRONG
ODOR: NO X YES SLIGHT STRONG COMMENTS:
WELL EVACUATION:
VOLUME OF WATER IN WELL BORE: 10.7 FT. GALLONS: 6.4
VOLUME OF WATER IN WELL BORE: 10.7 FT. GALLONS: 6.4  TOTAL VOLUME REMOVED: 2.14 GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
COMMENTS:
OPCEDIATIONS DUDING ENACTIATION
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO X YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE
WATER LEVEL NO CHANGE FELL BOSE
COMMENTS.
COMMENTS:

SAMPLING SAMPLE F	RECORD (		WELL NU	mber <u>B</u>	(5-3	<del></del>	
DATE DO MAN	DE OE	Dala	othedona (Di	sposible)			· ·
· PUMP TYPE OTHER	·	DVC	BLAN	Dec Pun	·O	<del></del>	
PUMP TYPE OTHER: SAMPLE OB	TAINED IS	:	GRAB_	X COM	POSITE_		
ON SITE MI					·		
Extraction	Temp	pН	Conduct.	DO	EH	Methane	00
-	PC		uS	9002	1		MG/L
Measured	Corning	Corning	Coming	Corning	ORP Testr		
1	18.6	7,38	875	14.8	.25		1,66
2	16.4	7.76	839	12,6	20		1,27
3	17.3	7.97	833.	13.2	,50	-	0.99
	1	1		, , , , , ,	<i>/</i> :		7
APPEARANCODOR: NO COMMENTS  SAMPLE CONUMBER, SI  ON-SITE SI  COMMENTS  ON-SITE SI  ON-SI  ON-SI	CONTAINE ZE, MATER AMPLE FI ON-SITE :AMPLE PR ADDE	RIAL: LTRATIO X MET  RESERVAT D BY LAB	N: THOD: <u>0.45 N</u> TION ORATORY	Micron TO CONTA			
CONTAINE CONTAINER CONTAINER CONTAINER CHAIN OF CO	SIDES LAI LIDS TAPI PLACED I USTODY C	BELED AN ED N ICE CHE OMPLETE	ST		X X X X		— — — — —
SAMPLERS S	IGNATTE	F. Q.	( Daus	650	DATE 7	-10-01	-

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## J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: BXS-4

SAMPLING LOCATION: Arlington, WA Plant DATE: 7-10-01  COLLECTED BY: Jim Clawson TIME: 10:15 Am
WEATHER cloudy, 66 TIME: 10:15 Am
MONITORING WELL CONDITION:  LOCKED_X_UNLOCKEDWELL NO. IS X_IS NOTAPPARENT OUTER CASING CONDITION:
DEPTH OF WELL: 47.40 FT. MEASURED WITH: 100' fiberglass tape WATER LEVEL: 14.92 FT. MEASURED WITH: Electronic Sounder COMMENTS Depth: 47.40 — 14.92 = 32.4 * 6 = 19.4 gal. P. L
FIELD EQUIPMENT CLEANED BEFORE USE: ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO +rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:  APPEARANCE: CLEAR \( \subseteq \) SL.CLOUDY CLOUDY V.CLOUDY  ODOR: NO \( \subseteq \) YES SLIGHT STRONG  COMMENTS:
WELL EVACUATION: VOLUME OF WATER IN WELL BORE: 32, 4 FT. GALLONS: 19, 4 TOTAL VOLUME REMOVED: 6,4 GALLONS (3 times casing volume) EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE COMMENTS:
OBSERVATIONS DURING EVACUATION:  APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE COMMENTS:

SAMPLING	RECORD	(CON'T)		WELL NU	mber B	(5-4	•
SAMPLE I BAILER MA	EXTRACTI DE OF:	ON METH Poly	IOD: ethylene (Di	sposable)	<del></del>		
PUMP TYPE OTHER:	•			<del></del>		<del></del>	
OTHER: SAMPLE OB	TAINED IS	•	GRAB_	X COM	POSITE		
ON SITE MI	EASUREM	ENTS					
Extraction	Temp	pН	Conduct.	DO	EH .	Methane	00
	PC		uS	9002	• •		MG/L
Measured	Corning	Corning	Coming		ORP Testr		707
1	9,8	6,38	180.8	19.8	60		2.0
2	9,9	6.87	182.0	15.9	80		16
3	8.6/	6.89	183,0	14.3	7,65		1,01
			V		<i>J</i> :		1 19
SAMPLE C NUMBER, SI ON-SITE S. NONE_ COMMENTS:	ZE, MATER	RIAL:	N:	· · · · · · · · · · · · · · · · · · ·			
ON-SITE SANONE COMMENTS:	ADDE		TON DRATORY 1	ГО СОПТА	INERS X		<u> </u>
CONTAINE CONTAINER CONTAINER CONTAINER CHAIN OF CU	SIDES LAE LIDS TAPE PLACED IN JSTODY CO	BELED ANI ED NICE CHES	ST		× × × × × × × × × × × × × × × × × × ×		- - - - -
SAMPLERS S	IGNATURE	:Jim	Claura	٠	DATE . 7-	10-01	<u>-</u> -

## J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: BX5-5

SAMPLING LOCATION: Arlington, WA Plant DATE: 7~10~0/
WEATHER 65 Pt. Cloudy TIME: \$130 AM
WEATHER 650 Pt. cloudy
MONITORING WELL CONDITION:  LOCKED X UNLOCKED WELL NO. IS IS NOT APPARENT
OUTER CASING CONDITION: _ O coc TYPE: Steel
OUTER CASING CONDITION: Q CO TYPE: Steel INNER CASING CONDITION: TYPE: PVC
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER_X_OTHER
DEPTH OF WELL: FT. MEASURED WITH: 100' fiberglass tape
WATER LEVEL: FT. MEASURED WITH: Electronic Sounder
DEPTH OF WELL:  WATER LEVEL:  FT. MEASURED WITH: 100' fiberglass tape  FT. MEASURED WITH: Electronic Sounder  COMMENTS Depth:  GALPIN
FIELD EQUIPMENT CLEANED BEFORE USE: ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO +rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION: APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG COMMENTS:
WELL EVACUATION:  VOLUME OF WATER IN WELL BORE: FT. GALLONS:  TOTAL VOLUME REMOVED: GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Qt PUMP TYPE  COMMENTS:
OBSERVATIONS DURING EVACUATION:  APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE COMMENTS:

FIELD BLANK

SAMPLING SAMPLE B	EXTRACT	ON METH	IOD:		mber <u>B</u> )		<del></del>
BAILER MAI PUMP TYPE	DE OF:	<u> </u>	culticue IIvi	sposaniei			· ·
OTHER:SAMPLE OB					IDOSITE.		
			GRAD	A COIV	ir Osi i L		
ON SITE ME	EASUREM	ENTS					
Extraction	Temp	pН	Conduct.	DO	EH ,	Methane	00
,	PC		uS	9002	t.		MG/1
Measured	Corning	Corning	Coming	Corning	ORP Testr		
1							<b></b>
2		·		,			
3							·
					•		·
ON-SITE SANONE_ ON-SITE SANONE_ ON-SITE SANONE_ ON-SITE SANONE_ ON-SITE SANONE_	AMPLE FI ON-SITE	LTRATION MET	N: THOD: <u>0,45 N</u>	<u> </u>			
COMMENTS:						<u>·</u>	_
CONTAINE CONTAINER CONTAINER CONTAINER CHAIN OF CU	SIDES LAI LIDS TAPI PLACED II JSTODY C	BELED AND ED NICE CHE	ST	3(_124)	× × ×		 
SAMPLERS S	IGNATURI	:Jim	Clauso	n	DATE . 7-	-10-61	

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	<u>Case</u>	Well Number	Water Level	<b>Bottom</b>	Comments
$\sim$				***	Duplicate BXS-6
	2"	BXS-1	36.39	47.90'	Ø Duplicate BXS-6
	2"	BXS-2	39,02	45.40'	& Top of pump
	2"	BXS-3	35,66	44.15'	
	2"	BXS-4	16.47	47.40'	
		BXS-5			Field Blank
	0.11				
	2"	BXN-1	51,75	58.18'	Duplicate BXN-5
	2"	BXN-2	48.01	57.24'	
	2"	BXN-3	49.74	58.66'	
	2"	BXN-4	47.63	51.74'	
		BXN-6			Field Blank
	4"	MW-1	34,41	41.02'	
	4"	MW-2	45.06	51.23'	
	4"	MW-3	42.69	51.96'	
_	2"	MW-4	13,53	41.92'	
3	2"	HCMW-5	29.50	35.43'	⊗
-	2"	HCMW-6	43.24	46.62'	Before Redevelopement
-				51.10'	After Redevelopement
-	2"	HCMW-7	44.98	55.08'	
		MW-A	• -		Duplicate MW-2
		MW-B		·	Field Blank
L					

Water Levels Taken pol 1/01

Q: Comments:

D: HAD TO pull THE pump to get THE WATER READ INCATS 9.78. D: HAD TO pull THE pump To get THE WATER READING AT 38,90

3: NO WATER IN WELL TO pump.

## RE-do Total Coliforms

BXS-1-11:30AM

BXS-2-12:00PM

BXS-3-12:30PM

BXS-4-1:00PM

BXS-5-10:00AM

BXS-6-11:00AM

HAD TO RE- do
THE COLIFORMS ON
BX5 WELLS DO TO
GREY hound shut
CLOWN - ONE day.

## J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: <u>ISX5-18</u>

SAMPLING LOCATION: Arlington, WA Plant DATE: 10-2-01
WEATHER 500 CIERR
MONITORING WELL CONDITION:
LOCKED WELL NO. IS X IS NOT APPARENT OUTER CASING CONDITION: TYPE: 6" Steel INNER CASING CONDITION: TYPE: 2" PVC
OUTER CASING CONDITION: Q cod TYPE: 6" Steel
INNER CASING CONDITION: QOOD TYPE: 2" PVC
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER X OTHER
CASING  TEPTH OF WELL 1 17 90 FT MEASURED WITH 100' Shoreless to a
WATER LEVEL: 39.78 FT MEASURED WITH: Flectronic Sounder
DEPTH OF WELL: 47.90 FT. MEASURED WITH: 100' fiberglass tape WATER LEVEL: 39.78 FT. MEASURED WITH: Electronic Sounder COMMENTS Depth: 47.90—39.78 = 8.12 * 6 = 4.8 94. P. L.
36.39 ToTHE Top of pump.
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
<u>Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO</u> +rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY
ODOR: NO X YES SLIGHT STRONG
COMMENTS.
WELL EVACUATION:
VOLUME OF WATER IN WELL BORE: 8.12 FT. GALLONS: 1.6  TOTAL VOLUME REMOVED: 4.8 GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER SIZE PUMP TYPE PVC
TOTAL VOLUME REMOVED: 4.8 GALLONS (3 times casing volume)
COMMENTS: RIGHTHOD: BAILER SIZE Y PUMP TYPE PVC
COMMENTS: BLADDER PUMP
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY
ODOR: NO A YES SLIGHT STRONG
APPEARANCE: CLEAR X SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO X YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE COMMENTS: DUPLICATE RXS
COMMENTS: OF PODISCRIE 18X2-0

SAMPLE OR	TAINED IS	Ţ.	GRAB	Y CON	IPOSITE	
			GB	<u>a</u> con	11 051112	
ON SITE MI	EASUREM	ENTS				
Extraction	Temp	pН	Conduct.	DO	EH	Methane
	PC		uS	9002	r t	
Measured	Corning	Corning	Corning	Corning	ORP Testr	
1	12.8	5,91	645	10.7	195.	
2	14.0	28.2	539.	16.5	120.	
3	14.6/	5.80	512.	10,2	120.	
	140	571	1498	8.7	115	
ON-SITE SA	AMPLE FI ON-SITE	LTRATIO	N: THOD:0.45 N	Micron		
ON-SITE SANONE_COMMENTS: ON-SITE SANONE	AMPLE FI ON-SITE :AMPLE PR	LTRATIO	N: THOD: <u>0.45 N</u>	Micron		
ON-SITE SANONE_COMMENTS:	AMPLE FI ON-SITE  AMPLE PF ADDE  ER HANDL SIDES LAF LIDS TAPE PLACED II	LTRATION MET MET MESERVATE DEVIABLE AND MED NICE CHE	N: THOD: <u>0.45 N</u> TION ORATORY '	Micron		

C

S. Administra

### J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: <u>BXS-2</u>

SAMPLING LOCATION: Arlington, WA Plant DATE: 10-2-0 ( COLLECTED BY: Jim Clawson TIME: 130pm
MONITORING WELL CONDITION:
LOCKED WELL CONDITION:  LOCKED NULL NO. IS IS NOT APPARENT  OUTER CASING CONDITION:  OCCUPATION:  TYPE:  TY
OUTER CASING CONDITION: Cood TYPE: 6" Steel
INNER CASING CONDITION: COOD TYPE: 2" PVC
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER_X_OTHER
CASING *
DEPTH OF WELL: 45,40 FT. MEASURED WITH: 100' fiberglass tape
DEPTH OF WELL: 45,40 FT. MEASURED WITH: 100' fiberglass tape WATER LEVEL: 38,90 FT. MEASURED WITH: Electronic Sounder COMMENTS Depth: 45,40—38,90 = 6.5 * 6 = 3,9 94, P. L.
COMMENTS DEPTH 195.40-30.70 = 6.5 * 16 = 3.4 9HIP.V
39.02 TO THE TOP OF PUMP
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION REPORT EXACULATION.
WATER CONDITION BEFORE EVACUATION:  APPEAR ANCE: CLEAR X SLICIOLDY CLOUDY V.CLOUDY
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG
COMMENTS:
YYERY Y RAYL CYLL RIANY
WELL EVACUATION:
VOLUME OF WATER IN WELL BORE: 6.5 FT. GALLONS: 1.3  TOTAL VOLUME REMOVED: 3.9 GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER SIZE PUMP TYPE PVC
EVACUATION METHOD: BAILER SIZE PLIMP Type DVC
COMMENTS: BLATER PUMP
ODGEDY A TRONG DYDDIG DYLL GYLL TION
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG
ODOR: NO X YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE
COMMENTS: WELL IS HEAVING

	SAMPLING SAMPLE F	EXTRACT	ON METH	(OD:				<del></del>
<i>i</i> .	BAILER MA PUMP TYPE	DE OF:	Poly	othylene (D	sposable)	<u> </u>		
	OTHER:			· · · · · · · · · · · · · · · · · · ·				
	SAMPLE OB	TAINED IS	<b>):</b>	GRAB	X COM	IPOSITE		<del></del>
	ON SITE ME	EASUREM	ENTS					
•	Extraction	•	pН	Conduct.	DO	EH ,	Methane	00
		PC		uS	9002	, !		MG/L
_	Measured	Corning	Corning	Corning	Coming.	ORP Testr		
2	1	18,5	6.34	849.		105		2.47
ſ	2	16.5	5.97	849	8.6	50.		0.80
2	3	15.5	6.05	847,	10,0	50.		0.93
						:		
	SAMPLE CONUMBER, SITE SAMPLE CON-SITE SAMPLE COMMENTS:  ON-SITE SAMPLE COMMENTS:	AMPLE FI ON-SITE	LTRATION X MET	N: THOD: <u>0.45 N</u> TION	Micron	AINERS_X		
	COMMENTS:				TO CONTA	MINERS_A		<del></del>
	CONTAINE CONTAINER CONTAINER CONTAINER CHAIN OF CU	SIDES LAI LIDS TAPI PLACED II JSTODY C	BELED ANI ED N ICE CHES	ST	·	X X X		  
-	SAMPLERS S	IGNATTIR		Con	<b>.</b>	DATE 16	1-7-0	

SAMPLE.			TOD.	11222110		x5 - 3
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# J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: RX5~L

SAMPLING LOCATION: Arlington, WA Plant DATE: 10-2-01
COLLECTED BY: Jim Clawson TIME: 2:30pm
WEATHER 74° Sunny
MONITORING WELL CONDITION:  LOCKED X UNLOCKED WELL NO. IS Y IS NOT APPARENT  OUTER CASING CONDITION:  OCO TYPE:  OTHER CASING CONDITION:  WATER DEPTH MEASUREMENT DATUM: TOP OF INNER X OTHER  CASING  DEPTH OF WELL:  OTHER CASING CONDITION:  TYPE:  OTHER CASING  OTHER CASING  DEPTH OF WELL:  OTHER CASING  DEPTH OF WELL:  OTHER CASING  DEPTH OF WELL:  OTHER CASING  OTHER CASING  DEPTH OF WELL:  OTHER CASING  OTHER CASING
COMMENTS DEPONITION TO SENTENCE
FIELD EQUIPMENT CLEANED BEFORE USE: ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO +rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:  APPEARANCE: CLEAR _ SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO _ Y YES SLIGHT STRONG COMMENTS:
WELL EVACUATION:  VOLUME OF WATER IN WELL BORE: 30.93 FT. GALLONS: 6, 1  TOTAL VOLUME REMOVED: 18, 5 GALLONS (3 times casing volume)  EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE  COMMENTS:
OBSERVATIONS DURING EVACUATION:  APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT X STRONG WATER LEVEL: NO CHANGE FELL ROSE COMMENTS:

# J.H. BAXTER GROUNDWATER SAMPLING RECORD WELL NUMBER: BXS-5

SAMPLING LOCATION: Arlington, WA Plant DATE: 10-2-01  COLLECTED BY: Jim Clawson TIME: 3:00pm  WEATHER 74 Survey
COLLECTED BY: Jim Clawson TIME: 3:000m
WEATHER 74 SURVA
· · · · · · · · · · · · · · · · · · ·
MONITORING WELL CONDITION:
LOCKED WELL NO. IS IS NOT APPARENT
OUTER CASING CONDITION: Q cod TYPE: Steel
LOCKED WELL NO. IS IS NOT APPARENT OUTER CASING CONDITION: O CO TYPE: Steel INNER CASING CONDITION: PVC
WATER DEPTH MEASUREMENT DATUM: TOP OF INNER_X_OTHER
CASING
DEPTH OF WELL: FT. MEASURED WITH: 100' fiberglass tape
WATER LEVEL: FT. MEASURED WITH: Electronic Sounder
DEPTH OF WELL:  WATER LEVEL:  FT. MEASURED WITH: 100' fiberglass tape  WATER LEVEL:  FT. MEASURED WITH: Electronic Sounder  COMMENTS Depth:  GALPLE
· <del></del>
FIELD EQUIPMENT CLEANED BEFORE USE:
ITEMS CLEANED AND METHOD: Well Depth tape/ Water Level Probe/ Filter XFR
Vessel/ Field instruments-Non-PHO's soap+ water wash- DI Water rinse-Dilute HNO
+rinse- DI water rinse- Isopropyl alcohol rinse-DI water rinse- Hexane rinse-DI Water
Rinse- Air Dry
WATER CONDITION BEFORE EVACUATION:
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY
ODOR: NO YES SLIGHT STRONG
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG COMMENTS:
TYPEN V SEVIL COLL BUILDING
WELL EVACUATION:
VOLUME OF WATER IN WELL BORE: FT. GALLONS: TOTAL VOLUME REMOVED: GALLONS (3 times casing volume) EVACUATION METHOD: BAILER X SIZE 1 Ot PUMP TYPE
GALLONS (3 times casing volume)
COMMENTED.
COMMENTS:
OBSERVATIONS DURING EVACUATION:
APPEARANCE: CLEAR SLCLOUDY CLOUDY VCLOUDY
ODOR: NO YES STIGHT STRONG
APPEARANCE: CLEAR SL.CLOUDY CLOUDY V.CLOUDY ODOR: NO YES SLIGHT STRONG WATER LEVEL: NO CHANGE FELL ROSE
COMMENTS:

FIELD BLANK

SAMPLING				WELL NU	MBER B	XS-5	·····
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· PUMP TYPE							
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APPEARANC ODOR: NC COMMENTS  SAMPLE C NUMBER, SI  ON-SITE S NONE COMMENTS  ON-SITE S	ONTAINE ZE, MATEI AMPLE FI ON-SITE	RS: RIAL: LTRATIONAL MET	N: THOD: <u>0.45 N</u>				
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CONTAINE CONTAINER CONTAINER CONTAINER CHAIN OF CO	SIDES LAI LIDS TAPI PLACED II	BELED AND ED N ICE CHE	ST	, ————————————————————————————————————	X X X		
OTHER COM	IMENTS	FIE	eld B	LAWK			_
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### **Appendix B**

Chain of Custody Records and Laboratory Reports



February 7, 2001

Service Request No: K2100424

K2100426

Georgia Baxter J.H. Baxter Company 1700 El Camino Real P.O. Box 5902 San Mateo, CA 94402-0902

Re: Arlington Plant Groundwater/BXN-WELLS/BXS-WELLS

Dear Georgia:

Enclosed are the results of the sample(s) submitted to our laboratory on January 18, 2001. For your reference, these analyses have been assigned our service request number K2100424.

The BXN-5 sample container for Total Coliform was received broken and was not analyzed for, per Ms. Larsen's instruction.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 3345.

Respectfully submitted,

Columbia Analytical Services, Inc.

Mingta Lin

**Project Chemist** 

ML/gep

Page 1 of

cc: Mary Larsen, J.H. Baxter(Arlington)

#### Acronyms

ASTM American Society for Testing and Materials

A2LA American Association for Laboratory Accreditation

CARB California Air Resources Board

CAS Number Chemical Abstract Service registry Number

CFC Chlorofluorocarbon
CFU Colony-Forming Unit

DEC Department of Environmental Conservation

DEQ Department of Environmental Quality

DHS Department of Health Services

DOE Department of Ecology
DOH Department of Health

EPA U. S. Environmental Protection Agency

ELAP Environmental Laboratory Accreditation Program

GC Gas Chromatography

GC/MS Gas Chromatography/Mass Spectrometry

LUFT Leaking Underground Fuel Tank

M Modified

MCL Maximum Contaminant Level is the highest permissible concentration of a substance

allowed in drinking water as established by the USEPA.

MDL Method Detection Limit
MPN Most Probable Number
MRL Method Reporting Limit

NA Not Applicable
NC Not Calculated

NCASI National Council of the Paper Industry for Air and Stream Improvement

ND Not Detected

NIOSH National Institute for Occupational Safety and Health

PQL Practical Quantitation Limit

RCRA Resource Conservation and Recovery Act

SIM Selected Ion Monitoring

TPH Total Petroleum Hydrocarbons

tr Trace level is the concentration of an analyte that is less than the PQL but greater

than or equal to the MDL.

#### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.

#### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- B The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- E The reported value is estimated because of the presence of matrix interference.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- 1 The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.
- \* The duplicate analysis not within control limits. See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.

#### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a chromatographic interference.
- X See case narrative.

#### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

PROJECT NAME PROJECT NUMBER

PROJECT MANAGER

PAGE \_\_\_ COC # 1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068 GCIMS

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#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100384

Date Collected: 1/16/01 Date Received: 1/17/01

Date Extracted: NA

**Inorganic Parameters** Units: mg/L (ppm)

		Sample Name: Lab Code:	<b>BXS-1</b> K2100384-001	<b>BXS-4</b> K2100384-002	<b>BXS-5</b> K2100384-003
Analyte	EPA Method	MRL			
pH (units)	150.1		( 6.06 )	8.03	5.52
Conductivity (µmhos/cm)	120.1	2	473	189	2
Ammonia as Nitrogen	350.1	0.05	0.10	0.63	0.06
Chemical Oxygen Demand (COD)	410.2	5	21	7	ND
Chloride	300.0	0.2	7.7	2.2	ND
Nitrate+Nitrite as Nitrogen	353.2	0.2	0.3	ND	ND
Solids, Total Dissolved (TDS)	160.1	5	286	131	ND
Solids, Total Suspended (TSS)	160.2	5	6	-	-
Sulfate	300.0	0.2	7.7	1.2	ND
Tannin and Lignin	SM 5550B	0.2	0.6	0.6	ND
Carbon, Total Organic (TOC)	415.1	0.5	8.6	1.0	ND

Standard Methods for the Examination of Water and Wastewater , 18th Ed., 1992.

Approved By:

3S30EPA/102094

SM

00384WET.PW1 - Mixed 2/2/01

Date: 2 2 01

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100384

Date Collected: 1/16/01 Date Received: 1/17/01

Date Extracted: NA

**Inorganic Parameters** Units: mg/L (ppm)

		Sample Name: Lab Code:	<b>BXS-6</b> K2100384-004	Method Blank K2100384-MB
Analyte	EPA Method	MRL		
pH (units)	150.1		6.10	-
Conductivity (µmhos/cm)	120.1	2	494	ND
Ammonia as Nitrogen	<b>35</b> 0.1	0.05	0.07	ND
Chemical Oxygen Demand (COD)	410.2	5	23	ND
Chloride	300.0	0.2	7.7	ND
Nitrate+Nitrite as Nitrogen	353.2	0.2	0.3	ND
Solids, Total Dissolved (TDS)	160.1	5	. 272	ND
Solids, Total Suspended (TSS)	160.2	5	-	ND
Sulfate	300.0	0.2	7.8	ND
Tannin and Lignin	SM 5550B	0.2	0.7	ND
Carbon, Total Organic (TOC)	415.1	0.5	8.6	ND

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

SM

Approved By: 3S30EPA/102094

00384WET.PW1 - Mixed (2) 2/2/01

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100384

Date Collected: 1/16/01 Date Received: 1/17/01

Date Extracted: NA

Date Analyzed: 1/17/01

Coliform, Total SM 9221B Units: MPN/100 ml

		Time Test							
Sample Name	Lab Code	MRL	Started		Result				
BXS-1	K2100384-001	2	1720	hrs	ND (X)				
BXS-4	K2100384-002	2	1720	hrs	ND (X)				
BXS-5	K2100384-003	2	1720	hrs	ND (X)				
BXS-6	K2100384-004	2	1720	hrs	ND (X)				

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By:

BACT/102194

SM

00384WET.PW1 - BactTC 2/2/01

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100384

Date Collected: 1/16/01

Date Received: 1/17/01

Date Extracted: 1/23/01

Dissolved Metals Units: mg/L (ppm)

	:	Sample Name: Lab Code: Date Analyzed:	<b>BXS-1</b> K2100384-001 1/25/01	BXS-4 K2100384-002 1/25/01	<b>BXS-5</b> K2100384-003 1/25/01
Analyte	EPA Method	MRL			
Arsenic	<b>70</b> 60 <b>A</b>	0.005	ND	ND	ND
Barium	6010B	0.005	0.03	0.025	ND
Cadmium	6010B	0.004	ND	ND	ND
Copper	6010B	0.01	ND	ND	ND
Iron	6010B	0.02	ND	0.05	ND
Manganese	6010B	0.005	0.409	0.123	ND
Nickel	6010B	0.02	0.02	ND	ND
Zinc	6010B	0.01	0.01	ND	ND

Approved By: 3S30EPA/102094

00384ICP.BR1 - 1-3 1/26/01

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Mine

Service Request: K2100384

Date Collected: 1/16/01
Date Received: 1/17/01

Date Extracted: 1/23/01

Dissolved Metals Units: mg/L (ppm)

		Sample Name: Lab Code: Date Analyzed:	<b>BXS-6</b> K2100384-004 1/25/01	<b>Method Blank</b> K2100384-MB 1/25/01
	EPA			
Analyte	Method	MRL		
Arsenic	7060A	0.005	ND	ND
Barium	6010B	0.005	0.03	ND
Cadmium	6010B	0.004	ND	ND
Copper	6010B	0.01	ND	ND
Iron	6010B	0.02	0.03	ND
Manganese	6010B	0.005	0.397	ND
Nickel	6010B	0.02	0.02	ND
Zinc	6010B	0.01	0.01	ND

## Analytical Results

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix:

Water

Service Request: K2100384

Date Collected: 01/16/2001 Date Received: 01/17/2001

Pentachlorophenol

Sample Name:

BXS-1

Lab Code:

K2100384-001

Extraction Method: METHOD

Analysis Method:

8151M

Units: ug/L

Basis: NA

Level: Low

			Dilution	Date	Date	Extraction	
Analyte Name	Result Q	MRL	Factor	Extracted	Analyzed	Lot	Note
Pentachlorophenol	19	0.50	1	01/23/01	01/24/01	KWG0100234	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
4-Bromo-2,6-dichlorophenol	84	40-100	01/24/01	Acceptable

## Analytical Results

Client:

J.H. Baxter & Company

Project: Sample Matrix:

Water

Arlington Plant Groundwater/BXS-WELLS

Service Request: K2100384

Date Collected: NA

Date Received: NA

Pentachlorophenol

Sample Name:

Method Blank

Units: ug/L

Lab Code:

KWG0100234-4

Basis: NA

Extraction Method:

**METHOD** 

Level: Low

Analysis Method:

8151M

	·.		Dilution	Date	Date	Extraction	
Analyte Name	Result Q	MRL	Factor	Extracted	Analyzed	Lot	Note
Pentachlorophenol	ND U	0.50	1	01/23/01	01/24/01	KWG0100234	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note	
4-Bromo-2,6-dichlorophenol	86	40-100	01/24/01	Acceptable	

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100426

Date Collected: 1/17/01 Date Received: 1/18/01

Date Extracted: NA

Date Analyzed: 1/18/01

Coliform, Total SM 9221B Units: MPN/100 ml

•				
Sample Name	Lab Code	MRL	Started	Result
BXS-2	K2100426-001	2	1315 hrs	4 (X)
BXS-3	K2100426-002	2	1315 hrs	14 (X)

SM

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

2/01 00022 Approved By: BACT/102194 00426WET.PW1 - BactTC 2/2/01 Page No.:

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100426 Date Collected: 1/17/01

Date Received: 1/18/01 Date Extracted: NA

Inorganic Parameters

Units: mg/L (ppm)

		Sample Name:	BXS-2	BXS-3	Method Blank
		Lab Code:	K2100426-001	K2100426-002	K2100426-MB
•					
	EPA				
Analyte	Method	MRL			
pH (units)	150.1		6.48	6.83	-
Conductivity (µmhos/cm)	120. <b>1</b>	2	878	872	ND
Alkalinity, Total as CaCO₃	310.1	2	492	487	ND
Ammonia as Nitrogen	<b>35</b> 0.1	0.05	ND	0.12	ND
Chemical Oxygen Demand (COD)	410.2	5	40	68	ND
Chloride	300.0	0.2	8.7	5.5	ND
Nitrate+Nitrite as Nitrogen	353.2	0.2	ND	ND	ND
Sulfate	300.0	0.2	0.4	0.2	ND
Tannin and Lignin	<i>SM</i> 5550B	0.2	1.7	12.2	ND
Carbon, Total Organic (TOC)	415.1	0.5	14.8	27.1	ND

SM

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By: 3S30EPA/102094

00426WET.PW1 - Mixed 2 2 01

## Analytical Report

Client: :

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100426

Date Collected: 1/17/01 Date Received: 1/18/01

Date Extracted: 1/23/01

Dissolved Metals Units: mg/L (ppm)

		Sample Name: Lab Code: Date Analyzed:	<b>BXS-2</b> K2100426-001 1/25/01	BXS-3 K2100426-002 1/25/01	Method Blank K2100426-MB 1/25/01
	EPA				
Analyte	Method	MRL			
Arsenic	7060A	0.005	ND	0.008	ND
Barium	6010B	0.005	0.051	0.060	ND
Cadmium	6010B	0.004	ND	ND	ND
Copper	6010B	0.01	ND	ND	ND
Iron	6010B	0.02	0.62	7.56	ND
Manganese	6010B	0.005	1.46	14.5	ND
Nickel	6010B	0.02	0.04	ND	ND
Zinc	6010B	0.01	ND	ND	ND

Date: 1/30/0/ 00024

3S30EPA/102094 00426ICP.BR1 - 1, 2, MB 1/29/01

Page No.:



February 7, 2001

Service Request No: K2100509

Georgia Baxter J.H. Baxter Company 1700 El Camino Real P.O. Box 5902 San Mateo, CA 94402-0902

Re: MW-WELLS & HCMMW-WELLS/BXS WELLS

Dear Georgia:

Enclosed are the results of the sample(s) submitted to our laboratory on January 20, 2001. For your reference, these analyses have been assigned our service request number K2100509.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 3345.

Respectfully submitted,

Columbia Analytical Services, Inc.

Mingta Lin

Project Chemist

ML/gep

Page 1 of

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

00424ICP.BR1 - 1-3 1/29/01

Service Request: K2100424

Date Collected: 1/17/01

Date Received: 1/18/01 Date Extracted: 1/23/01

Dissolved Metals Units: mg/L (ppm)

		Sample Name: Lab Code: Date Analyzed:	<b>BXN-1</b> K2100424-001 1/25/01	<b>BXN-2</b> K2100424-002 1/25/01	<b>BXN-3</b> K2100424-003 1/25/01
	EPA				
Analyte	Method	MRL	. )		
Arsenic	7060A	0.005	ND =	ND	0.016
Barium	6010B	0.005	0.022	0.008	0.085
Cadmium	6010B	0.004	ND	ND	ND
Copper	6010B	0.01	ND	ND	ND
Iron	6010B	0.02	2.61	ND	19.1
Manganese	6010B	0.005	2.23	0.724	3.65
Nickel	6010B	0.02	0.05	0.02	0.02
Zinc	6010B	0.01	ND	ND	ND

Approved By: 3S30EPA/102094

Page No.:

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

00424ICP.BR1 - 4-6 1/29/01

Service Request: K2100424

Date Collected: 1/17/01 Date Received: 1/18/01

Date Extracted: 1/23/01

Dissolved Metals Units: mg/L (ppm)

		Sample Name: Lab Code: Date Analyzed:	<b>BXN-4</b> K2100424-004 1/25/01	<b>BXN-5</b> K2100424-005 1/25/01	<b>BXN-6</b> K2100424-006 1/25/01
Analyte	EPA Method	MRL			
Arsenic	7060A	0.005	ND	ND	ND
Barium	6010B	0.005	0.242	0.021	ND
Cadmium	6010B	0.004	ND	ND	- ND
Copper	6010B	0.01	0.04	ND	ND
Iron	6010B	0.02	0.06	2.63	ND
Manganese	6010B	0.005	9.10	2.24	ND
Nickel	6010B	0.02	0.12	0.05	ND
Zinc	6010B	0.01	ND	ND	ND

Approved By: 3S30EPA/102094

Page No.:

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100424

Date Collected: NA

Date Received: NA

Date Extracted: 1/23/01

Dissolved Metals Units: mg/L (ppm)

Sample Name:

Method Blank

Lab Code:

K2100424-MB

Date Analyzed:

1/25/01

	LPA		
Analyte	Method	MRL	
Arsenic	7060A	0.005	ND .
Barium	6010B	0.005	ND
Cadmium	6010B	0.004	ND
Copper	6010B	0.01	ND
Iron	6010B	0.02	ND
Manganese	6010B	0.005	ND
Nickel	6010B	0.02	ND
Zinc	6010B	0.01	ND

Approved By: 3S30EPA/102094

00424ICP.BR1 - MB 1/29/01

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100384

Date Collected: 1/16/01

Date Received: 1/17/01 Date Extracted: NA

Date Analyzed: 1/17/01

Coliform, Total *SM* 9221B Units: MPN/100 ml

	•		Time Test		
Sample Name	Lab Code	MRL	Started		Result
BXS-1	K2100384-001	2	1720	hrs	ND (X)
BXS-4	K2100384-002	2	1720	hrs	ND (X)
BXS-5	K2100384-003	2	1720	hrs	ND (X)
BXS-6	K2100384-004	2	1720	hrs	ND (X)

SM

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By: BACT/102194 00384WET.PW1 - BactTC 2/2/01

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100426

**Date Collected: 1/17/01** 

Date Received: 1/18/01 Date Extracted: NA

Date Analyzed: 1/18/01

Coliform, Total SM 9221B Units: MPN/100 ml

Sample Name	Lab Code	MRL	Time Test Started	Result
BXS-2	K2100426-001	2 2	1315 hrs	4 (X)
BXS-3	K2100426-002		1315 hrs	14 (X)

SM

 ${\it Standard\ Methods\ for\ the\ Examination\ of\ Water\ and\ Wastewater}\,,\,18th\ Ed.,\,1992.$ 

Approved By: BACT/102194 00426WET.PW1 - BacrTC 2/2/01

Page No.:

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100384 Date Collected: 1/16/01 Date Received: 1/17/01

Date Extracted: NA

**Inorganic Parameters** 

Units: mg/L (ppm)

		Sample Name:	BXS-1	BXS-4	BXS-5
		Lab Code:	K2100384-001	K2100384-002	K2100384-003
	EPA				
Analyte	Method	MRL			
pH (units)	150.1		6.06	8.03	5.52
Conductivity (µmhos/cm)	120.1	2	473	189	2
Ammonia as Nitrogen	350.1	0.05	0.10	0.63	0.06
Chemical Oxygen Demand (COD)	410.2	5	21	7	ND
Chloride	300.0	0.2	7.7	2.2	ND
Nitrate+Nitrite as Nitrogen	353.2	0.2	0.3	ND	ND
Solids, Total Dissolved (TDS)	160.1	5	. 286	131	ND
Solids, Total Suspended (TSS)	160.2	5	6	-	•
Sulfate	300.0	0.2	7.7	1.2	ND
Tannin and Lignin	SM 5550B	0.2	0.6	0.6	ND
Carbon, Total Organic (TOC)	415.1	0.5	8.6	1.0	ND

SM

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By:

3S30EPA/102094 00384WET.PW1 - Mixed 2/2/01

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100384

Date Collected: 1/16/01

Date Received: 1/17/01 Date Extracted: NA

**Inorganic Parameters** 

Units: mg/L (ppm)

		Sample Name: Lab Code:	<b>BXS-6</b> K2100384-004	Method Blank K2100384-MB
Analyte	EPA Method	MRL		
pH (units)	150.1		6.10	-
Conductivity (µmhos/cm)	120.1	. 2	494	ND
Ammonia as Nitrogen	350.1	0.05	0.07	ND
Chemical Oxygen Demand (COD)	410.2	5	23	ND
Chloride	300.0	0.2	7.7	ND
Nitrate+Nitrite as Nitrogen	353.2	0.2	0.3	ND
Solids, Total Dissolved (TDS)	160.1	5	. 272	ND
Solids, Total Suspended (TSS)	160.2	, 5	-	ND
Sulfate	300.0	0.2	7.8	ND
Tannin and Lignin	SM 5550B	0.2	0.7	ND
Carbon, Total Organic (TOC)	415.1	0.5	8.6	ND

SM

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By:

3S30EPA/102094

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100426 Date Collected: 1/17/01

Date Received: 1/18/01 Date Extracted: NA

**Inorganic Parameters** Units: mg/L (ppm)

		Sample Name: Lab Code:	<b>BXS-2</b> K2100426-001	<b>BXS-3</b> K2100426-002	Method Blank K2100426-MB
Analyte	EPA Method	MRL			
pH (units)	150.1		6.48	6.83	-
Conductivity (µmhos/cm)	120.1	2	878	872	ND
Alkalinity, Total as CaCO₃	310.1	2	492	487	ND
Ammonia as Nitrogen	350.1	0.05	ND	0.12	ND
Chemical Oxygen Demand (COD)	410.2	5	40	68	ND
Chloride	300.0	0.2	8.7	5.5	ND
Nitrate+Nitrite as Nitrogen	353.2	0.2	ND	ND	ND
Sulfate	300.0	0.2	0.4	0.2	ND
Tannin and Lignin	SM 5550B	0.2	1.7	12.2	ND
Carbon, Total Organic (TOC)	415.1	0.5	14.8	27.1	ND

SM

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By: 3S30EPA/102094 00-426WET.PW1 - Mixed 2/2/01

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Sample Matrix: Water

Arlington Plant Groundwater/BXS-WELLS

Date Collected: 1/16/01

Date Received: 1/17/01 Date Extracted: 1/23/01

Service Request: K2100384

Dissolved Metals Units: mg/L (ppm)

		Sample Name: Lab Code: Date Analyzed:	<b>BXS-1</b> K2100384-001 1/25/01	<b>BXS-4</b> K2100384-002 1/25/01	<b>BXS-5</b> K2100384-003 1/25/01
	EPA		•		
Analyte	Method	MRL			
Arsenic	7060A	0.005	ND	ND	ND
Barium	6010B	0.005	0.03	0.025	ND
Cadmium	6010B	0.004	ND	ND	ND
Copper	6010B	0.01	ND	ND	ND
Iron	6010B	0.02	ND	0.05	ND
Manganese	6010B	0.005	0.409	0.123	ND
Nickel	6010B	0.02	0.02	ND	ND
Zinc	6010B	0.01	0.01	ND	ND

Date: Approved By: 3S30EPA/102094 00384ICP.BR1 - I-3 1/26/01

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100384

Date Collected: 1/16/01

**Date Received:** 1/17/01 **Date Extracted:** 1/23/01

Page No.:

Dissolved Metals Units: mg/L (ppm)

		Sample Name: Lab Code: Date Analyzed:	<b>BXS-6</b> K2100384-004 1/25/01	Method Blank K2100384-MB 1/25/01
	EPA			
Analyte	Method	MRL		
Arsenic	7060A	0.005	ND	ND
Barium	6010B	0.005	0.03	ND
Cadmium	6010B	0.004	ND	ND
Copper	6010B	0.01	ND	ND
Iron	6010B	0.02	0.03	ND
Manganese	6010B	0.005	0.397	ND
Nickel	6010B	0.02	0.02	ND
Zinc	6010B	0.01	0.01	ND

00384ICP.BR1 - 4, MB 1/26/01

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2100426

Date Collected: 1/17/01 Date Received: 1/18/01

Date Extracted: 1/23/01

Dissolved Metals Units: mg/L (ppm)

		Sample Name: Lab Code: Date Analyzed:	<b>BXS-2</b> K2100426-001 1/25/01	<b>BXS-3</b> K2100426-002 1/25/01	Method Blank K2100426-MB 1/25/01
Analyte	EPA Method	MRL			
Arsenic	7060A	0.005	ND	0.008	ND
Barium	6010B	0.005	0.051	0.060	ND
Cadmium	6010B	0.004	ND	ND	ND
Copper	6010B	0.01	ND	ND	ND
Iron	6010B	0.02	0.62	7.56	ND
Manganese	6010B	0.005	1.46	14.5	ND
Nickel	6010B	0.02	0.04	ND	ND ·
Zinc	6010B	0.01	ND	ND	ND

Date: 1/30/6/ 00021 Approved By: 3S30EPA/102094

00426ICP.BR1 - 1, 2, MB 1/29/01

Analytical Results

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: 'K2100384

**Date Collected:** 01/16/2001

**Date Received:** 01/17/2001

Pentachlorophenol

Sample Name:

BXS-1

Lab Code:

K2100384-001

Extraction Method:

**METHOD** 

Analysis Method:

8151M

Units: ug/L Basis: NA

Level: Low

Analyte Name	Result Q	MRL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Pentachlorophenol	19	0.50	1	01/23/01	01/24/01	KWG0100234	··

00022

SuperSet Reference: RR5428

#### Analytical Results

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: .

Water

Service Request: K2100384

Date Collected: NA

Date Received: NA

Pentachlorophenol

Sample Name:

Method Blank

Lab Code:

KWG0100234-4

Extraction Method:

**METHOD** 

Analysis Method:

8151M

Units: ug/L Basis: NA

Level: Low

Analyte Name

Result Q

MRL

Dilution Factor

Date Extracted

Date Analyzed

Extraction

Pentachlorophenol

ND U

0.50

01/23/01

01/24/01

Lot Note KWG0100234

Surrogate Name

4-Bromo-2,6-dichlorophenol

%Rec 86

Control Limits 40-100

Date Analyzed

Note

01/24/01 Acceptable

00023



May 7, 2001

Service Request No: K2102320

K2102370

Georgia Baxter J.H. Baxter Company 1700 El Camino Real P.O. Box 5902 San Mateo, CA 94402-0902

Re: J.H.Baxter & Co./BXN-WELLS/BXS WELLS

Dear Georgia:

Enclosed are the results of the sample(s) submitted to our laboratory on April 04, 2001. For your reference, these analyses have been assigned our service request number K2102320.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3345.

Respectfully submitted,

Columbia Analytical Services, Inc.

Mingta Lin

**Project Chemist** 

ML/gep

Page 1 of

cc: Mary Lee Larson, J.H.Baxter & Company Lori Herman, Hart Crowser, Inc.

#### Acronyms

ASTM American Society for Testing and Materials

A2LA American Association for Laboratory Accreditation

CARB California Air Resources Board

CAS Number Chemical Abstract Service registry Number

CFC Chlorofluorocarbon
CFU Colony-Forming Unit

DEC Department of Environmental Conservation

DEQ Department of Environmental Quality

DHS Department of Health Services

DOE Department of Ecology
DOH Department of Health

EPA U. S. Environmental Protection Agency

ELAP Environmental Laboratory Accreditation Program

GC Gas Chromatography

GC/MS Gas Chromatography/Mass Spectrometry

LUFT Leaking Underground Fuel Tank

M Modified

MCL Maximum Contaminant Level is the highest permissible concentration of a substance

allowed in drinking water as established by the USEPA.

MDL Method Detection Limit
MPN Most Probable Number
MRL Method Reporting Limit

NA Not Applicable
NC Not Calculated

NCASI National Council of the Paper Industry for Air and Stream Improvement

ND Not Detected

NIOSH National Institute for Occupational Safety and Health

PQL Practical Quantitation Limit

RCRA Resource Conservation and Recovery Act

SIM Selected Ion Monitoring

TPH Total Petroleum Hydrocarbons

tr Trace level is the concentration of an analyte that is less than the PQL but greater

than or equal to the MDL.

#### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.

#### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- B The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- E The reported value is estimated because of the presence of matrix interference.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.
- \* The duplicate analysis not within control limits. See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.

#### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- i The MRL/MDL has been elevated due to a chromatographic interference.
- X See case narrative.

## Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y

  The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

An Employee-Owned Company 1317	South 13th Ave. • Kels	so, WA 98626	(360) 577-7	222 • (800) 69	95-7222 • F	 AX (360) (	536 <b>-</b> 1068		PAGE	1	OF	. 1		_ <u></u> COC #	
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III. Data Validation Report (includes all raw data)	5 Day														
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' Columbia Analytical Services Cooler Receipt And Preservation Project/Client Work Order K21 Cooler.received on and opened on 4 1. Were custody seals on outside of cooler? If yes, how many and where? 2. Were seals intact and signature & date correct? 3. COC# Temperature of cooler(s) upon receipt: Temperature Blank: Were custody papers properly filled out (ink, signed, etc.)? Type of packing material present Did all bottles arrive in good condition (unbroken)? Were all bottle labels complete (i.e. analysis, preservation, etc.)? Did all bottle labels and tags agree with custody papers? Were the correct types of bottles used for the tests indicated? 10. Were all of the preserved bottles received at the lab with the appropriate pH? 11. Were VOA vials checked for absence of air bubbles, and if present, noted below?

4.

5.

6.

7.

8.

9.

12.

Explain any discrepancies

Samples that required preservation of	r received out	of temperati	ire:			
Sample ID	Reagent	Volume	Lot Number	Bottle Type	Rec'd out of Temperature	Initials
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Did the bottles originate from CAS/K or a branch laboratory?

NO

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2102370

Date Collected: 4/4/01 Date Received: 4/5/01 Date Extracted: NA

Inorganic Parameters Units: mg/L (ppm)

		Sample Name:	BXS-1	BXS-2	BXS-3
		Lab Code:	K2102370-001	K2102370-002	K2102370-003
	EPA				
Analyte	Method	MRL			
pH (units)	150.1		6.33	6.36	6.90
Conductivity (µmhos/cm)	120.1	2	506	884	901
Ammonia as Nitrogen	350.I	0.05	ND	ND	0.14
Chemical Oxygen Demand (COD)	410.2	5	27	47	79
Chloride	300.0	0.2	5.9	7.6	4.8
Nitrate+Nitrite as Nitrogen	353.2	0.2	0.2	ND	ND
Solids, Total Dissolved (TDS)	160.1	10	284	456	556
Sulfate	300.0	0.2	8.3	0.4	0.4
Tannin and Lignin	<i>SM555</i> 0B	0.2	0.4	0.9	3.2
Carbon, Total Organic (TOC)	415.1	0.5	7.5	14.6	26.1

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

3S10EPA/102094 02J70WET.PW1 - Mixed 4/23/01

SM

Date: 4/23/01 000!3

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2102370

Date Collected: 4/4/01

Date Received: 4/5/01 Date Extracted: NA

Inorganic Parameters Units: mg/L (ppm)

		Sample Name: Lab Code:	BXS-4 K2102370-004	<b>BXS-5</b> K2102370-005	<b>BXS-6</b> K2102370-006
Analyte	EPA Method	MRL			
pH (units)	150.1		7.87	5.40	6.01
Conductivity (µmhos/cm)	120.1	2	193	3	474
Ammonia as Nitrogen	350.1	0.05	0.48	ND	ND
Chemical Oxygen Demand (COD)	410.2	5	14	ND	27
Chloride	300.0	0.2	2.0	ND	5.8
Nitrate+Nitrite as Nitrogen	353.2	0.2	ND	ND	0.4
Solids, Total Dissolved (TDS)	160.1	10	134	ND	258
Sulfate	300.0	0.2	1.6	0.3	8.0
Tannin and Lignin	<i>SM</i> 5550B	0.2	0.2	ND	0.4
Carbon, Total Organic (TOC)	415.1	0.5	1.2	ND	7.5

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

SM

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2102370

Date Collected: NA Date Received: NA

Date Extracted: NA

Inorganic Parameters Units: mg/L (ppm)

		Sample Name: Lab Code:	Method Blank K2102370-MB	Method Blank K2102370-MB
Analyte	EPA Method	MRL		
Conductivity (µmhos/cm)	120.1	2	ND	-
Ammonia as Nitrogen	350.1	0.05	ND	-
Chemical Oxygen Demand (COD)	410.2	5	. ND	-
Chloride	300.0	0.2	ND	•
Nitrate+Nitrite as Nitrogen	353.2	0.2	ND	-
Solids, Total Dissolved (TDS)	160.1	10	ND	-
Sulfate	300.0	0.2	ND	-
Tannin and Lignin	SM5550B	0.2	ND	-
Carbon, Total Organic (TOC)	415.1	0.5	ND	ND

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By: \_\_\_

Date: 4/23/01

SM

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2102370

Date Collected: 4/4/01

Date Received: 4/5/01 Date Extracted: NA

Date Analyzed: 4/5/01

Coliform, Total SM 9221B Units: MPN/100 ml

Sample Name	Lab Code	MRL	Time Test Started		Result
BXS-2	K2102370-002	2	1700	hrs	17 (X)
BXS-3	K2102370-003	2	1700	hrs	ND(X)
BXS-4	K2102370-004	2	1700	hrs	ND(X)
BXS-5	K2102370-005	2	1700	hrs	ND(X)
BXS-6	K2102370-006	2	1700	hrs	ND (X)

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

SM

02370WET PW1 - BactTC 4/23/01

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2102370

Date Collected: 4/4/01 Date Received: 4/5/01

Date Extracted: 4/13/01

Dissolved Metals Units: mg/L (ppm)

		Sample Name: Lab Code: Date Analyzed:	<b>BXS-1</b> K2102370-001 4/16-19/01	<b>BXS-2</b> K2102370-002 4/16-19/01	BXS-3 K2102370-003 4/16-19/01
Analyte	EPA Method	MRL			
Arsenic	7060	0.005	ND	ND	0.016
Barium	6010B	0.005	0.025	0.050	0.067
Cadmium	6010B	0.004	ND	ND	ND
Copper	6010B	0.01	ND	ND	ND
Iron	6010B	0.02	ND	0.71	5.32
Manganese	6010B	0.005	0.341	1.47	16.2
Nickel	6010B	0.02	ND	0.03	ND
Zinc	6010B	0.01	ND	0.01	0.02

Approved By: 3S30EPA/102094

02370iCP.EA1 - Sample 4/19/01

Date: 4/20/01

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2102370

Date Collected: 4/4/01 Date Received: 4/5/01

Date Extracted: 4/13/01

Page No.:

Dissolved Metals Units: mg/L (ppm)

		Sample Name: Lab Code: Date Analyzed:	<b>BXS-4</b> K2102370-004 4/16-19/01	<b>BXS-5</b> K2102370-005 4/16-19/01	<b>BXS-6</b> K2102370-006 4/16-19/01
Analyte	EPA Method	MRL			
Arsenic	7060	0.005	0.005	ND	ND
Barium	6010B	0.005	0.026	ND	0.025
Cadmium	6010B	0.004	ND	ND	ND
Copper	6010B	0.01	ND	ND	ND
Iron	6010B	0.02	0.04	ND	ND
Manganese	6010B	0.005	0.116	ND	0.345
Nickel	6010B	0.02	ND	ND	ND
Zinc	6010B	0.01	ND	ND	0.01

Approved By: \_\_ 3S30EPA/102094

023701CP.EA1 - Sample (2) 4/19/01

## Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2102370

Date Collected: NA Date Received: NA Date Extracted: 4/13/01

Dissolved Metals Units: mg/L (ppm)

Sample Name: Lab Code: Method Blank

K2102370-MB

Date Analyzed:

4/16-19/01

	EPA		
Analyte	Method	MRL	
Arsenic	7060	0.005	ND
Barium	6010B	0.005	ND
Cadmium	6010B	0.004	ND
Copper	6010B	0.01	ND
Iron	6010B	0.02	ND
Manganese	6010B	0.005	ND
Nickel	6010B	0.02	ND
Zinc	6010B	0.01	ND

Approved By: 3S30EPA/102094 02370ICP.EA1 - Sample (3) 4/19/01

Date: \_\_\_\_\_\_\_

00019

Page No.:



August 7, 2001

Service Request No: K2104874

K2104907

Richard Morales
J.H. Baxter Company
1700 El Camino Real
P.O. Box 5902
San Mateo, CA 94402-0902

Re: J.H. Baxter & Co./BXS/BXN Wells

Dear Richard:

Enclosed are the results of the sample(s) submitted to our laboratory on July 10, 2001. For your reference, these analyses have been assigned our service request number K2104874.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3345.

Respectfully submitted,

Columbia Analytical Services, Inc.

Mingta Lin

Project Chemist

ML/ll

Page 1 of W

cc: Mary Larson, J.H. Baxter (Arlington) Lori Herman, Hart Crowser (Seattle)

## Acronyms

ASTM American Society for Testing and Materials

A2LA American Association for Laboratory Accreditation

CARB California Air Resources Board

CAS Number Chemical Abstract Service registry Number

CFC Chlorofluorocarbon
CFU Colony-Forming Unit

DEC Department of Environmental Conservation

DEQ Department of Environmental Quality

DHS Department of Health Services

DOE Department of Ecology
DOH Department of Health

EPA U. S. Environmental Protection Agency

ELAP Environmental Laboratory Accreditation Program

GC Gas Chromatography

GC/MS Gas Chromatography/Mass Spectrometry

LUFT Leaking Underground Fuel Tank

M Modified

MCL Maximum Contaminant Level is the highest permissible concentration of a

substance allowed in drinking water as established by the USEPA.

National Council of the Paper Industry for Air and Stream Improvement

MDL Method Detection Limit
MPN Most Probable Number
MRL Method Reporting Limit

NA Not Applicable

NC Not Calculated

ND Not Detected

**NCASI** 

NIOSH National Institute for Occupational Safety and Health

PQL Practical Quantitation Limit

RCRA Resource Conservation and Recovery Act

SIM Selected Ion Monitoring

TPH Total Petroleum Hydrocarbons

tr Trace level is the concentration of an analyte that is less than the PQL but greater

than or equal to the MDL.

#### **Inorganic Data Qualifiers**

- The result is an outlier. See case narrative.
- The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- The result is an estimate amount because the value exceeded the instrument calibration range.
- The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  - The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.

#### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- } The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- The reported value is estimated because of the presence of matrix interference.
- M The duplicate injection precision was not met.
- The Matrix Spike sample recovery is not within control limits. See case narrative.
- The reported value was determined by the Method of Standard Additions (MSA).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL has been elevated due to a matrix interference.
- See case narrative.
- The duplicate analysis not within control limits. See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.

#### **Organic Data Qualifiers**

- The result is an outlier. See case narrative.
- The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- 3 The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  - The MRL/MDL has been elevated due to a chromatographic interference.
- See case narrative.

## Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
  - The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- The chromatographic fingerprint does not resemble a petroleum product.



# CHAIN OF CUSTODY

SR#: 1210440'/

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068 PROJECT NAME T. H. Baxt PROJECT NUMBER andfill PROJECT MANAGER REMARKS SAMPLE I.D. LAB I.D. MATRIX DATE TIME 7-10 MAGE BXS-Water 2 7-10 2:000 7-10 3:00 pm 7-10 10:15Am 7-10 8130Am 7-10 12:00pm INVOICE INFORMATION Circle which metals are to be analyzed: REPORT REQUIREMENTS P.O. # X I. Routine Report: Method Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg Bill To: J.H. Bartortco. PO BOX 5902 San Matro, CA 94402 Blank, Surrogate, as Dissolved Metals) AI (As) Sb (Ba) Be B Ca (Cd) Co Cr (Cu) (Fe) Pb Mg (Mn) Mo (Ni) K Ag Na Se Sr TI Sn V (Zn) Hg required \*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORHTWEST OTHER: (CIRCLE ONE) \_\_ II. Report Dup., MS, MSD as TURNAROUND REQUIREMENTS SPECIAL INSTRUCTIONS/COMMENTS: required 24 hr. \_\_\_ III. Data Validation Report 5 Day (includes all raw data) X Standard (10-15 working days) Attn: Georgia Baxter Mary Larson \_\_\_ IV. CLP Deliverable Report Provide FAX Results Field Filtered -\_\_\_ V. EDD Requested Report Date RECEWED BY **RELINQUISHED BY: RELINQUISHED BY:** RECEIVED BY: Signature Date/Time Signature Date/Time Printed Name Firm **Printed Name** Firm

# SHORTHOLDIME

# Cooler Receipt And Preservation Form

.00ופר.ת	eceived on 7/11/0	1_ and opened	on 4/1/11/	1 by Pat			•
		-			aet		
•	Were custody seals of If yes, how many an			Hront			(ES
-	Were seals intact and	l signature & d	ate correct?				(YES
	COC#						·
	Temperature of coole	r(s) upon recei	pt:	<u>5.5</u> <u>2.8</u>	******		
	Temperature Blank:			5.7 3.1		<del>-</del>	
	Were custody papers	properly filled	out (ink, signe	xd, etc.)?			YES
	Type of packing mate	rial present	Mossic-	bwy?			
	Did all bottles arrive	in good conditi	on (unbroken)	?	_		(YES)
	Were all bottle labels	complete (i.e. :	malysis, prese	rvation, etc.)?	•		YES
	Did all bottle labels at	id tags agree w	ith custody pag	cers?			YES
•	Were the correct types	of bottles used	for the tests in	dicated?			YES
	Were all of the preserv	ved bottles rece	ived at the lab	with the appropriate pH	?		YES
	Were VOA vials check	ced for absence	of air bubbles	, and if present, noted b	elow?		YES ?
	Did the bottles origina	te from CAS/K	or a branch la	boratory?			(YES) N
	Sample ID	Reagent	Volume			1 ±	
			Tolume	Lot Number	Bottle Type	Rec'd out of Temperature	Initials
			Volume	Lot Number	Bottle Type	1 _ 1	Initials
			Volume	Lot Number		1 _ 1	Initials
			Volume	Lot Number		1 _ 1	Initials
			Volume	Lot Number		1 _ 1	Initials
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				- 1 To	Type	1 _ 1	Initials

Client:

J.H. Baxter & Company

Service Request No.:

K2104874 K2104907

Project:

BXS/BXN Wells

Date Received:

July10 &11, 2001

Sample Matrix:

Water

#### CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier I data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses.

#### Sample Receipt

Twelve water samples were received for analysis at Columbia Analytical Services on July 10 &11, 2001. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### **Inorganic Parameters**

The samples were receive past the recommended holding time of 24 hours for Total Coliform and pH analysis.

No QA/QC anomalies were observed during the analysis of these samples.

#### **Dissolved Metals**

No QA/QC anomalies were observed during the analysis of these samples.

Date	<u> 81</u>	7	l	01

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2104907

Date Collected: 7/10/01 Date Received: 7/11/01 Date Extracted: NA

**Inorganic Parameters** Units: mg/L (ppm)

		Sample Name: Lab Code:	<b>BXS-1</b> K2104907-001	<b>BXS-2</b> K2104907-002	<b>BXS-3</b> K2104907-003
Analyte	EPA Method	MRL			
pH (units)	150.1	•••	6.09	6.44	6.64
Conductivity (µmhos/cm)	120.1	2	489	890	885
Bicarbonate Alkalinity as CaCO <sub>3</sub>	SM 2320B	2	242	496	498
Ammonia as Nitrogen	350.1	0.05	ND	ND	0.11
Chemical Oxygen Demand (COD)	410.2	5	23	46	71
Chloride	300.0	0.2	5.6	6.7	4.4
Nitrate+Nitrite as Nitrogen	353.2	0.2	0.4	ND	ND
Solids, Total Dissolved (TDS)	160.1	5	212	320	420
Sulfate	300.0	0.2	7.2	0.3	0.2
Tannin and Lignin	SM 5550B	0.2	0.5	1.4	6.4
Carbon, Total Organic (TOC)	415.1	0.5	6.8	15.1	25.9

SM

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By:

3S30EPA/102094

04907WET.PW1 - Mixed 7/25/01

00005

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2104907 Date Collected: 7/10/01

Date Received: 7/11/01 Date Extracted: NA

**Inorganic Parameters** Units: mg/L (ppm)

		Sample Name: Lab Code:	<b>BXS-4</b> K2104907-004	<b>BXS-5</b> K2104907-005	<b>BXS-6</b> K2104907-006
Analyte	EPA Method	MRL			
pH (units)	150.1	·	7.96	5.53	6.12
Conductivity (µmhos/cm)	120.1	2	193	ND	490
Bicarbonate Alkalinity as CaCO <sub>3</sub>	SM 2320B	2	96	ND	250
Ammonia as Nitrogen	350.1	0.05	0.53	ND	ND
Chemical Oxygen Demand (COD)	410.2	5	38	ND	24
Chloride	300.0	0.2	2.0	ND	5.5
Nitrate+Nitrite as Nitrogen	353.2	0.2	ND	ND	0.4
Solids, Total Dissolved (TDS)	160.1	5	134	ND	262
Sulfate	300.0	0.2	1.6	ND	7.1
Tannin and Lignin	SM 5550B	0.2	0.4	ND	0.5
Carbon, Total Organic (TOC)	415.1	0.5	9.3	ND	7.3

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

SM

Approved By: 3S30EPA/102094 04907WET.PW1 - Mixed (2) 7/25/01

00006

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2104907

Date Collected: NA Date Received: NA

Date Extracted: NA

**Inorganic Parameters** Units: mg/L (ppm)

Sample Name:

Method Blank

Lab Code:

K2104907-MB

Analyte	EPA Method	MRL	
Conductivity (µmhos/cm) Bicarbonate Alkalinity as CaCO <sub>3</sub> Ammonia as Nitrogen Chemical Oxygen Demand (COD) Chloride Nitrate+Nitrite as Nitrogen Solids, Total Dissolved (TDS) Sulfate Tannin and Lignin	120.1 SM 2320B 350.1 410.2 300.0 353.2 160.1 300.0 SM 5550B	2 2 0.05 5 0.2 0.2 5 0.2 0.2	ND ND ND ND ND ND ND ND
Carbon, Total Organic (TOC)	415.1	0.5	ND

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

SM

Date: 125/01 Approved By: 3S30EPA/102094 04907WET.PW1 - Mixed (3) 7/25/01

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2104907

Date Collected: 7/10/01

Date Received: 7/11/01 Date Extracted: NA

Date Analyzed: 7/11/01

Coliform, Total SM 9221B Units: MPN/100 ml

			Time Test	•	
Sample Name	Lab Code	MRL	Started		Result
BXS-1	K2104907-001	2	1600	hrs	ND
BXS-2	K2104907-002	2	1600	hrs	500
BXS-3	K2104907-003	2	1600	hrs	ND
BXS-4	K2104907-004	2	1600	hrs	ND
BXS-5	K2104907-005	2	1600	hrs	ND
3XS-6	K2104907-006	2	1600	hrs	ND

SM

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By: 04907WET.PW1 - BactTC 7/25/01

00008

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

04907ICP.JC1 - Sample 7/24/01

Service Request: K2104907

Date Collected: 7/10/01

Date Received: 7/11/01 Date Extracted: 7/16/01

Dissolved Metals Units: µg/L (ppb)

		Sample Name: Lab Code: Date Analyzed:	<b>BXS-1</b> K2104907-001 7/17-23/01	<b>BXS-2</b> K2104907-002 7/17-23/01	<b>BXS-3</b> K2104907-003 7/17-23/01
Analyte	EPA Method	MRL			
Arsenic	7060A	5	ND	ND	9
Barium	6010B	5	27	53	64
Cadmium	6010B	4	ND	ND	ND
Copper	6010B	10	ND	ND	ND
Iron	6010B	20	ND	736	<b>85</b> 30
Manganese	6010B	5	396	1540	17100
Nickel	6010B	20	27	41	38
Zinc	6010B	10	ND	ND	ND

Approved By: 3S30EPA/102094

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

Service Request: K2104907

Date Collected: 7/10/01 Date Received: 7/11/01

Date Extracted: 7/16/01

Dissolved Metals Units: µg/L (ppb)

		Sample Name: Lab Code: Date Analyzed:	<b>BXS-4</b> K2104907-004 7/17-23/01	BXS-5 K2104907-005 7/17-23/01	BXS-6 K2104907-006 7/17-23/01
Analyte	EPA Method	MRL			
Arsenic	7060A	5	5	ND	ND
Barium	6010B	5	32	ND	27
Cadmium	6010B	4	ND	ND	ND
Copper	6010B	10	ND	ND	ND
Iron	6010B	20	438	ND	ND
Manganese	6010B	5	123	ND	400
Nickel	6010B	20	ND	ND	26
Zinc	6010B	10	ND	ND	ND

Approved By:

3S30EPA/102094 04907ICP.JC1 - Sample (2) 7/24/01

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Arlington Plant Groundwater/BXS-WELLS

Sample Matrix: Water

04907ICP.JC1 - Sample (3) 7/24/01

Service Request: K2104907

Date Collected: NA Date Received: NA Date Extracted: 7/16/01

Dissolved Metals Units: µg/L (ppb)

Sample Name:

Method Blank

Lab Code:

K2104907-MB

Date Analyzed:

7/17-23/01

	EPA		
Analyte	Method	MRL	
Arsenic	7060A	5	ND
Barium	6010B	5	ND
Cadmium	6010B	4	ND
Copper	6010B	10	ND
Iron	6010B	20	ND
Manganese	6010B	5	ND
Nickel	6010B	20	ND
Zinc	6010B	10	ND

Approved By: 3S30EPA/102094

00011



November 16, 2001

Service Request No: K2107313

K2107398

K2107506

Georgia Baxter
J.H. Baxter Company
1700 El Camino Real
P.O. Box 5902
San Mateo, CA 94402-0902

Re: J.H. Baxter & Co/BXS-WELLS/BXN WELLS-LANDFILL

Dear Georgia:

Enclosed are the results of the sample(s) submitted to our laboratory on October 4, 2001. For your reference, these analyses have been assigned our service request number K2107313, K2107398 and K2107506.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3345.

Respectfully submitted,

Columbia Analytical Services, Inc.

Mingta Lin

**Project Chemist** 

ML/afs

Page 1 of

cc: Mary Larson, J.H. Baxter (Arlington, WA) Lori Herman, Hart Crowser (Seattle, WA)

#### Acronyms

ASTM American Society for Testing and Materials

A2LA American Association for Laboratory Accreditation

CARB California Air Resources Board

CAS Number Chemical Abstract Service registry Number

CFC Chlorofluorocarbon
CFU Colony-Forming Unit

DEC Department of Environmental Conservation

DEQ Department of Environmental Quality

DHS Department of Health Services

DOE Department of Ecology

DOH Department of Health

EPA U. S. Environmental Protection Agency

ELAP Environmental Laboratory Accreditation Program

GC Gas Chromatography

GC/MS Gas Chromatography/Mass Spectrometry

LUFT Leaking Underground Fuel Tank

M Modified

MCL Maximum Contaminant Level is the highest permissible concentration of a substance

allowed in drinking water as established by the USEPA.

MDL Method Detection Limit
MPN Most Probable Number

MRL Method Reporting Limit

NA Not Applicable
NC Not Calculated

NCASI National Council of the Paper Industry for Air and Stream Improvement

ND Not Detected

NIOSH National Institute for Occupational Safety and Health

PQL Practical Quantitation Limit

RCRA Resource Conservation and Recovery Act

SIM Selected Ion Monitoring

TPH Total Petroleum Hydrocarbons

tr Trace level is the concentration of an analyte that is less than the PQL but greater

than or equal to the MDL.

#### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRLMDL.
- The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.

#### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- B The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- E The reported value is estimated because of the presence of matrix interference.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL has been elevated due to a matrix interference.
- X See case narrative.
- \* The duplicate analysis not within control limits. See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.

#### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result.
- The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- The result is an estimate amount because the value exceeded the instrument calibration range.
- The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
- U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
  - The MRL/MDL has been elevated due to a chromatographic interference.
- See case narrative.

#### Additional Petroleum Hydrocarbon Specific Qualifiers

- The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
  - ' The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.

The chrcmatographic fingerprint does not resemble a petroleum product.



## **CHAIN OF CUSTODY**

SR#: \(\(\text{L2107313}\) \(\text{PAGE}\) \(\text{OF}\) \(\text{COC}\) \(\text{COC}\) \(\text{T}\)

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068 PROJECT NAME\_ Semivolatile Organics by GCM/S PROJECT NUMBER PHONE # 360 435 - 3 SAMPLER'S GIGNAPHIN REMARKS LAB I.D. MATRIX SAMPLE I.D. DATE TIME Water 10-2-61 10:00AN 2 INVOICE INFORMATION Circle which metals are to be analyzed: REPORT REQUIREMENTS P.O. # Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg BIII To: J.H. Baxterico I. Routine Report: Method PO BOX 590 Z San Matro CA 9440Z Dissolved Metals: Al (As) Sb (Ba) Be B Ca (Cd) Co Cr (Cu) (Fe) Pb Mg (Mn) Mo (Ni) K Ag Na Se Sr Tl Sn v (Zn) Hg Blank, Surrogate, as required (CIRCLE ONE) \*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORHTWEST OTHER: II. Report Dup., MS, MSD as TURNAROUND REQUIREMENTS SPECIAL INSTRUCTIONS/COMMENTS: required 24 hr. \_ III. Data Validation Report 5 Day (includes all raw data) X Standard (10-15 working days) Attn: Georgia Baxter Mary Larson IV. CLP Deliverable Report Provide FAX Results V. EDD Field Filtered Requested Report Date **RELINQUISHED BY:** RECEIVED BY: **RELINQUISHED BY: RECEIVED BY:** Date/Time Date/Time Signature Signature Firm **Printed Name Printed Name** Firm

### Columbia Analytical Services Inc. Cooler Receipt And Preservation Form

Project/Cl	ient (	A. BA.	de L	Work Order K21		7313	
Cooler rec	141	nd opened on	10/4/1	by y	4		`
1.	Were custody seals on ou If yes, how many and wh	utside of coole		Jen 1X.	Back		YES NO
2.	Were seals intact and sig	nature & date	correct?			**	YES NO
3.	COC#		·				
	Temperature of cooler(s)	upon receipt:	<b>,</b> , , , , , , , , , , , , , , , , , ,	7,3 10,0	L lord	<u> </u>	
	Temperature Blank:			8.6 108	Les	3	<u> </u>
4.	Were custody papers pro	perly filled ou	ıt (ink, signed	1, etc.)?	~	@	(YES)NO
5.	Type of packing material	present		Langalle.	i seit		$\widetilde{}$
6.	Did all bottles arrive in g	good condition	(unbroken)?				(YES NO
<b>7.</b>	Were all bottle labels cor	mplete (i.e. an	a <del>lys</del> is, preser	vation, etc.)?			YES NO
8.	Did all bottle labels and	tags agree wit	h custody pap	ers?			YES NO
9.	Were the correct types of	bottles used f	for the tests in	dicated?			YES VO
10.	Were all of the preserved	l bottles receiv	ed at the lab	with the appropriate pH	and/or Cl2/	Res negative?	YES NO
11.	Were VOA vials checked	d for absence	of air bubbles	, and if present, noted b	elow?		TES NO
12.	Did the bottles originate	from CAS/K	or a branch la	lboratory?	<del></del>	• •	YÊS NO
Explain		Or .	y any	as hold i	7	· off	discrepancies
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## CHAIN OF CUSTODY

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Analytical Services **		•					14 0									PΑ	AGE	- }		OF		*	COC	#		_
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SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX /	1 ₹	\&\ \&\&\	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	£.@/	O Fuel	0  8  4 413.9	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	908	5.	A.	\Q\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	<b>\</b> \$&	\ <del>`</del> \$	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	<u> </u>	/ 2		<u> </u>	_		REMARKS	
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REPORT REQUIREM	MENTS		DICE INFO	RMATIO	N	Circle	e which r	netals	are to	be ana	alyzed:	i														
I. Routine Report:		P.O.# Bill To:	TURA	TEV 41		To	tal Metal	s: Al	As	Sb B	Ba Be	вс	a Cd	Со	Cr C	u Fe	Pb	Mg N	∕In M	o Ni	K A	g Na	Se S	Sr TI	Sn V Zn Hg	
Blank, Surrogate		20.1	Sox S	102	— ·	Disso	olved Meta	ais: Al	l As	Sb E	За Ве	∌ В С	a Cd	Со	Cr C	u Fe	Pb	Mg I	Mn M	lo Ni	K A	g Na	Se	Sr TI	Sn V Zn Hg	j
required		SAMM	nteo,C	A,94	402	*INE	DICATE	STA	TE HY	/DRO	CARE	ON P	ROCE	DUR	E: A	K C	A W	l NC	)RHT\	NEST	OTH	HER:_		(CII	RCLE ONE)	
II. Report Dup., MS required	S, MSD as	TURNA	ROUND RE		ENTS	SPE	CIAL IN	ISTR	UCTI	ONS/0	COM	/ENT	S:													
III. Data Validation	Report		hr	48 hr.																						
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# Cohen branday tical Services Inc. Cooler Receipt And Preservation Form

Project/Clie	nt JH BAKE		Poliota	Work Order K21	/m	0750	6-
Cooler recei	Were custody seals on out If yes, how many and whe	dopened on _ side of cooler re?	1 1	Front.	) ()		YES NO
2.	Were seals intact and signa		orrect?			C	YES NO
3.	COC#		-				
	Temperature of cooler(s)	mon receipt:		D.6	***************************************		<del></del>
	Temperature Blank:		. J	<u>D-</u> D	·		
4.	Were custody papers prop	erly filled out	(ink, signed,	, etc.)?			YES NO
5.	Type of packing material	present	10	, publics.			<u> </u>
6.	Did all bottles arrive in go	ood condition	(unbroken)?				YES NO
7.	Were all bottle labels com	plete (i.e. ana	llysis, preserv	vation, etc.)?			MES NO
8.	Did all bottle labels and to	igs agree with	custody pape	ers?			YES NO
9.	Were the correct types of	bottles used fo	or the tests in	dicated?			(YES NO
10.	Were all of the preserved	bottles receiv	ed at the lab	with the appropriate pl	I and/or Cl2/I	Res negative?	YES NO
11.	Were VOA vials checked	for absence of	of air bubbles,	and if present, noted l	below?		¥ <del>ES N</del> O
12.	Did the bottles originate i	rom CAS/K	or a branch la	boratory?			YES NO
Explain	Report 1	728CZ	any	$\mathcal{A}_{\mathcal{A}}$			discrepancies
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Samples t	nat required preservation or Sample ID	Reagent	Volume	Lot Number	Bottle Type	Rec'd out of Temperature	Initials
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	4.						
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#### Analytical Report

Client:

J.H. Baxter & Company

Project:

BXS-Wells-Landfill

Sample Matrix: Water

Service Request: K2107506 Date Collected: 10/09/01

Date Received: 10/10/01 Date Extracted: NA

Date Analyzed: 10/10/01

Coliform, Total SM 9221B Units: MPN/100 ml

Sample Name	Lab Code	MRL	Started		Result
BXS-1	K2107506-001	2	·· - 1855	hrs	ND
BXS-2	K2107506-002	2	1855	hrs	ND
BXS-3	K2107506-003	2	1855	hrs	900
BXS-4	K2107506-004	2	1855	hrs	2
BXS-5	K2107506-005	2	1855	hrs	ND
BXS-6	K2107506-006	2	1855	hrs	ND

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

SM

Approved By:

BACT/102194

Date: 10/24/01

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

J.H. Baxter & Co./BXS-WELLS Landfill

Sample Matrix: Water

Service Request: K2107313

Date Collected: 10/2/01

Date Received: 10/4/01

Date Extracted: NA

Inorganic Parameters Units: mg/L (ppm)

		Sample Name: Lab Code:	<b>BXS-1</b> K2107313-001	<b>BXS-2</b> K2107313-002	<b>BXS-3</b> K2107313-003
Analyte	EPA Method	MRL			
pH (units)	150.1		6.07	6.27	6.36
Conductivity (µmhos/cm)	120.1	2	504	861	887
Ammonia as Nitrogen	350.1	0.05	ND	ND	ND
Chemical Oxygen Demand (COD)	410.2	5 .	18	37	60
Chloride	300.0	0.2	4.3	6.7	4.1
Nitrate as Nitrogen	300.0	0.1	0.3	0.3	0.3
Nitrite as Nitrogen	300.0	0.1	ND	ND	0.2
Sulfate	300.0	0.2	6.7	0.3	0.2
Tannin and Lignin	SM5550B	0.2	0.6	2.8	21.6
<del>-</del>	415.1	0.5	7.1	13.7	21.6
Carbon, Total Organic (TOC) Solids, Total Dissolved (TDS)	160.1	5	262	420	408

Standard Methods for the Examination of Water and Wastewater , 18th  ${\rm E}^{\prime}$ 

Approved By: \_

SM

3S30EPA/102094 07313WET.DM1 - Mixed 10/22/01

Date: 16/22/01 011007

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

J.H. Baxter & Co./BXS-WELLS Landfill

Sample Matrix: Water

Service Request: K2107313

Date Collected: 10/2/01 Date Received: 10/4/01

Date Extracted: NA

Inorganic Parameters Units: mg/L (ppm)

	e de la companya de La companya de la co		A Company		,
		Sample Name:	BXS-4	BXS-5	BXS-6
		Lab Code:	K2107313-004	K2107313-005	K2107313-006
Analyte	EPA Metho <del>d</del>	MRL			
pH (units)	150.1		7.58	5.92	5.96
Conductivity (µmhos/cm)	120.1	2	195	6	500
Ammonia as Nitrogen	350.1	0.05	0.37	ND	ND
Chemical Oxygen Demand (COD)	410.2	5 .	10	ND	19
Chloride	300.0	0.2	2.0	ND	4.3
Nitrate as Nitrogen	300.0	0.1	0.2	0.3	0.3
Nitrite as Nitrogen	300.0	0.1	ND	ND	ND ·
Sulfate	300.0	0.2	1.2	ND	6.5
Tannin and Lignin	SM 5550B	0.2	0.5	ND	0.8
Carbon, Total Organic (TOC)	415.1	0.5	0.9	ND	7.1
Solids, Total Dissolved (TDS)	160.1	5	140	8	274

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

SM

Approved By:

3S30EPA/102094 07313WET.DM1 - Mixed (2) 10/22/01

Date: 10/22/01

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

J.H. Baxter & Co./BXS-WELLS Landfill

Sample Matrix: Water

Service Request: K2107313

Date Collected: 10/2/01 Date Received: 10/4 01

Date Extracted: NA

Inorganic Parameters Units: mg/L (ppm)

Sample Name:

Method Blank

Lab Code:

K2107313-MB

Analyte	EPA Method	MRL	🛥 u
pH (units)	150.1		-
Conductivity (µmhos/cm)	120.1	2	ND
Ammonia as Nitrogen	350.1	0.05	ND
Chemical Oxygen Demand (COD)	410.2	5 .	ND
Chloride	300.0	0.2	ND
Nitrate as Nitrogen	300.0	0.1	ND
Nitrite as Nitrogen	300.0	0.1	ND
Sulfate	300.0	0.2	ND
Tannin and Lignin	<i>SM</i> 5550B	0.2	ND
Carbon, Total Organic (TOC)	415.1	0.5	ND
Solids, Total Dissolved (TDS)	160.1	5	ND

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By:

SM

3S30EPA/102094 07313WET.DM1 - Mixed (3) 10/22/01

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

J.H. Baxter & Co./BXS-WELLS Landfill

Sample Matrix: Water

Service Request: K2107313

Date Collected: 10/2/01 Date Received: 10/4/01

Date Extracted: NA Date Analyzed: 10/4/01

Coliform, Total SM 9221B Units: MPN/100 ml

			Time Test		
Sample Name	Lab Code	MRL	Started		Result
·					
BXS-1	K2107313-001	2	1330	hrs	ND
BXS-2	K2107313-002	2	1330	hrs	ND
BXS-3	K2107313-003	2	1330	hrs	500
BXS-4	K2107313-004	2	1330	hrs	8
BXS-5	K2107313-005	2	1330	hrs	ND
BXS-6	K2107313-006	2	1330	hrs	ND

SM

Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992.

Approved By: \_ 07313WET.DM1 - BactTC 10/22/01

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

J.H.Baxter & Co./ BXS-WELLS Landfill

Sample Matrix: Water

Service Request: K2107313 Date Collected: 10/2/01

Date Received: 10/4/01

Date Extracted: 10/16/01

Dissolved Metals Units: µg/L (ppb)

		Sample Name: Lab Code: Date Analyzed:	BXS-1 K2107313-001 10/19-23/01	<b>BXS-2</b> K2107313-002 10/19-23/01	<b>BXS-3</b> K2107313-003 10/19-23/01
Analyte	EPA Method	MRL	<del>-</del> -		
Arsenic	7060A	5	ND	ND	5
Barium	6010B	5	31	50	49
Cadmium	6010B	5	ND	ND	ND
Copper	6010B	10	ND	ND	ND
Iron	6010B	20 -	ND	789	4740
Manganese	6010B	5	556	1580	13600
Nickel	6010B	20	24	39	ND
Zinc	6010B	10	13	11	ND

Date: 10/260 Approved By: \_ 3S30EPA/102094

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

J.H.Baxter & Co./ BXS-WELLS Landfill

Sample Matrix: Water

Service Request: K2107313 Date Collected: 10/2/01

Date Received: 10/4/01

Date Extracted: 10/16/01

Dissolved Metals Units: µg/L (ppb)

	,				
		ample Name: Lab Code: nte Analyzed:	<b>BXS-4</b> K2107313-004 10/19-23/01	BXS-5 K2107313-005 10/19-23/01	<b>BXS-6</b> K2107313-006 10/19-23/01
Analyte	EPA Method	 MRL			
Arsenic	7060A	5	5	ND	ND
Barium	6010B	5	26	ND	28
Cadmium	6010B	5	ND	ND	ND
Copper	6010B	10	ND	ND	ND
Iron	6010B	20	35	ND	~ND
Manganese	6010B	5	114	ND	534
Nickel	6010B	20	ND	ND	21
Zinc	6010B	10	ND	ND	12

Date: 10/2001 Approved By: 3S30EPA/102094

#### Analytical Report

Client:

J.H. Baxter & Company

Project:

Sample Matrix: Water

J.H.Baxter & Co./ BXS-WELLS Landfill

Service Request: K2107313 Date Collected: NA

Date Received: NA

Date Extracted: 10/16/01

Dissolved Metals Units: µg/L (ppb)

**Method Blank** Sample Name: Lab Code: K2107313-MB Date Analyzed: 10/19-23/01

	EPA		
Analyte	Method	MRL	· ·
Arsenic	7060A	5	ND
Barium	6010B	5	ND
Cadmium	6010B	5 -	ND
Copper	6010B	10	ND
Iron	6010B	20	ND
Manganese	6010B	5	ND
Nickel	6010B	20	ND
Zinc	6010B	10	ND

Date: \_\_\_ Approved By: \_ 3S30EPA/102094

## **Appendix C**

Statistical Analysis of Groundwater Quality Results (BXS-1 through BXS-4)

## Field pH

4-Oct-01

6.91

6.89

7.52

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

4 253

17-Jan-01

8.07

8.07

7.92

3-Apr-01

7.52

8.07

8.07

9-Jul-01

6.89

7.52

8.07

Critical Statistic  $t_c$ 

26-Jul-00

7.74

7.59

5-Oct-00

7.92

7.74

7.59

20-Apr-00

7.59

BXS-4

2.353

16-Jan-01

8.07

7.92

7.74

BXS-1				1.00	1.14	1.32	0.07	0.01	1.02
BXS-1					7.59	7.74	7.92	8.07	8.07
T.50   S.10   S.20	Average Concentration (Upgradient Well)			m <sub>o</sub>	7.88	7.86	7.69	7.49	7.35
T.50   S.10   S.20									
T.50   S.10   S.20					,			-	
T.50   6.18   6.22   6.25   6.07   6.08   6.22   6.25   6.07   6.55   6.07   7.50   6.18   6.22   6.25   6.55   6.07   7.50   6.18   6.22   6.22   6.55	BXS-1	7.50	6.18	6.22	6.22	6.55	6.07	7.26	5.71
Average Concentration (Downgradient Well)  Sample variance (Downgradient Well)  Sample Standard Deviation  Sample Standard Deviation  Student's T-Test Statistic  T,53  6,52  6,47E-01  1,73E-01  2,98E-02  4,11E-02  2,08E-01  4,49E-01  5,75E-01  5,			7.50	6.18	6.22	6.22	6.55	6.07	7.26
Name				7.50	6.18	6.22	6.22	6.55	6.07
Sample variance (Downgradient Well)   S   4.19E-01   2.98E-02   4.11E-02   2.80E-01   4.49E-01   5.28mple Standard Deviation   Student's T-Test Statistic   Stat					7.50	6.18	6.22	6.22	6.55
Sample Standard Deviation   Student's T-Test Statistic   State   Sta	Average Concentration (Downgradient Well)			X <sub>bar</sub>	6.53	6.29	6.27	6.53	6.40
Student's T-Test Statistic   Total Statistic	Sample variance (Downgradient Well)			s²	4.19E-01	2.98E-02	4.11E-02	2.80E-01	4.49E-01
BXS-2	Sample Standard Deviation			s	6.47E-01	1.73E-01	2.03E-01	5.29E-01	6.70E-01
7.53   6.52   6.45   6.73   6.73   6.47   8.37	Student's T-Test Statistic			$t_{stat}$	-1.042	-4.550	-3.524	-0.913	-0.709
7.53   6.52   6.45   6.73   6.73   6.47   8.37									
T.53   6.52   6.45   6.73   6.73   6.47	BXS-2	7.53	6.52	6.45	6.73	6.73	6.47	8.37	6.05
Average Concentration (Downgradient Well)  X bar  Sample variance (Downgradient Well)  Sample Standard Deviation  Student's T-Test Statistic  BXS-3  7.51  6.58  6.39  7.51  6.58  6.39  7.51  6.58  6.39  7.51  6.58  6.39  7.51  6.58  6.39  7.51  6.58  6.39  7.51  6.58  6.39  7.51  6.58  6.39  7.51  6.58  6.39  7.51  6.58  6.39  7.51  6.58  6.39  7.51  7.51  6.58  6.39  7.51  7.51  6.58  6.39  7.51  7.51  6.58  6.39  7.51  7.51  6.58  6.39  7.51  7.51  6.58  6.39  7.51  7.51  6.58  6.39  7.51  7.51  6.58  6.39  7.51  7.51  6.58  6.39  7.51  7.51  6.58  6.39  7.51  7.51  7.51  6.58  6.39  7.51  7.51  6			7.53	6.52	6.45	6.73	6.73	6,47	8.37
Average Concentration (Downgradient Well)         X bar         6.81         6.61         6.60         7.08         6.91           Sample variance (Downgradient Well)         S²         2.46E-01         2.08E-02         2.44E-02         7.60E-01         1.03E+00           Sample Standard Deviation         S         4.96E-01         1.44E-01         1.56E-01         8.72E-01         1.02E+00           Student's T-Test Statistic         t <sub>stat</sub> 6.208         22.295         20.475         3.753         3.068           BXS-3         7.51         6.58         6.39         7.11         7.11         6.49         7.87         6.70           7.51         6.58         6.39         7.11         7.11         6.49         7.87         6.70           Average Concentration (Downgradient Well)         X <sub>bar</sub> 6.90         6.80         6.78         7.15         7.04           Sample variance (Downgradient Well)         S²         2.60E-01         1.36E-01         1.51E-01         3.19E-01         3.71E-01           Sample Standard Deviation         S         5.09E-01         3.69E-01         5.65E-01         6.09E-01				7.53	6.52	6.45	6.73	6.73	6.47
Sample variance (Downgradient Well)         s²         2.46E-01         2.08E-02         2.44E-02         7.60E-01         1.03E+00           Sample Standard Deviation         s         4.96E-01         1.44E-01         1.56E-01         8.72E-01         1.02E+00           Student's T-Test Statistic         t <sub>stat</sub> 6.208         22.295         20.475         3.753         3.068           BXS-3         7.51         6.58         6.39         7.11         7.11         6.49         7.87         6.70           7.51         6.58         6.39         7.11         7.11         6.49         7.87           7.51         6.58         6.39         7.11         7.11         6.49         7.87           7.51         6.58         6.39         7.11         7.11         6.49         7.87           7.51         6.58         6.39         7.11         7.11         6.49           Average Concentration (Downgradient Well)         X         6.90         6.80         6.78         7.15         7.04           Sample variance (Downgradient Well)         s²         2.60E-01         1.36E-01         1.51E-01         3.19E-01         3.71E-01           Sample Standard Deviation         s         5.09E-					7.53	6.52	6.45	6.73	6.73
Sample Standard Deviation         \$ stat         4.96E-01         1.44E-01         1.56E-01         8.72E-01         1.02E+00           Student's T-Test Statistic         \$ stat         4.96E-01         1.44E-01         1.56E-01         8.72E-01         1.02E+00           BXS-3         7.51         6.58         6.39         7.11         7.11         6.49         7.87           7.51         6.58         6.39         7.11         7.11         6.49         7.87           7.51         6.58         6.39         7.11         7.11         6.49         7.87           Average Concentration (Downgradient Well)         X bar         6.90         6.80         6.78         7.15         7.04           Sample variance (Downgradient Well)         \$ 2         2.60E-01         1.36E-01         1.51E-01         3.19E-01         3.71E-01           Sample Standard Deviation         \$ 5.09E-01         3.69E-01         3.89E-01         5.65E-01         6.09E-01	Average Concentration (Downgradient Well)			X <sub>bar</sub>	6.81	6.61	6.60	7.08	6.91
Student's T-Test Statistic   t <sub>stat</sub>   6.208   22.295   20.475   3.753   3.068   3.0	Sample variance (Downgradient Well)			s²	2.46E-01	2.08E-02	2.44E-02	7.60E-01	1.03E+00
BXS-3   7.51   6.58   6.39   7.11   7.11   6.49   7.87   6.70     7.51   6.58   6.39   7.11   7.11   6.49   7.87     7.51   6.58   6.39   7.11   7.11   6.49   7.87     7.51   6.58   6.39   7.11   7.11   6.49     7.51   6.58   6.39   7.11   7.11   6.49     7.51   6.58   6.39   7.11   7.11   7.11     Average Concentration (Downgradient Well)   X   6.90   6.80   6.78   7.15   7.04     Sample variance (Downgradient Well)   S²   2.60E-01   1.36E-01   1.51E-01   3.19E-01   3.71E-01     Sample Standard Deviation   S   5.09E-01   3.69E-01   5.65E-01   6.09E-01	Sample Standard Deviation			s	4.96E-01	1.44E-01	1.56E-01	8.72E-01	1.02E+00
7.51 6.58 6.39 7.11 7.11 6.49 7.87  7.51 6.58 6.39 7.11 7.11 6.49 7.87  7.51 6.58 6.39 7.11 7.11 6.49  7.51 6.58 6.39 7.11 7.11 6.49  7.51 6.58 6.39 7.11 7.11 7.11  Average Concentration (Downgradient Well)  X bar 6.90 6.80 6.78 7.15 7.04  Sample variance (Downgradient Well)  Sample Standard Deviation  S 5.09E-01 3.69E-01 3.89E-01 5.65E-01 6.09E-01	Student's T-Test Statistic			$t_{stat}$	6.208	22.295	20.475	3.753	3.068
7.51 6.58 6.39 7.11 7.11 6.49 7.87  7.51 6.58 6.39 7.11 7.11 6.49 7.87  7.51 6.58 6.39 7.11 7.11 6.49  7.51 6.58 6.39 7.11 7.11 6.49  7.51 6.58 6.39 7.11 7.11 7.11  Average Concentration (Downgradient Well)  X bar 6.90 6.80 6.78 7.15 7.04  Sample variance (Downgradient Well)  Sample Standard Deviation  S 5.09E-01 3.69E-01 3.89E-01 5.65E-01 6.09E-01									
7.51   6.58   6.39   7.11   7.11   6.49	BXS-3	<b>7</b> .51	6.58	6.39	7.11	7.11	6.49	7.87	6.70
T.51   6.58   6.39   7.11   7.11			7.51	6.58	6.39	7.11	7.11	6.49	<b>7</b> .87
Average Concentration (Downgradient Well)         X <sub>bar</sub> 6.90         6.80         6.78         7.15         7.04           Sample variance (Downgradient Well)         s²         2.60E-01         1.36E-01         1.51E-01         3.19E-01         3.71E-01           Sample Standard Deviation         s         5.09E-01         3.69E-01         3.89E-01         5.65E-01         6.09E-01				7.51	6.58	6.39	7.11	7.11	6.49
Sample variance (Downgradient Well)         s²         2.60E-01         1.36E-01         1.51E-01         3.19E-01         3.71E-01           Sample Standard Deviation         s         5.09E-01         3.69E-01         3.89E-01         5.65E-01         6.09E-01					7.51	6.58	6.39	7.11	7.11
Sample Standard Deviation S 5.09E-01 3.69E-01 5.65E-01 6.09E-01	Average Concentration (Downgradient Well)			X <sub>bar</sub>	6.90	6.80	6.78	7.15	7.04
	Sample variance (Downgradient Well)			s²	2.60E-01	1.36E-01	1.51E-01	3.19E-01	3.71E-01
Student's T-Test Statistic t <sub>stat</sub> 6.282 9.013 8.508 5.553 4.950	Sample Standard Deviation			s	5.09E-01	3.69E-01	3.89E-01	5.65E-01	6.09E-01
	Student's T-Test Statistic			t <sub>stat</sub>	6.282	9.013	8.508	5.553	4.950

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

Items with no difference at all (zero difference) will indicate #DIV/0!

## Field Conductivity (uS/cm)

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

4 .

Critical Statistic t<sub>c</sub>

2.353

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	187.10	182.10	184.60	181.60	181.60	184.20	183.00	203.00
		187.10	182.10	184.60	181.60	181.60	184.20	183.00
			187.10	182.10	184.60	181.60	181.60	184.20
				187.10	182.10	184.60	181.60	181.60
Average Concentration (Upgradient Well)	*		m <sub>o</sub>	183.40	182.82	183.00	186.68	187.95
			•					
BXS-1	431.00	464.00	502.00	522.00	522.00	476.00	477.00	495.00
		431.00	464.00	502.00	522.00	522.00	476.00	477.00

431.00	464.00	502.00	522.00	522.00	476.00	477.00	495.00
	431.00	464.00	502.00	522.00	522.00	476.00	477.00
		431.00	464.00	502.00	522.00	522.00	476.00
			431.00	464.00	502.00	522.00	522.00
1		X <sub>bar</sub>	479.75	502.50	505.50	499.25	492.50
		s <sup>2</sup>	1.63E+03	7.48E+02	4.76E+02	6.90E+02	4.63E+02
		s	4.04E+01	2.73E+01	2.18E+01	2.63E+01	2.15E+01
		t <sub>stat</sub>	3.665	5.846	7.393	5.949	7.077
	431.00	431.00	431.00 464.00 431.00 X <sub>bar</sub> s <sup>2</sup> s	431.00 464.00 502.00 431.00 464.00 431.00 X <sub>bar</sub> 479.75 s <sup>2</sup> 1.63E+03 s 4.04E+01	431.00 464.00 502.00 522.00 431.00 464.00 502.00 431.00 464.00 X <sub>bar</sub> 479.75 502.50 s² 1.63E+03 7.48E+02 s 4.04E+01 2.73E+01	431.00 464.00 502.00 522.00 522.00 431.00 464.00 502.00 522.00 431.00 464.00 502.00 X <sub>bar</sub> 479.75 502.50 505.50 S <sup>2</sup> 1.63E+03 7.48E+02 4.76E+02 \$ 4.04E+01 2.73E+01 2.18E+01	431.00 464.00 502.00 522.00 522.00 476.00 431.00 464.00 502.00 522.00 522.00 431.00 464.00 502.00 522.00  X <sub>bar</sub> 479.75 502.50 505.50 499.25  s 1.63E+03 7.48E+02 4.76E+02 6.90E+02 4.04E+01 2.73E+01 2.18E+01 2.63E+01

875.00	905.00	833.00	893.00	893.00	860.00	850.00	847.00
	875.00	905.00	833.00	893.00	893.00	860.00	850.00
		875.00	905.00	833.00	893.00	893.00	860.00
			875.00	905.00	833.00	893.00	893.00
		X <sub>bar</sub>	876.50	881.00	869.75	874.00	862.50
		s²	9.93E+02	1.06E+03	8.42E+02	4.98E+02	4.44E+02
		s	3.15E+01	3.25E+01	2.90E+01	2.23E+01	2.11E+01
		t <sub>stat</sub>	13.266	13.135	14.609	18.994	19.948
		875.00	875.00 905.00 875.00 X <sub>bar</sub> s <sup>2</sup> s	875.00 905.00 833.00 875.00 905.00 875.00 875.00 X <sub>bar</sub> 876.50 s <sup>2</sup> 9.93E+02 s 3.15E+01	875.00 905.00 833.00 893.00 875.00 905.00 833.00 875.00 905.00 905.00 X <sub>bar</sub> 876.50 881.00 s <sup>2</sup> 9.93E+02 1.06E+03 s 3.15E+01 3.25E+01	875.00 905.00 833.00 893.00 893.00 875.00 905.00 833.00 893.00 875.00 905.00 833.00 X <sub>bar</sub> 876.50 881.00 869.75 S <sup>2</sup> 9.93E+02 1.06E+03 8.42E+02 S 3.15E+01 3.25E+01 2.90E+01	875.00 905.00 833.00 893.00 893.00 860.00 875.00 905.00 833.00 893.00 893.00 875.00 905.00 833.00 893.00 X <sub>bar</sub> 876.50 881.00 869.75 874.00 \$^2 9.93E+02 1.06E+03 8.42E+02 4.98E+02 \$ 3.15E+01 3.25E+01 2.90E+01 2.23E+01

BXS-3	831.00	822.00	855.00	925.00	925.00	860.00	833.00	872.00
•		831.00	822.00	855.00	925.00	925.00	860.00	833.00
			831.00	822.00	855.00	925.00	925.00	860.00
				831.00	822.00	855.00	925.00	925.00
Average Concentration (Downgradient Well)			$X_{bar}$	858.25	881.75	891.25	885.75	872.50
Sample variance (Downgradient Well)			s <sup>2</sup>	2.1 <b>7</b> E+03	2.68E+03	1.52E+03	2.18E+03	1.49E+03
Sample Standard Deviation			s	4.66E+01	5.17E+01	3.90E+01	4.66E+01	3.86E+01
Student's T-Test Statistic			t <sub>stat</sub>	8.865	8.209	11.047	9.256	11.025

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

Items with no difference at all (zero difference) will indicate #DIV/0!

## **Temperature (C)**

9-Jul-01

4-Oct-01

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

5-Oct-00

Number of Samples n

17-Jan-01

Critical Statistic tc

2.353

BXS-4	10.80	13.50	9.90	8.00	8.00	9.40	8.60	11.50
		10.80	13.50	9.90	8.00	8.00	9.40	8.60
			10.80	13.50	9.90	8.00	8.00	9.40
				10.80	13.50	9.90	8.00	8.00
Average Concentration (Upgradient Well)	•		m <sub>o</sub>	10.04	9.76	8.78	9.10	9.38
BXS-1							<del></del>	
BA3-1	15.20	14.40	12.60	9.60	9.60	14.00	13.80	14.00
		15.20	14.40	12.60	9.60	9.60	14.00	13.80
			15.20	14.40	12.60	9.60	9.60	14.00
Average Concentration (Downgradient Well)			$X_{bar}$	15.20 12.95	14.40 11.55	12.60 11.45	9.60	9.60 12.85
,			s <sup>2</sup>			4.89E+00	1	
Sample variance (Downgradient Well) Sample Standard Deviation			s S			2.21E+00		4.70E+00
Student's T-Test Statistic			t <sub>stat</sub>	0.586	0.378	0.604	0.533	0.801
•			Stat	0.000	0.070	0.001	0.000	0.001
BXS-2	16.10	15.90	19.40	10.60	10.60	15.30	14.10	15.50
		16.10	15.90	19.40	10.60	10.60	15.30	14.10
			16.10	15.90	19.40	10.60	10.60	15.30
				16.10	15.90	19.40	10.60	10.60
Average Concentration (Downgradient Well)			X <sub>bar</sub>	15.50	14.13	13.98	12.65	13.88
Sample variance (Downgradient Well)			s²	1.32E+01	1.86E+01	1.80E+01	5.84E+00	5.15E+00
Sample Standard Deviation			s	3.64E+00	4.31E+00	4.24E+00	2.42E+00	2.27E+00
Student's T-Test Statistic			t <sub>stat</sub>	1.788	1.363	1.387	2.103	2.579
_								
BXS-3	15.30	19.90	16.20	11.40	11.40	14.90	17.30	15.40
		15.30	19.90	16.20	11.40	11.40	14.90	17.30
			15.30	19.90	16.20	11.40	11.40	14.90
				15.30	19.90	16.20	11.40	11.40
Average Concentration (Downgradient Well)			X <sub>bar</sub>	15.70	14.73	13.48	13.75	14.75
Sample variance (Downgradient Well)			s²	1.22E+01	1.70E+01	6.02E+00	8.32E+00	6.06E+00
Sample Standard Deviation			s	3.49E+00	4.13E+00	2.45E+00	2.89E+00	2.46E+00
Student's T-Test Statistic			t <sub>stat</sub>	1.728	1.262	1.881	1.964	2.536

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

50.00

0.11

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples **n**Critical Statistic **t**<sub>c</sub>

2.353

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	-80.00	-70.00	-0.75	0.00	0.00	-65.00	-0.65	180.00
		-80.00	-70.00	-0.75	0.00	0.00	-65.00	-0.65
			-80.00	-70.00	-0.75	0.00	0.00	-65.00
				-80.00	-70.00	-0.75	0.00	0.00
ent Well)			m <sub>o</sub>	-30.15	-27.15	-13.28	22.87	28.59

Average Concentration (Upgradient Well)

-								
BXS-1	120.00	135.00	130.00	110.00	110.00	100.00	120.00	115.00
		120.00	135.00	130.00	110.00	110.00	100.00	120.00
			120.00	135.00	130.00	110.00	110.00	100.00
				120.00	135.00	130.00	110.00	110.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	123.75	121.25	112.50	110.00	111.25
Sample variance (Downgradient Well)			s²	1.23E+02	1.73E+02	1.58E+02	6.67E+01	7.29E+01
Sample Standard Deviation			s	1.11E+01	1.31E+01	1.26E+01	8.16E+00	8.54E+00
Student's T-Test Statistic			t <sub>stat</sub>	6.941	5.643	4.998	5.336	4.840
			'					

	80.00	120.00	0.11	90.00	90.00	105.00	0.11
		80.00	120.00	0.11	90.00	90.00	105.00
			80.00	120.00	0.11	90.00	90.00
Average Concentration (Downgradient Well)		X <sub>bar</sub>	72.53	75.03	71.28	71.28	61.28
Sample variance (Downgradient Well)		s <sup>2</sup>	2.62E+03	2.69E+03	2.30E+03	2.30E+03	2.20E+03
Sample Standard Deviation		s	5.12E+01	5.19E+01	4.80E+01	4.80E+01	4.69E+01
Student's T-Test Statistic		t <sub>stat</sub>	0.600	0.596	0.612	0.658	0.562

0.11

90.00

90.00

105.00

120.00

BXS-3	-70.00	-45.00	-0.10	-20.00	-20.00	45.00	0.50	20.00
		-70.00	-45.00	-0.10	-20.00	-20.00	45.00	0.50
			-70.00	-45.00	-0.10	-20.00	-20.00	45.00
				-70.00	-45.00	-0.10	-20.00	-20.00
Average Concentration (Downgradient Well)			$X_{bar}$	-33.78	-21.28	1.23	1.38	11.38
Sample variance (Downgradient Well)			s <sup>2</sup>	9.21E+02	3.38E+02	9. <b>4</b> 0E+02	9.39E+02	7.69E+02
Sample Standard Deviation			s	3.03E+01	1.84E+01	3.07E+01	3.06E+01	2.77E+01
Student's T-Test Statistic			t <sub>stat</sub>	-1.400	-1.990	-0.762	-0.760	-0.641

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

BXS-2

80.00

DO (mg/L)

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples **n** 

4

Critical Statistic t<sub>c</sub>

2.353

	00.400	00 1 1 00						
BXS-4	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
DAG-4	0.00	2.22	4.99	4.30	4.30	0.75	1.46	0.99
		0.00	2.22	4.99	4.30	4.30	0.75	1.46
			0.00	2.22	4.99	4.30	4.30	0.75
				0.00	2.22	4.99	4.30	4.30
radient Well)			m <sub>o</sub>	3.16	3.31	3.16	2.36	1.88
			•					

Average Concentration (Upgradient Well)

BXS-1	0.00	0.76	5.89	6.96	6.98	1.22	0.33	0.86
		0.00	0.76	5.89	6.96	6.98	1.22	0.33
			0.00	0.76	5.89	6.96	6.98	1.22
				0.00	0.76	5.89	6.96	6.98
Average Concentration (Downgradient Well)			X <sub>bar</sub>	3.40	5.15	5.26	3.87	2.35
Sample variance (Downgradient Well)			s²	1.25E+01	8.81E+00	7.52E+00	1.29E+01	9.67E+00
Sample Standard Deviation			s	3.53E+00	2.97E+00	2.74E+00	3.60E+00	3.11E+00
Student's T-Test Statistic			t <sub>stat</sub>	0.034	0.309	0.383	0.210	0.076

BXS-2	0.00	2.33	5.22	1.28	1.28	1,11	1.32	0.93
		0.00	2.33	5.22	1.28	1.28	1.11	1.32
			0.00	2.33	5.22	1.28	1.28	1.11
				0.00	2.33	5.22	1.28	1.28
Average Concentration (Downgradient Well)			X <sub>bar</sub>	2.21	2.53	2.22	1.25	1.16
Sample variance (Downgradient Well)			s <sup>2</sup>	4.94E+00	3.47E+00	4.00E+00	8.76E-03	3.18E-02
Sample Standard Deviation			s	2.22E+00	1.86E+00	2.00E+00	9.36E-02	1.78E-01
Student's T-Test Statistic		,	t <sub>stat</sub>	-0.298	-0.119	-0.130	-12.542	-5.467

BXS-3	0.80	1.62	5.24	2.54	2.54	1.37	0.99	0.83
		0.80	1.62	5.24	2.54	2.54	1.37	0.99
			0.80	1.62	5.24	2.54	2.54	1.37
				0.80	1.62	5.24	2.54	2.54
Average Concentration (Downgradient Well)			X <sub>bar</sub>	2.55	2.99	2.92	1.86	1.43
Sample variance (Downgradient Well)			s²	3.72E+00	2.45E+00	2.69E+00	6.41E-01	5.96E-01
Sample Standard Deviation			s	1.93E+00	1.56E+00	1.64E+00	8.00E-01	7.72E-01
Student's T-Test Statistic			t <sub>stat</sub>	0.085	0.359	0.281	1.103	0.812

#### Notes:

7.58 7.96 7.87

8.03

7.86

6.27

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

 $m_o$ 

Number of Samples n Critical Statistic t<sub>c</sub>

2.353

7.97

7.96

7.78

7.94

6.48

7.99

7.98

6.36

8.03

7.89

6.44

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	10-lu <b>L-</b> 9	4-Oct-01
BXS-4	7.97	7.78	7.99	8.03	8.03	7.87	7.96	7.58
		7.97	7.78	7.99	8.03	8.03	7.87	7.96
			7.97	7.78	7.99	8.03	8.03	7.87
						-		

Average Concentration (Upgradient Well)

Sample Standard Deviation

Student's T-Test Statistic

BXS-1 6.15 5.96 6.33 6.15 6.06 6.06 6.09 6.07 6.15 5.96 6.15 6.06 6.06 6.33 6.09 6.15 5.96 6.15 6.06 6.06 6.33 6.15 5.96 6.15 6.06 6.06 X<sub>bar</sub> Average Concentration (Downgradient Well) 6.08 6.06 6.15 6.14 6.14  $s^2$ Sample variance (Downgradient Well) 8.20E-03 6.03E-03 1.62E-02 1.71E-02 1.66E-02 s 9.06E-02 7.76E-02 1.27E-01 1.31E-01 1.29E-01  $t_{stat}$ -10.381 -12.126 -7.173 -6.726 -6.680

6.48

	6.39	6.31	6.37	6.48	6.48	6.36	6.44
		6.39	6.31	6.37	6.48	6.48	6.36
			6.39	6.31	6.37	6.48	6.48
Average Concentration (Downgradient Well)		X <sub>bar</sub>	6.39	6.41	6.42	6.44	6.39
Sample variance (Downgradient Well)		s²	4.96E-03	7.13E-03	4.43E-03	3.20E-03	8.63E-03
Sample Standard Deviation		s	7.04E-02	8.45E-02	6.65E-02	5.66E-02	9.29E-02
Student's T-Test Statistic		t <sub>stat</sub>	44.713	37.488	47.318	55.766	33.695

6.37

6.31

BXS-3	6.47	6.34	6.47	6.83	6.83	6.90	6.64	6.36
		6.47	6.34	6.47	6.83	6.83	6.90	6.64
			6.47	6.34	6.47	6.83	6.83	6.90
				6.47	6.34	6.47	6.83	6.83
Average Concentration (Downgradient Well)			X <sub>bar</sub>	6.53	6.62	6.76	6.80	6.68
Sample variance (Downgradient Well)			s <sup>2</sup>	4.44E-02	6.30E-02	3.78E-02	1.25E-02	5.83E-02
Sample Standard Deviation			s	2.11E-01	2.51E-01	1.94E-01	1.12E-01	2.41E-01
Student's T-Test Statistic			t <sub>stat</sub>	15.318	13.012	17.202	30.198	13.647

#### Notes:

BXS-2

6.39

## Conductivity (umhos/cm)

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

2.353

Critical Statistic tc

20-Apr-00 26-Jul-00 5-Oct-00 16-Jan-01 17-Jan-01 3-Apr-01 9-Jul-01 4-Oct-01 BXS-4 150.00 165.00 159.00 189.00 189.00 193.00 193.00 195.00 150.00 165.00 159.00 189.00 189.00 193.00 193.00 150.00 165.00 159.00 189.00 189.00 193.00 1<u>5</u>9.00 150.00 165.00 189.00 189.00  $m_o$ 170.40 179.00 184.60 191.80 192.50

Average Concentration (Upgradient Well)

_								
BXS-1	342.00	401.00	414.00	473.00	473.00	506.00	489.00	504.00
		342.00	401.00	414.00	473.00	473.00	506.00	489.00
			342.00	401.00	414.00	473.00	473.00	506.00
				342.00	401.00	414.00	473.00	473.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	407.50	440.25	466.50	485.25	493.00
Sample variance (Downgradient Well)		:	s <sup>2</sup>	2.89E+03	1.46E+03	1.47E+03	2.48E+02	2.35E+02
Sample Standard Deviation		!	s	5.37E+01	3.82E+01	3.83E+01	1.58E+01	1.53E+01
Student's T-Test Statistic		1	t <sub>stat</sub>	2.206	3.421	3.680	9.312	9.794

Student's T-Test Statistic			t <sub>stat</sub>	4.208	4.805	4.975	75.440	34.516
Sample Standard Deviation			s	8.42E+01	8.04E+01	8.05E+01	5.74E+00	1.25E+01
Sample variance (Downgradient Well)			s²	7.09E+03	6.46E+03	6.49E+03	3.30E+01	1.56E+02
Average Concentration (Downgradient Well)			X <sub>bar</sub>	762.25	810.50	839.75	882.50	878.25
				685.00	767.00	719.00	878.00	878.00
			685.00	767.00	719.00	878.00	878.00	884.00
		685.00	767.00	719.00	878.00	878.00	884.00	890.00
DA3-2	685.00	767.00	719.00	878.00	878.00	884.00	890.00	861.00

BXS-3								
BV3-3	568.00	589.00	614.00	872.00	872.00	901.00	885.00	887.00
		568.00	589.00	614.00	872.00	872.00	901.00	885.00
			568.00	589.00	614.00	872.00	872.00	901.00
. <del>-</del>				568.00	589.00	614.00	872.00	872.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	660.75	736.75	814.75	882.50	886.25
Sample variance (Downgradient Well)			s <sup>2</sup>	2.02E+04	2.45E+04	1.81E+04	1.90E+02	1.41E+02
Sample Standard Deviation			s	1.42E+02	1.57E+02	1.35E+02	1.38E+01	1.19E+01
Student's T-Test Statistic			t <sub>stat</sub>	2.029	2.097	2.729	31.831	36.802

#### Notes:

## Ammonia as Nitrogen

0.03

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples **n**Critical Statistic **t**<sub>c</sub>

4 253

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	0.51	0.54	0.46	0.63	0.63	0.48	0.53	0.37
		0.51	0.54	0.46	0.63	0.63	0.48	0.53
			0.51	0.54	0.46	0.63	0.63	0.48
				0.51	0.54	0.46	0.63	0.63
ent Well)			m <sub>o</sub>	0.55	0.55	0.55	0.53	0.50

Average Concentration (Upgradient Well)

BXS-1	0.03	0.03	0.03	0.03	0.10	0.03	0.03	0.03
		0.03	0.03	0.03	0.03	0.10	0.03	0.03
			0.03	0.03	0.03	0.03	0.10	0.03
				0.03	0.03	0.03	0.03	0.10
Average Concentration (Downgradient Well)			X <sub>bar</sub>	0.03	0.04	0.04	0.04	0.04
Sample variance (Downgradient Well)			s <sup>2</sup>	0.00E+00	1.41E-03	1.41E-03	1.41E-03	1.41E-03
Sample Standard Deviation			s	0.00E+00	3.75E-02	3.75E-02	3.75E-02	3.75E-02
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	-6.723	-6.697	-6.457	-6.117
			•					

	0.03	0.03	0.03	0.03	0.03	0.03	0.03
		0.03	0.03	0.03	0.03	0.03	0.03
			0.03	0.03	0.03	0.03	0.03
Average Concentration (Downgradient Well)		X <sub>bar</sub>	0.03	0.03	0.03	0.03	0.03
Sample variance (Downgradient Well)		s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sample Standard Deviation		s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Student's T-Test Statistic		t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

באסטן	0.30	0.31	0.16	0.12]	0.12	0.14	0.11	0.03
		0.30	0.31	0.16	0.12	0.12	0.14	0.11
			0.30	0.31	0.16	0.12	0.12	0.14
				0.30	0.31	0.16	0.12	0.12
Average Concentration (Downgradient Well)			X <sub>bar</sub>	0.22	0.18	0.14	0.12	0.10
Sample variance (Downgradient Well)			s²	9.36E-03	8.16E-03	3.67E-04	1.58E-04	2.57E-03
Sample Standard Deviation			s	9.67E-02	9.03E-02	1.91E-02	1.26E-02	5.07E-02
Student's T-Test Statistic			t <sub>stat</sub>	1.150	0.983	3.525	4.868	0.973

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

Items with no difference at all (zero difference) will indicate #DIV/0!

BXS-2

BXS-3

0.03

## **Chemical Oxygen Demand**

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

Critical Statistic t<sub>c</sub>

•	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	16.00	2.50	29.00	7.00	7.00	14.00	38.00	10.00
		16.00	2.50	29.00	7.00	7.00	14.00	38.00
			16.00	2.50	29.00	7.00	7.00	14.00
				16.00	2.50	29.00	7.00	7.00
Average Concentration (Upgradient Well)			m <sub>o</sub>	12.30	11.90	19.00	15.20	17.25

BXS-1	24.00	29.00	26.00	21.00	21.00	27.00	23.00	18.00
		24.00	29.00	26.00	21.00	21.00	27.00	23.00
			24.00	29.00	26.00	21.00	21.00	27.00
				24.00	29.00	26.00	21.00	21.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	25.00	24.25	23.75	23.00	22.25
Sample variance (Downgradient Well)			s²	1.13E+01	1.56E+01	1.03E+01	8.00E+00	1.43E+01
Sample Standard Deviation			s	3.37E+00	3.95E+00	3.20E+00	2.83E+00	3.77E+00
Student's T-Test Statistic			t <sub>stat</sub>	1.886	1.564	0.742	1.379	0.662

BXS-2	44.00	49.00	41.00	40.00	40.00	47.00	46.00	37.00
		44.00	49.00	41.00	40.00	40.00	47.00	46.00
			44.00	49.00	41.00	40.00	40.00	47.00
				44.00	49.00	41.00	40.00	40.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	43.50	42.50	42.00	43.25	42.50
Sample variance (Downgradient Well)			s²	1.63E+01	1.90E+01	1.13E+01	1.43E+01	2.30E+01
Sample Standard Deviation			s	4.04E+00	4.36E+00	3.37E+00	3.77E+00	4.80E+00
Student's T-Test Statistic			t <sub>stat</sub>	4.965	4.422	5.762	5.354	4.037

BXS-3	91.00	49.00	77.00	68.00	68.00	79.00	71.00	60.00
		91.00	49.00	77.00	68.00	68.00	<b>7</b> 9.00	71.00
			91.00	49.00	77.00	68.00	68.00	79.00
				91.00	49.00	77.00	68.00	68.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	71.25	65.50	73.00	71.50	69.50
Sample variance (Downgradient Well)			s <sup>2</sup>	3.10E+02	1.39E+02	3.40E+01	2.70E+01	6.17E+01
Sample Standard Deviation			s	1.76E+01	1.18E+01	5.83E+00	5.20E+00	7.85E+00
Student's T-Test Statistic			t <sub>stat</sub>	1.910	2.593	5.971	6.517	4.120

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

Items with no difference at all (zero difference) will indicate #DIV/0!

BXS-2

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

4

Critical Statistic t<sub>c</sub>

2.353

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	2.00	2.00	2.00	2.20	2.20	2.00	2.00	2.00
		2.00	2.00	2.00	2.20	2.20	2.00	2.00
			2.00	2.00	2.00	2.20	2.20	2.00
				2.00	2.00	2.00	2.20	2.20
Average Concentration (Upgradient Well)			m <sub>o</sub>	2.08	2.08	2.08	2.08	2.05
nyo 4l	1		I	r				
BXS-1	8.20	8.30	6.70	7.70	7.70	5.90	5.60	4.30
		8.20	8.30	6.70	7.70	7.70	5.90	5.60
			8.20	8.30	6.70	7.70	7.70	5.90
				8.20	8.30	6.70	7.70	7.70
Average Concentration (Downgradient Well	)		X <sub>bar</sub>	7.73	7.60	7.00	6.73	5.88
Sample variance (Downgradient Well)			s <sup>2</sup>	5.36E-01	4.40E-01	7.60E-01	1.28E+00	1.96E+00
Sample Standard Deviation			s	7.32E-01	6.63E-01	8.72E-01	1.13E+00	1.40E+00
Student's T-Test Statistic			t <sub>stat</sub>	3.856	4.161	2.822	2.051	1.365
=vo.al								
BXS-2	7.40	8.80	8.10	8.70	8.70	7.60	6.70	6.70
		7.40	8.80	8.10	8.70	8.70	7.60	6.70
			7.40	8.80	8.10	8.70	8.70	7.60
				7.40	8.80	8.10	8.70	8.70
Average Concentration (Downgradient Well	)		X <sub>bar</sub>	8.25	8.58	8.28	7.93	7.43
Sample variance (Downgradient Well)			s <sup>2</sup>	4.17E-01	1.03E-01	2.83E-01	9.36E-01	9.03E-01
Sample Standard Deviation			S	6.45E-01	3.20E-01	5.32E-01	9.67E-01	9.50E-01
Student's T-Test Statistic			t <sub>stat</sub>	5.823	12.356	6.964	3.511	3.171
pyo ol								
BXS-3	3.90	5.50	5.00	5.50	5.50	4.80	4.40	4.10
		3.90	5.50	5.00	5.50	5.50	4.80	4.40
			3.90	5.50	5.00	5.50	5.50	4.80
				3.90	5.50	5.00	5.50	5.50
Average Concentration (Downgradient Well,	)		X <sub>bar</sub>	4.98	5.38	5.20	5.05	4.70
Sample variance (Downgradient Well)			s <sup>2</sup>	5.69E-01	6.25E-02	1.27E-01	2.97E-01	3.67E-01
Sample Standard Deviation			_	7 5 4 5 04	0.505.04	0.505.04		0.005.04
•			s t <sub>stat</sub>	7.54E-01	2.50E-01	3.56E-01	5.45E-01	6.06E-01 <b>3.096</b>

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

Items with no difference at all (zero difference) will indicate #DIV/0!

## Nitrate + Nitrite as Nitrogen

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

 $m_o$ 

Number of Samples n

2.353

Critical Statistic tc

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.30
		0.10	0.10	0.10	0.10	0.10	0.10	0.10
			0.10	0.10	0.10	0.10	0.10	0.10
				0.10	0.10	0.10	0.10	0.10

0.10

0.10

0.10

0.10

0.10

0.14

0.10

0.15

0.40

Average Concentration (Upgradient Well)

Sample Standard Deviation

Student's T-Test Statistic

BXS-1

BXS-2

BXS-3

0.10

0.40 0.50 0.10 0.30 0.20 0.30 0.40 0.50 0.10 0.30 0.30 0.20 0.40 0.40 0.10 0.50 0.30 0.30 0.20 0.40 0.50 0.10 0.30 0.30 Average Concentration (Downgradient Well)  $X_{bar}$ 0.33 0.30 0.23 0.30 0.33  $s^2$ Sample variance (Downgradient Well) 9.17E-03 2.92E-02 2.67E-02 9.17E-03 6.67E-03 s 1.71E-01 1.63E-01 9.57E-02 8.16E-02 9.57E-02 t<sub>stat</sub> 0.659 0.612 0.653 0.980 0.914

0.10

	0.10	0.10	0.10	0.10	0.10	0.10	0.10
		0.10	0.10	0.10	0.10	0.10	0.10
			0.10	0.10	0.10	0.10	0.10
Average Concentration (Downgradient Well)		X <sub>bar</sub>	0.10	0.10	0.10	0.10	0.18
Sample variance (Downgradient Well)		s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.25E-02
Sample Standard Deviation		S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-01
Student's T-Test Statistic		t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.264

0.10

0.10

BXS-3	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.50
		0.10	0.10	0.10	0.10	0.10	0.10	0.10
			0.10	0.10	0.10	0.10	0.10	0.10
				0.10	0.10	0.10	0.10	0.10
Average Concentration (Downgradient Well)			X <sub>bar</sub>	0.10	0.10	0.10	0.10	0.20
Sample variance (Downgradient Well)			s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.00E-02
Sample Standard Deviation			s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-01
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.125

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

Items with no difference at all (zero difference) will indicate #DIV/0!

## Nitrate as Nitrogen

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

Critical Statistic t<sub>c</sub>

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
		0.00	0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
ent Well)			m <sub>o</sub>	0.00	0.00	0.00	0.04	0.05

Average Concentration (Upgradie

BXS-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
		0.00	0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
Average Concentration (Downgradient Well)	_		X <sub>bar</sub>	0.00	0.00	0.00	0.00	0.08
Sample variance (Downgradient Well)			s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.25E-02
Sample Standard Deviation			s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-01
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.083

	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00
Average Concentration (Downgradient Well)		X <sub>bar</sub>	0.00	0.00	0.00	0.00	0.08
Sample variance (Downgradient Well)		s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.25E-02
Sample Standard Deviation		s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-01
Student's T-Test Statistic		t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	-0.250

0.00

0.00

0.00

0.00

0.00

0.00

0.30

BXS-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
		0.00	0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
Average Concentration (Downgradient Well)		-	X <sub>bar</sub>	0.00	0.00	0.00	0.00	0.08
Sample variance (Downgradient Well)			s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.25E-02
Sample Standard Deviation			s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-01
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	-0.250

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

Items with no difference at all (zero difference) will indicate #DIV/0!

BXS-2

BXS-3

0.00

# Nitrite as Nitrogen

9-Jul-01

0.00

4-Oct-01

0.10

3-Apr-01

0.00

# $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

20-Apr-00

0.00

BXS-4

4

17-Jan-01

0.00

Critical Statistic t<sub>c</sub>

26-Jul-00

0.00

5-Oct-00

0.00

2.353

16-Jan-01

0.00

		<del></del>	
0.00 0.00 0.00 0.00	0.00	0.00	0.00
0.00 0.00 0.00	0.00	0.00	0.00
0.00 0.00	0.00	0.00	0.00
Average Concentration (Upgradient Well) m <sub>o</sub> 0.00 0.00	0.00	0.02	0.03
	-:	·	
DVO 4	<u> </u>	T	
BXS-1 0.00 0.00 0.00 0.00 0.00	0.00	0.00	0.10
0.00 0.00 0.00	0.00	0.00	0.00
0.00 0.00 0.00	0.00	0.00	0.00
0.00 0.00	0.00	0.00	0.00
Average Concentration (Downgradient Well)  X <sub>bar</sub> 0.00  0.00	0.00	0.00	0.03
Sample variance (Downgradient Well) s <sup>2</sup> 0.00E+00 0.00E+00	0.00E+00	0.00E+00	2.50E-03
Sample Standard Deviation S 0.00E+00 0.00E+00	0.00E+00	0.00E+00	5.00E-02
Student's T-Test Statistic #DIV/0! #DIV/0!	#DIV/0!	#DIV/0!	0.000
BXS-2 0.00 0.00 0.00 0.00 0.00	0.00	0.00	0.10
0.00 0.00 0.00	0.00	0.00	0.00
0.00 0.00 0.00	0.00	0.00	0.00
0.00 0.00	0.00	0.00	0.00
Average Concentration (Downgradient Well) X <sub>bar</sub> 0.00 0.00	0.00	0.00	0.03
Sample variance (Downgradient Well) s <sup>2</sup> 0.00E+00 0.00E+00	0.00E+00	0.00E+00	2.50E-03
Sample Standard Deviation S 0.00E+00 0.00E+00	0.00E+00	0.00E+00	5.00E-02
Student's T-Test Statistic t <sub>stat</sub> #DIV/0! #DIV/0!	#DIV/0!	#DIV/0!	-0.250
BXS-3 0.00 0.00 0.00 0.00 0.00	0.00	0.00	0.20
0.00 0.00 0.00 0.00	0.00	0.00	0.00
0.00 0.00 0.00	0.00	0.00	0.00
	0.00	0.00	0.00
0.00 0.00			0.05
Average Concentration (Downgradient Well)  Note: 100   0.0	0.00	0.00	0.00
	<u> </u>	L	1.00E-02
Average Concentration (Downgradient Well)  X <sub>bar</sub> 0.00 0.00	0.00E+00	0.00E+00	

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

### Solids, Total Dissolved

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples **n** 

4

Critical Statistic t<sub>c</sub>

2.353

	20-Apr-00	26-Jul-00	F O - 100	46 1 04	47 1 04			10.101
BXS-4	· · · · · · · · · · · · · · · · · · ·		5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
DA3-4	180.00	156.00	94.00	131.00	131.00	134.00	134.00	140.00
		180.00	156.00	94.00	131.00	131.00	134.00	134.00
			180.00	156.00	94.00	131.00	131.00	134.00
				180.00	156.00	94.00	131.00	131.00
Average Concentration (Upgradient Well)			m <sub>o</sub>	138.40	129.20	124.80	134.00	134.75

_								
BXS-1	330.00	323.00	281.00	286.00	286.00	284.00	212.00	262.00
		330.00	323.00	281.00	286.00	286.00	284.00	212.00
			330.00	323.00	281.00	286.00	286.00	284.00
				330.00	323.00	281.00	286.00	286.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	305.00	294.00	284.25	267.00	261.00
Sample variance (Downgradient Well)			s <sup>2</sup>	6.29E+02	3.79E+02	5.58E+00	1.35E+03	1.19E+03
Sample Standard Deviation			s	2.51E+01	1.95E+01	2.36E+00	3.67E+01	3.44E+01
Student's T-Test Statistic			t <sub>stat</sub>	3.322	4.231	33.740	1.813	1.834

	500.00	598.00	532.00	501.00	0.00	456.00	320.00	420.00
		500.00	598.00	532.00	501.00	0.00	456.00	320.00
			500.00	598.00	532.00	501.00	0.00	456.00
				500.00	598.00	532.00	501.00	0.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	532. <b>7</b> 5	407.75	372.25	319.25	299.00
Sample variance (Downgradient Well)			s <sup>2</sup>	2.11E+03	7.55E+04	6.26E+04	5.12E+04	4.30E+04
Sample Standard Deviation			s	4.60E+01	2.75E+02	2.50E+02	2.26E+02	2.07E+02
Student's T-Test Statistic			t <sub>stat</sub>	5.522	0.706	0.739	0.624	0.638

BX2-3[	500.00	561.00	517.00	503.00	0.00	556.00	420.00	408.00
		500.00	561.00	517.00	503.00	0.00	556.00	420.00
			500.00	561.00	517.00	503.00	0.00	556.00
				500.00	561.00	517.00	503.00	0.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	520.25	395.25	394.00	369.75	346.00
Sample variance (Downgradient Well)			s²	7.93E+02	7.00E+04	6.95E+04	6.39E+04	5.77E+04
Sample Standard Deviation			s	2.82E+01	2.65E+02	2.64E+02	2.53E+02	2.40E+02
Student's T-Test Statistic			t <sub>stat</sub>	8.422	0.228	0.273	0.284	0.288

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

## Solids, Total Suspended

3-Apr-01

0.00

0.00

9-Jul-01

0.00

0.00

4-Oct-01

0.00

# $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

20-Apr-00

0.00

BXS-4

4

17-Jan-01

0.00

0.00

Critical Statistic t<sub>c</sub>

26-Jul-00

0.00

0.00

5-Oct-00

0.00

0.00

2.353

16-Jan-01

0.00

0.00

			0.00	0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
Average Concentration (Upgradient Well)			$m_o$	0.00	0.00	0.00	0.00	0.00
5vo.4					<del></del>	7		-
BXS-1	0.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00
		0.00	0.00	0.00	0.00	6.00	0.00	0.00
			0.00	0.00	0.00	0.00	6.00	0.00
				0.00	0.00	0.00	0.00	6.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	0.00	1.50	1.50	1.50	1.50
Sample variance (Downgradient Well)			s²	0.00E+00	9.00E+00	9.00E+00	9.00E+00	9.00E+00
Sample Standard Deviation			s	0.00E+00	3.00E+00	3.00E+00	3.00E+00	3.00E+00
Student's T-Test Statistic			$\mathbf{t}_{stat}$	#DIV/0!	0.250	0.250	0.250	0.250
BXS-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	0.00	0.00	0.00	0.00	0.00
Sample variance (Downgradient Well)			s²	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sample Standard Deviation			S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
								*
BXS-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
Average Concentration (Downgradient Well)			$X_{bar}$	0.00	0.00	0.00	0.00	0.00
Sample variance (Downgradient Well)			s²	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sample Standard Deviation			s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

# $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples **n**Critical Statistic **t**<sub>c</sub>

4

omiour standing 4g

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	1.60	1.70	1.60	1.20	1.20	1.60	1.60	1.20
		1.60	1.70	1.60	1.20	1.20	1.60	1.60
,			1.60	1.70	1.60	1.20	1.20	1.60
				1.60	1.70	1.60	1.20	1.20
Average Concentration (Upgradient Well)			m <sub>o</sub>	1.46	1.46	1.44	1.36	1.40

BXS-1	7.70	7.80	6.10	7.70	7.70	8.30	7.20	6.70
		7.70	7.80	6.10	7.70	7.70	8.30	7,20
			7.70	7.80	6.10	7.70	7.70	8.30
				7.70	7.80	6.10	7.70	7.70
Average Concentration (Downgradient Well	)		X <sub>bar</sub>	7.33	7.33	7.45	7.73	7.48
Sample variance (Downgradient Well)			s <sup>2</sup>	6.69E-01	6.69E-01	8.90E-01	2.02E-01	4.69E-01
Sample Standard Deviation			s	8.18E-01	8.18E-01	9.43E-01	4.50E-01	6.85E-01
Student's T-Test Statistic			t <sub>stat</sub>	3.585	3.585	3.185	7.072	4.435
BXS-2	0.30	0.20	0.30	0.40	0.40	0.40	0.30	0.30
		0.30	0.20	0.30	0.40	0.40	0.40	0.30
			0.30	0.20	0.30	0.40	0.40	0.40
				0.30	0.20	0.30	0.40	0.40
Average Concentration (Downgradient Well,	)		X <sub>bar</sub>	0.30	0.33	0.38	0.38	0.35
Sample variance (Downgradient Well)			s <sup>2</sup>	6.67E-03	9.17E-03	2.50E-03	2.50E-03	3.33E-03
Sample Standard Deviation			s	8.16E-02	9.57E-02	5.00E-02	5.00E-02	5.77E-02
Student's T-Test Statistic			t <sub>stat</sub>	-3.172	-2.575	-5.684	-0.750	-2.901
			•					
BXS-3	0.30	0.10	0.10	0.10	0.20	0.40	0.20	0.20
		0.30		0.10	0.10	0.20	0.40	0.20
			0.30	0.10	0.10	0.10	0.20	0.40
			0.00	0.30	0.10	0.10	0.10	0.20
Average Concentration (Downgradient Well,	)		X <sub>bar</sub>	0.15	0.13	0.20	0.23	0.25
Sample variance (Downgradient Well)			s²	1.00E-02	2.50E-03	2.00E-02	1.58E-02	1.00E-02
Sample Standard Deviation			s	1.00E-01	5.00E-02	1.41E-01	1.26E-01	1.00E-01
Student's T-Test Statistic			t <sub>stat</sub>	0.342	0.293	0.530	0.695	0.961

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

### Tannin and Lignin

### $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

Critical Statistic t<sub>c</sub>

2.353 . One tail

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	0.30	0.30	0.40	0.60	0.60	0.20	0.40	0.50
		0.30	0.30	0.40	0.60	0.60	0.20	0.40
			0.30	0.30	0.40	0.60	0.60	0.20
				0.30	0.30	0.40	0.60	0.60
ent Well)			m <sub>o</sub>	0.44	0.42	0.44	0.46	0.43

Average Concentration (Upgradie

BXS-1 0.30 0.30 0.50 0.60 0.40 0.50 0.60

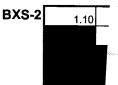
Average Concentration (Downgradient Well)

Sample variance (Downgradient Well)

Sample Standard Deviation

Student's T-Test Statistic

Student & Test



Interval Scal

Average Concentration (Downgradient Well)

Sample variance (Downgradient Well)

Sample Standard Deviation

Student's T-Test Statistic

Null Hypo. 2 vandom samples from common population



- Sample size of 5 not

Average Concentration (Downgradient Well)

Sample variance (Downgradient Well)

Sample Standard Deviation

Student's T-Test Statistic

Did they use SE standard

### Notes:

Item shown in **bold** indicates a statistically valid detec Items with no difference at all (zero difference) will inc

Gould do analysis of variance.

## Carbon, Total Organic

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n Critical Statistic t<sub>c</sub>

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	0.70	1.10	1.30	1.00	1.00	1.20	9.30	0.90
		0.70	1.10	1.30	1.00	1.00	1.20	9.30
			0.70	1.10	1.30	1.00	1.00	1.20
				0.70	1.10	1.30	1.00	1.00
Average Concentration (Upgradient Well)			m <sub>o</sub>	1.02	1.12	2.76	2.68	3.10

<del></del>								
BXS-1	6.60	7.70	9.70	8.60	8.60	7.50	6.80	7.10
		6.60	7.70	9.70	8.60	8.60	7.50	6.80
			6.60	7.70	9.70	8.60	8.60	7.50
				6.60	7.70	9.70	8.60	8.60
Average Concentration (Downgradient Well)			X <sub>bar</sub>	8.15	8.65	8.60	7.88	7.50
Sample variance (Downgradient Well)			s²	1.74E+00	6.70E-01	8.07E-01	7.82E-01	6.20E-01
Sample Standard Deviation			s	1.32E+00	8.19E-01	8.98E-01	8.85E-01	7.87E-01
Student's T-Test Statistic			t <sub>stat</sub>	2.705	4.600	3.251	2.936	2.794

BXS-2	13.50	16.80	15.50	14.80	14.80	14.60	15.10	13.70
		13.50	16.80	15.50	14.80	14.80	14.60	15.10
			13.50	16.80	15.50	14.80	14.80	14.60
				13.50	16.80	15.50	14.80	14.80
Average Concentration (Downgradient Well)			X <sub>bar</sub>	15.15	15.48	14.93	14.83	14.55
Sample variance (Downgradient Well)			s²	1.90E+00	8.89E-01	1.56E-01	4.25E-02	3.63E-01
Sample Standard Deviation			s	1.38E+00	9.43E-01	3.95E-01	2.06E-01	6.03E-01
Student's T-Test Statistic			t <sub>stat</sub>	5.022	7.772	17.766	33.810	11.416

BXS-3	28.80	29.20	0.25	27.10	27.10	26.10	25.90	21.60
		28.80	29.20	0.25	27.10	27.10	26.10	25.90
			28.80	29.20	0.25	27.10	2 <b>7</b> .10	26.10
				28.80	29.20	0.25	27.10	27.10
Average Concentration (Downgradient Well)		_	X <sub>bar</sub>	21.34	20.91	20.14	26.55	25.18
Sample variance (Downgradient Well)			s²	1.98E+02	1.91E+02	1.76E+02	4.10E-01	5.96E+00
Sample Standard Deviation			s	1.41E+01	1.38E+01	1.33E+01	6.40E-01	2.44E+00
Student's T-Test Statistic			t <sub>stat</sub>	0.708	0.723	0.744	20.571	5.034

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

Items with no difference at all (zero difference) will indicate #DIV/0!

BXS-2

### Total Coliforms (MPN/100mL)

3-Apr-01

0.00

0.00

9-Jul-01

0.00

0.00

4-Oct-01

0.00

0.00

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples **n** 

20-Apr-00

2.00

BXS-4

4

Critical Statistic t<sub>c</sub>

26-Jul-00

2.00

2.00

5-Oct-00

4.00

2.00

2.353

16-Jan-01

2.00

4.00

17-Jan-01

0.00

2.00

	2.0	2.00	7.00	2.00	0.00	0.00	0.00
		2.00	2.00	4.00	2.00	0.00	0.00
			2.00	2.00	4.00	2.00	0.00
Average Concentration (Upgradient Well)		m <sub>o</sub>	2.00	1.60	1.20	0.40	0.00
							<u></u>
BXS-1	11.00 2.0	00 2.00	2.00	0.00	0.00	0.00	0.00
	11.0	00 2.00	2.00	2.00	0.00	0.00	0.00
		11.00	2.00	2.00	2.00	0.00	0.00
			11.00	2.00	2.00	2.00	0.00
Average Concentration (Downgradient Well)		$X_{bar}$	4.25	1.50	1.00	0.50	0.00
Sample variance (Downgradient Well)		s²	2.03E+01	1.00E+00	1.33E+00	1.00E+00	0.00E+00
Sample Standard Deviation		s	4.50E+00	1.00E+00	1.15E+00	1.00E+00	0.00E+00
Student's T-Test Statistic		t <sub>stat</sub>	0.250	-0.050	-0.087	0.050	#DIV/0!
·			1		-		
BXS-2	2.00 6.0	00 11.00	4.00	0.00	0.00	0.00	0.00
	2.0	6.00	11.00	4.00	0.00	0.00	0.00
		2.00	6.00	11.00	4.00	0.00	0.00
			2.00		11.00	4.00	0.00
Average Concentration (Downgradient Well)		X <sub>bar</sub>	5.75	5.25	3.75	1.00	0.00
Sample variance (Downgradient Well)		s²	1.49E+01	2.09E+01	2.69E+01	4.00E+00	0.00E+00
Sample Standard Deviation		S	ľ	4.57E+00			0.00E+00
Student's T-Test Statistic		t <sub>stat</sub>	0.162	0.465	0.250	0.000	#DIV/0!
BXS-3	2.00 110.0	00 80.00	14.00	0.00	0.00	0.00	0.00
	2.00 110.0				0.00	0.00	0.00
	2.0	2.00		14.00 80.00	0.00 14.00	0.00	0.00
		2.00	2.00	110.00	80.00	14.00	0.00
Average Concentration (Downgradient Well)		$X_{bar}$	51.50	51.00	23.50	3.50	0.00
Sample variance (Downgradient Well)		s²	2.70E+03	2.76E+03	1.46E+03	4.90E+01	0.00E+00
Sample Standard Deviation		s	5.19E+01	5.26E+01	3.82E+01	7.00E+00	0.00E+00
Student's T-Test Statistic		$\mathbf{t_{stat}}$	0.459	0.442	0.239	0.107	#DIV/0!

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

Appendix C. Statistical Analysis of Groundwater Quality Results for Downgradient Well

Arsenic

4-Oct-01

5.00

5.00

# $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

20-Apr-00

5.00

BXS-4

4 2 3 5 2

Critical Statistic  $\, t_{c} \,$ 

26-Jul-00

6.00

5.00

5-Oct-00

5.00

6.00

2.353

16-Jan-01

2.50

5.00

17-Jan-01

5.00

2.50

3-Apr-01

5.00

5.00

9-Jul-01

5.00

5.00

			5.00	6.00	5.00	2.50	5.00	5.00
				5.00	6.00	5.00	2.50	5.00
Average Concentration (Upgradient Well)			$m_o$	4.70	4.70	4.50	4.50	5.00
	-3132-211							
· <b>-</b>								
BXS-1	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
		2.50	2.50	2.50	2.50	2.50	2.50	2.50
			2.50	2.50	2.50	2.50	2.50	2.50
				2.50	2.50	2.50	2.50	2.50
Average Concentration (Downgradient Well)			X <sub>bar</sub>	2.50	2.50	2.50	2.50	2.50
Sample variance (Downgradient Well)			s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sample Standard Deviation			s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
BXS-2	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
		2.50	2.50	2.50	2.50	2.50	2.50	2.50
			2.50	2.50	2.50	2.50	2.50	2.50
				2.50	2.50	2.50	2.50	2.50
Average Concentration (Downgradient Well)			X <sub>bar</sub>	2.50	2.50	2.50	2.50	2.50
Sample variance (Downgradient Well)			s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sample Standard Deviation			s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			'					
BXS-3	50.00	46.00	49.00	5.00	8.00	16.00	9.00	5.00
		50.00	46.00	49.00	5.00	8.00	16.00	9.00
			50.00	46.00	49.00	5.00	8.00	16.00
				50.00	46.00	49.00	5.00	8.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	37.50	27.00	19.50	9.50	9.50
Sample variance (Downgradient Well)			s²	4.72E+02	5.63E+02	4.08E+02	2.17E+01	2.17E+01
Sample Standard Deviation			s	2.17E+01	2.37E+01	2.02E+01	4.65E+00	4.65E+00
Student's T-Test Statistic			t <sub>stat</sub>	0.863	0.569	0.482	1.020	1.020

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

Barium

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n Critical Statistic t<sub>c</sub>

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	26.00	26.00	29.00	25.00	25.00	26.00	32.00	26.00
		26.00	26.00	29.00	25.00	25.00	26.00	32.00
			26.00	26.00	29.00	25.00	25.00	26.00
				26.00	26.00	29.00	25.00	25.00
nt Well)			m <sub>o</sub>	26.20	26.20	27.40	26.80	27.25

Average Concentration (Upgradier

BXS-1	29.00	28.00	34.00	30.00	30.00	25.00	27.00	31.00
		29.00	28.00	34.00	30.00	30.00	25.00	27.00
			29.00	28.00	34.00	30.00	30.00	25.00
				29.00	28.00	34.00	30.00	30.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	30.25	30.50	29.75	28.00	28.25
Sample variance (Downgradient Well)			s²	6.92E+00	6.33E+00	1.36E+01	6.00E+00	7.58E+00
Sample Standard Deviation			s	2.63E+00	2.52E+00	3.69E+00	2.45E+00	2.75E+00
Student's T-Test Statistic			t <sub>stat</sub>	0.770	0.854	0.319	0.245	0.182

BXS-2	56.00	51.00	56.00	51.00	51.00	50.00	53.00	50.00
•		56.00	51.00	56.00	51.00	51.00	50.00	53.00
			56.00	51.00	56.00	51.00	51.00	50.00
				56.00	51.00	56.00	51.00	51.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	53.50	52.25	52.00	51.25	51.00
Sample variance (Downgradient Well)			s <sup>2</sup>	8.33E+00	6.25E+00	7.33E+00	1.58E+00	2.00E+00
Sample Standard Deviation			s	2.89E+00	2.50E+00	2.71E+00	1.26E+00	1.41E+00
Student's T-Test Statistic			t <sub>stat</sub>	8.811	9.947	8.921	19.391	17.058

-x• • L	63.00	າບວ.ບບ	103.00	00.00	00.00	67.00	04.00	49.00
		83.00	105.00	103.00	60.00	60.00	6 <b>7</b> .00	64.00
			83.00	105.00	103.00	60.00	60.00	67.00
				83.00	105.00	103.00	60.00	60.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	87.75	82.00	72.50	62.75	60.00
Sample variance (Downgradient Well)			s²	4.41E+02	6.46E+02	4.24E+02	1.16E+01	6.20E+01
Sample Standard Deviation			s	2.10E+01	2.54E+01	2.06E+01	3.40E+00	7.87E+00
Student's T-Test Statistic			t <sub>stat</sub>	2.021	1.564	1.694	9.034	3.720

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

BXS-3

Appendix C. Statistical Analysis of Groundwater Quality Results for Downgradient Well

Cadmium

### $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

Critical Statistic t<sub>c</sub>

2.353

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
		2.00	2.00	2.00	2.00	2.00	2.00	2.00
			2.00	2.00	2.00	2.00	2.00	2.00
				2.00	2.00	2.00	2.00	2.00
Average Concentration (Upgradient Well)			m <sub>o</sub>	2.00	2.00	2.00	2.00	2.00
, 								
BXS-1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
		2.00	2.00	2.00	2.00	2.00	2.00	2.00
			2.00	2.00	2.00	2.00	2.00	2.00
				2.00	2.00	2.00	2.00	2.00
Average Concentration (Downgradient Well	)		$X_{bar}$	2.00	2.00	2.00	2.00	2.00
Sample variance (Downgradient Well)			s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sample Standard Deviation			s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
BXS-2	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
		2.00	2.00	2.00	2.00	2.00	2.00	2.00
			2.00	2.00	2.00	2.00	2.00	2.00
				2.00	2.00	2.00	2.00	2.00
Average Concentration (Downgradient Well,	)		X <sub>bar</sub>	2.00	2.00	2.00	2.00	2.00
Sample variance (Downgradient Well)			s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sample Standard Deviation			s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
BXS-3	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
		2.00	2.00	2.00	2.00	2.00	2.00	2.00
			2.00	2.00	2.00	2.00	2.00	2.00
				2.00	2.00	2.00	2.00	2.00
Average Concentration (Downgradient Well,	)		X <sub>bar</sub>	2.00	2.00	2.00	2.00	2.00

#DIV/0!

#DIV/0!

0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00

0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00

#DIV/0!

#DIV/0!

#DIV/0!

#### Notes:

Sample variance (Downgradient Well)

Sample Standard Deviation

Student's T-Test Statistic

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

S

 $\mathbf{t}_{\mathsf{stat}}$ 

# $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

Critical Statistic t<sub>c</sub>

				-				
DVC 4	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
		5.00	5.00	5.00	5.00	5.00	5.00	5.00
			5.00	5.00	5.00	5.00	5.00	5.00
				5.00	5.00	5.00	5.00	5.00
ent Well)			m <sub>o</sub>	5.00	5.00	5.00	5.00	5.00

Average Concentration (Upgradies

BXS-1	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
		5.00	5.00	5.00	5.00	5.00	5.00	5.00
			5.00	5.00	5.00	5.00	5.00	5.00
				5.00	5.00	5.00	5.00	5.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	5.00	5.00	5.00	5.00	5.00
Sample variance (Downgradient Well)			s²	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sample Standard Deviation			s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

5.00

5.00

5.00

5.00

5.00

	5.00	5.00	5.00	5.00	5.00	5.00	5.00
		5.00	5.00	5.00	5.00	5.00	5.00
			5.00	5.00	5.00	5.00	5.00
Average Concentration (Downgradient Well)		X <sub>bar</sub>	5.00	5.00	5.00	5.00	5.00
Sample variance (Downgradient Well)		s²	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sample Standard Deviation		s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Student's T-Test Statistic		t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		'					

5.00

5.00

DX0-3	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
		5.00	5.00	5.00	5.00	5.00	5.00	5.00
			5.00	5.00	5.00	5.00	5.00	5.00
				5.00	5.00	5.00	5.00	5.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	5.00	5.00	5.00	5.00	5.00
Sample variance (Downgradient Well)			s <sup>2</sup>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sample Standard Deviation			s	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Student's T-Test Statistic			t <sub>stat</sub>	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

BXS-2

BXS-3

5.00

Iron

### $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n

Critical Statistic t<sub>c</sub>

2.353

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	40.00	40.00	60.00	50.00	50.00	40.00	40.00	40.00
		40.00	40.00	60.00	50.00	50.00	40.00	40.00
			40.00	40.00	60.00	50.00	50.00	40.00
				40.00	40.00	60.00	50.00	50.00
ent Well)			m <sub>o</sub>	48.00	48.00	48.00	44.00	42.50

Average Concentration (Upgradie.

Sample Standard Deviation

Student's T-Test Statistic

BXS-1 10.00 Average Concentration (Downgradient Well)  $X_{bar}$ 10.00 10.00 10.00 10.00 10.00  $s^2$ Sample variance (Downgradient Well) 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 S 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00  $t_{stat}$ #DIV/0! #DIV/0! #DIV/0! #DIV/0! #DIV/0!

BXS-2	690.00	720.00	630.00	620.00	620.00	710.00	740.00	789.00
		690.00	720.00	630.00	620.00	620.00	710.00	740.00
			690.00	720.00	630.00	620.00	620.00	710.00
				690.00	720.00	630.00	620.00	620.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	665.00	647.50	645.00	672.50	714.75
Sample variance (Downgradient Well)			s <sup>2</sup>	2.30E+03	2.36E+03	1.90E+03	3.83E+03	5.05E+03
Sample Standard Deviation			S	4.80E+01	4.86E+01	4.36E+01	6.18E+01	7.11E+01
Student's T-Test Statistic			t <sub>stat</sub>	6.933	6.667	7.399	5.437	5.029

BXS-3	56600.00	52600.00	34200.00	7560.00	7560.00	5320.00	8530.00	4740.00
		56600.00	52600.00	34200.00	7560.00	7560.00	5320.00	8530.00
			56600.00	52600.00	34200.00	7560.00	7560.00	5320.00
				56600.00	52600.00	34200.00	7560.00	7560.00
Average Concentration (Downgradient Well	)	•	X <sub>bar</sub>	37740.00	25480.00	13660.00	7242.50	6537.50
Sample variance (Downgradient Well)			s <sup>2</sup>	5.00E+08	4.85E+08	1.89E+08	1.85E+06	3.24E+06
Sample Standard Deviation			s	2.24E+04	2.20E+04	1.37E+04	1.36E+03	1.80E+03
Student's T-Test Statistic			t <sub>stat</sub>	0.843	0.578	0.496	2.638	1.795

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

### Manganese

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n Critical Statistic t<sub>c</sub>

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4								
	123.00	120.00	129.00	123.00	123.00	116.00	123.00	114.00
		123.00	120.00	129.00	123.00	123.00	116.00	123.00
			123.00	120.00	129.00	123.00	123.00	116.00
				123.00	120.00	129.00	123.00	123.00
ient Well)	.,,,,,,,,,,		m <sub>o</sub>	123.60	122.20	122.80	119.80	119.00

Average Concentration (Upgradie

BXS-1	264.00	307.00	346.00	409.00	409.00	341.00	396.00	556.00
		264.00	307.00	346.00	409.00	409.00	341.00	396.00
			264.00	307.00	346.00	409.00	409.00	341.00
				264.00	307.00	346.00	409.00	409.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	331.50	367.75	376.25	388.75	425.50
Sample variance (Downgradient Well)			s²	3.79E+03	2.52E+03	1.43E+03	1.05E+03	8.44E+03
Sample Standard Deviation			s	6.16E+01	5.02E+01	3.79E+01	3.24E+01	9.19E+01
Student's T-Test Statistic			t <sub>stat</sub>	1.688	2.445	3.346	4.148	1.668

BXS-2	1450.00	1500.00	1390.00	1460.00	1460.00	1470.00	1540.00	1580.00
		1450.00	1500.00	1390.00	1460.00	1460.00	1470.00	1540.00
			1450.00	1500.00	1390.00	1460.00	1460.00	1470.00
				1450.00	1500.00	1390.00	1460.00	1460.00
Average Concentration (Downgradient Well)			X <sub>bar</sub>	1450.00	1452.50	1445.00	1482.50	1512.50
Sample variance (Downgradient Well)			s²	2.07E+03	2.09E+03	1.37E+03	1.49E+03	3.29E+03
Sample Standard Deviation			s	4.55E+01	4.57E+01	3.70E+01	3.86E+01	5.74E+01
Student's T-Test Statistic			t <sub>stat</sub>	15.271	15.331	19.031	18.773	12.381

BXS-3	15900.00	13900.00	15800.00	14500.00	14500.00	16200.00	17100.00	13600.00
		15900.00	13900.00	15800.00	14500.00	14500.00	16200.00	17100.00
			15900.00	13900.00	15800.00	14500.00	14500.00	16200.00
				15900.00	13900.00	15800.00	14500.00	14500.00
Average Concentration (Downgradient Well	)		X <sub>bar</sub>	15025.00	14675.00	15250.00	15575.00	15350.00
Sample variance (Downgradient Well)			s²	9.69E+05	6.43E+05	7.77E+05	1.68E+06	2.52E+06
Sample Standard Deviation			s	9.84E+02	8.02E+02	8.81E+02	1.29E+03	1.59E+03
Student's T-Test Statistic			t <sub>stat</sub>	7.608	9.125	8.631	6.001	4.814

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).

### Tannin and Lignin

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n Critical Statistic to

4 2.353 . One tail

	20.400	20.14.00	5040					
BXS-4	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
DV2-4	0.30	0.30	0.40	0.60	0.60	0.20	0.40	0.50
		0.30	0.30	0.40	0.60	0.60	0.20	0.40
			0.30	0.30	0.40	0.60	0.60	0.20
				0.30	0.30	0.40	0.60	0.60
ent Well)			m <sub>o</sub>	0.44	0.42	0.44	0.46	0.43

Average Concentration (Upgradie

BXS-1 n 30 0.30 0.50 0.60 0.60 0.40 0.50 0.60

Average Concentration (Downgradient Well)

Sample variance (Downgradient Well)

Sample Standard Deviation

Student's T-Test Statistic

Student & Test



Average Concentration (Downgradient Well)

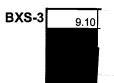
Sample variance (Downgradient Well)

Sample Standard Deviation

Student's T-Test Statistic

Null Hypo. 2 vandom samples from common population

Interval Scale



Average Concentration (Downgradient Well)

Sample variance (Downgradient Well)

Sample Standard Deviation

Student's T-Test Statistic

- Sample size of 5 not

Did they use SE standard error

#### Notes:

Item shown in bold indicates a statistically valid deter Items with no difference at all (zero difference) will inc

Gould do analysis of variance.

Student & Test Parametriction to see if must test population to see if no smal. Interval Scale Null Hypo. dom samples. from common population - Sample size of 5 not recommended. Did they use SE standard error Gould do avalysis of variance.

Appendix C. Statistical Analysis of Groundwater Quality Results for Downgradient Well

### **Tannin and Lignin**

## $t_{stat} = X_{bar} - m_o/s/sqrt(n)$

Number of Samples n	۱ 4	tail
Critical Statistic $\mathbf{t_c}$	2.353	one '

	20-Apr-00	26-Jul-00	5-Oct-00	16-Jan-01	17-Jan-01	3-Apr-01	9-Jul-01	4-Oct-01
BXS-4	0.30	0.30	0.40	0.60	0.60	0.20	0.40	0.50
		0.30	0.30	0.40	0.60	0.60	0.20	0.40
			0.30	0.30	0.40	0.60	0.60	0.20
				0.30	0.30	0.40	0.60	0.60
Average Concentration (Upgradient Well)			m <sub>o</sub>	0.44	0.42	0.44	0.46	0.43

BXS-1 0.30 0.30 0.60 0.60 0.50 0.40 0.50 0.60 0.30 0.30 0.50 0.60 0.60 0.40 0.50 0.30 0.30 0.50 0.60 0.60 0.40 0.30 0.30 0.50 0.60 0.60 X<sub>bar</sub> Average Concentration (Downgradient Well) 0.43 0.50 0.53 0.53 0.53 s² Sample variance (Downgradient Well) 2.25E-02 2.00E-02 9.17E-03 9.17E-03 9.17E-03 Sample Standard Deviation s 1.50E-01 1.41E-01 9.57E-02 9.57E-02 9.57E-02 Student's T-Test Statistic  $t_{stat}$ -0.050 0.283 0.444 0.339 0.522 BXS-2 1.10 1.10 1.00 1.70 1.70 0.90 1.40 2.80 1.10 1.10 1.00 1.70 1.70 0.90 1.40 1.10 1.10 1.00 1.70 1.70 0.90 1.10 1.10 1.00 1.70 1.70 Average Concentration (Downgradient Well)  $X_{bar}$ 1.23 1.38 1.33 1.43 1.70 s² Sample variance (Downgradient Well) 1.03E-01 1.43E-01 1.89E-01 1.43E-01 6.47E-01 Sample Standard Deviation s 3.20E-01 3.77E-01 4.35E-01 3.77E-01 8.04E-01 Student's T-Test Statistic 1.679 t<sub>stat</sub> 1.634 1.413 1.761 0.997

BXS-3	9.10	7.10	8.20	12.20	12.20	3.20	6.40	21.60
		9.10	7.10	8.20	12.20	12.20	3.20	6.40
			9.10	7.10	8.20	12.20	12.20	3.20
				9.10	7.10	8.20	12.20	12.20
Average Concentration (Downgradient Well)	)		X <sub>bar</sub>	9.15	9.93	8.95	8.50	10.85
Sample variance (Downgradient Well)			s²	4.80E+00	7.10E+00	1.83E+01	2.00E+01	6.52E+01
Sample Standard Deviation			s	2.19E+00	2.67E+00	4.27E+00	4.47E+00	8.08E+00
Student's T-Test Statistic			t <sub>stat</sub>	2.014	1.791	0.997	0.909	0.622

#### Notes:

Item shown in **bold** indicates a statistically valid detection (according to the student's T-Test statistic).