PREPARED FOR:

COBLE'S SANDROCK, INC.
5833 FOSTER STORE ROAD
LIBERTY, NORTH CAROLINA 27298

COBLE'S SANDROCK CONSTRUCTION & DEMOLITION DEBRIS LANDFILL
PERMIT NO. 01-05

FIRST SEMIANNUAL WATER QUALITY MONITORING REPORT OF 2012

JULY 2012

PREPARED BY:

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DENR USE ONLY: ☐ Paper Report ☐ Electronic Data - Email CD (data loaded: Yes / No) Doc/Event #:

NC DENR
Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- **Prepare one form for each individually monitored unit.**
- **Please type or print legibly.**
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

Joyce Engineering, Inc.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: G. Van Ness Burbach, Ph.D., P.G. Phone: (336) 323-0092

E-mail: vburbach@joyceengineering.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Coble's Sandrock, Inc. C&D Debris Landfill	5833 Foster Store Road Liberty, NC 27928	01-05	.0500	April 16-17, 2012

Environmental Status: (Check all that apply)

☐ Initial/Background Monitoring ☒ Detection Monitoring ☐ Assessment Monitoring ☐ Corrective Action

Type of data submitted: (Check all that apply)

☒ Groundwater monitoring data from monitoring wells
☐ Groundwater monitoring data from private water supply wells
☐ Leachate monitoring data
☒ Surface water monitoring data
☐ Methane gas monitoring data
☐ Corrective action data (specify) _____
☐ Other(specify) _____

Notification attached?

☐ No. No groundwater or surface water standards were exceeded.
☒ Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
☐ Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

G. VanNess Burbach, Ph.D., PG — Technical Consultant — (336) 323-0092

Facility Representative Name (Print) — Title — (Area Code) Telephone Number

Signature — 7/31/12 Date

Affix NC Licensed Professional Geologist Seal

NORTH CAROLINA LICENSED SEAL 1349 GEOLOGIST G. VAN NESS BURBACH

2211 West Meadowview Road, Suite 101 Greensboro, NC 27407

Facility Representative Address

C-0782

NC PE Firm License Number (if applicable effective May 1, 2009)

Revised 6/2009

First Semiannual Water Quality Monitoring Report of 2012
Coble's Sandrock Construction & Demolition Debris Landfill
Alamance County, North Carolina

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1.0 INTRODUCTION

1.1 Site Information

The Coble's Sandrock Construction and Demolition (C&D) Debris Landfill is owned and operated by Kent and Brenda Coble under Permit No. 01-05. The property consists of approximately 154 acres in Alamance County, one half mile east of Kimesville, North Carolina and approximately eight miles south of Burlington, North Carolina. The 154 acres includes the currently permitted 39.6 acres plus an adjacent expansion area of 114.4 acres. The current C & D facility has been in operation since 1998 on the currently permitted 39.6 acres previously approved for site suitability. It includes a total of 12.86 acres approved for waste disposal, including Phase 1 (7.0 acres), Phase 2A (1.1 acres), and Phase 2B (4.76 acres). The proposed 114.4 acre expansion property is contiguous with and south and east of the currently permitted facility, and includes two proposed new waste cells, Phase 3A (6.3 acres) and Phase 3B (5.6 acres).

The site is located in the Piedmont physiographic province on a group of knolls and valleys. The northeast-flowing Poppaw Creek is located along the northern facility property line. Two primary drainage features (small, intermittent creeks) transect the site and flow into Poppaw Creek. One of the drainage features flows west-southwest across the southern half of the site and has a 2- to 4-acre man-made pond at its upstream limit in the southeastern corner of the proposed site. The other drainage feature flows north-northwest, roughly parallel to the eastern site boundary, and is fed by outflow from a small pond located on the site property and by two smaller, spring-fed drainage feature which flow into it from off the site property to east. These streams and ponds are shown on Drawing No. 1. Adjoining land uses are primarily agricultural and residential. The regional topography is shown on an excerpt of the USGS 7.5 Minute Topographic Quadrangle for Kimesville, North Carolina included as Figure No. 1.

1.2 Site Geology

The site is located within the Carolina Slate Belt in the central Piedmont physiographic and geological province. The Carolina Slate Belt consists of metamorphosed sediments, volcanics, and intrusive igneous rocks and the site is underlain by a felsic intrusive complex. The complex is described as white to gray, fine- to coarse-grained, massive to foliated, metamorphosed bodies of assemblages of intimately associated felsic intrusive rock types. The rock types vary from granite, granodiorite, quartz diorite, to quartz monzonite. Narrow mafic dikes are common within the felsic intrusive units. This region is also characterized by regional- and small-scale Mesozoic diabase dikes. Most of the dikes are near-vertical and trend north-south to northwest-southeast and are characterized by plagioclase, augite and olivine minerals (Ragland, 1991).

The rock seen in float and/or large outcrops, as well as rock core from this site was predominantly medium-grained biotite-muscovite granite with foliation observed locally. Otherwise, site outcrops of granite are massive, with very little to no observed structure or foliation. No diabase dikes have been observed at the site, but numerous mafic (meta-volcanic) dikes do exist.

1.3 Regulatory Status

The Coble's Sandrock C&D Debris Landfill is currently in the detection monitoring program for C&D landfills under Section .0544 of the North Carolina Solid Waste Management Rules. The facility initially monitored for the eight RCRA metals and NC Appendix I list of volatile organic compounds. After the Permit to Operate was issued on February 23, 2009 for Phases 1 and 2, Continued Operation, the full list of NC Appendix I constituents including mercury, chloride, manganese, sulfate, iron, alkalinity, and total dissolved solids (TDS) were sampled beginning with the April 2010 event.

2.0 FACILITY MONITORING PROGRAM

2.1 Groundwater Monitoring Program

Seven active groundwater monitoring wells comprise the monitoring network at the Coble's Sandrock C&D Debris Landfill. The current compliance network consists of the following monitoring wells: MW-2, MW-4, MW-6 (facility background well), MW-7, MW-8, MW-10S, and PZ-19S. Monitoring wells MW-5 and MW-10D are monitored for water levels only.

Monitoring Well	Date Installed	Classification	Monitoring Program	Total Depth from TOC (ft)	Lithology of Screened Interval
MW-1	3/25/97	-	Abandoned	35.85	Saprolite/Part. Weathered Rock
MW-2	3/28/97	Compliance	Detection (C&D)	22.98	Saprolite/Part. Weathered Rock
MW-3	3/31/97	-	Abandoned	59.82	Bedrock
MW-4	4/01/97	Compliance	Detection (C&D)	24.22	Saprolite/Part. Weathered Rock
MW-5	1/18/02	Observation	Water Level	17.20	Saprolite/Part. Weathered Rock
MW-6	8/05/97	Background	Detection (C&D)	41.00	Bedrock
MW-7	12/19/02	Compliance	Detection (C&D)	16.00	Saprolite/Part. Weathered Rock
MW-8	3/21/05	Compliance	Detection (C&D)	22.76	Saprolite/Part. Weathered Rock
MW-9	3/21/05	-	Abandoned	40.16	Partially Weathered Rock
MW-10S	3/22/05	Compliance	Detection (C&D)	24.34	Bedrock
MW-10D	3/25/05	Observation	Water Level	66.86	Bedrock
PZ-19S	1/31/02	Compliance	Detection (C&D)	13.00	Saprolite

Three monitoring wells (MW-1, MW-2, and MW-4) were installed during the Phase 1 site suitability study to characterize the uppermost aquifer. A letter dated September 18, 1998 from Trigon Engineering Consultants, Inc. to the Solid Waste Section stated that piezometer P-1 was converted to an upgradient monitoring well now known as MW-3. After April 2003, MW-3 was replaced with MW-6 (formerly P-3) as the upgradient background well. PZ-19S was installed originally as a piezometer for the new Phase 3 Expansion in January 2002 but has been since converted to a monitoring well for future compliance monitoring. Well MW-5 was added to the

compliance network before the April 2002 sampling event, but was replaced with MW-7 before the November 2003 sampling event at the request of the Solid Waste Section. Four monitoring wells (MW-8, MW-9, MW-10S, and MW-10D) were installed in and around the Phase 3A waste cell limits between March 21 and 25, 2005. Monitoring wells, MW-1, MW-3, and MW-9, were abandoned on September 30 and 31, 2008 for the Phase 3A and 3B expansion.

2.2 Surface Water Monitoring Program

Surface water monitoring at the Coble's Sandrock C&D Debris Landfill is completed in accordance with NCSWMR §0602 (Surface Water Monitoring) and the approved Water Quality Monitoring Plan for the facility.

Surface Point	Classification	Monitoring Program
SW-1	Compliance	Surface Water
SW-2	Compliance	Surface Water

The two surface water monitoring points are monitored semiannually for the full list of NC Appendix I constituents including mercury, chloride, manganese, sulfate, iron, alkalinity, and total dissolved solids. Surface water point SW-1 is located in Poppaw Creek, shortly after it enters the site. The sample location is at the property line near the northwest edge of the site. Surface water monitoring point SW-2 serves as a downstream monitoring point. Samples from this point are collected at a location approximately 350 feet northeast of the proposed Phase 3 disposal area near the northeastern corner of the site and where a small tributary that flows adjacent to the eastern property boundary discharges into Poppaw Creek. Surface water monitoring point locations are shown on Drawing No. 1.

3.0 FIRST SEMIANNUAL SAMPLING EVENT OF 2012

3.1 Field Work and Visual Inspection

In order to detect potential releases of leachate and/or landfill gas migration in a timely manner, a visual inspection program has been implemented at the Coble's Sandrock C&D Debris Landfill. This inspection program involves field personnel making the following observations:

- Observation of stress induced on the biological community (i.e., dead or dying vegetation),
- Indications of leachate impact (i.e., seeps, impacted surface water),
- Observations of erosion; and
- Negative changes around the waste facility.

On April 16-17, 2012 personnel from JOYCE visited Coble's Sandrock C&D Debris Landfill to purge and sample monitoring wells MW-2, MW-4, MW-6, MW-7, MW-8, MW-10S, and P-19S. MW-10S was unable to be located and was not sampled. Surface water monitoring points SW-1 and SW-2 were also sampled during the April 2012 event. Beginning with the background well (MW-6), depth-to-water measurements were obtained to the nearest 0.01 foot using an electronic

water level indicator for all monitoring wells in the compliance network prior to purging. Historical groundwater elevations can be found in Table 1.

Monitoring wells were purged and sampled using disposable bailers. Measurements of temperature, pH, specific conductivity, and turbidity were recorded in the dedicated site log book prior to purging, after each purge volume, and during sampling. Prior to sampling, laboratory-supplied containers were prepared with the following information:

- Monitoring well number (completed by field personnel),
- Date and time of sample collection (completed by field personnel),
- Initials of sampling personnel (completed by field personnel),
- Project name and number (completed by the laboratory),
- Chemical preservative (completed by the laboratory); and
- Requested chemical analysis (completed by the laboratory).

Groundwater samples from each monitoring well were collected directly from the disposable bailers in the provided laboratory containers either immediately after purging or within 24 hours of the final purge volume. Immediately after collection, the samples were placed on ice in a laboratory provided cooler. Field data logs are provided in Appendix 1.

3.2 Laboratory Analysis and Quality Control

The April 2012 groundwater and surface water samples were submitted to Pace Analytical Services, Inc. of Huntersville, North Carolina under chain-of-custody control for analysis. As presented earlier, the April 2012 groundwater samples were analyzed for the full list of NC Appendix I constituents including mercury, chloride, manganese, sulfate, iron, alkalinity, and TDS. JOYCE requested a Level II data report for each final laboratory report. The samples were received by the laboratory on April 19, 2012 in good condition, properly preserved, and within analyses hold times.

In addition to samples collected for compliance monitoring at the Coble's Sandrock C&D Debris Landfill, a Field Blank was collected by JOYCE personnel as part of the April 2012 sampling event. Also, a Trip Blank was prepared by the laboratory to accompany the volatile sampling containers to and from the laboratory for the April 2012 sampling event. The April 2012 Field Blank was analyzed the full list of NC Appendix I constituents including mercury, manganese and iron. While the Trip Blank was analyzed for NC Appendix I volatile organic compounds only.

Upon receipt of the laboratory data packages, the data was reviewed by JOYCE personnel for the following:

- General typographical errors,
- Correct analyses performed and within method specified hold times,
- Biased data results based on Surrogate Recoveries, Matrix Spike, Matrix Spike Duplicate, and Laboratory Control Samples,

- Blank qualified data (B-flags),
- Detections above the NC 2L Groundwater Standards (NC 2L), Groundwater Water Protection Standards (GWPS), and/or NC 2B Surface Water Standards (NC 2B); and
- Detections that are above historical levels.

4.0 HYDROGEOLOGICAL CONDITIONS

The surficial aquifer beneath the site occurs within saprolite, partially weathered rock (PWR), and bedrock. Generally, the saprolite and PWR units are relatively thin (5 to 40 feet) at and around the waste disposal areas. The saprolite and PWR are expected to behave as a relatively isotropic, porous medium, whereas groundwater flow in the bedrock is primarily through fractures; however, the bedrock is highly fractured and well connected to the overlying units so they are expected to behave as a single aquifer. The groundwater potentiometric surface, based on water level measurements taken on April 16, 2012, is shown on Drawing No. 1.

Horizontal hydraulic gradients for the site were calculated using three groundwater flow line segments indicated on the groundwater surface contour map (Drawing No. 1). Average linear groundwater flow velocities were calculated using the modified Darcy equation:

$$\mathbf{V = Ki/n}$$

where **V** = average linear velocity (feet per day), **K** = hydraulic conductivity (ft/day), **i** = horizontal hydraulic gradient, and **n** = effective porosity. An effective porosity of **n** = 0.21 (21%) was assumed based on average effective porosities for saprolite and PWR determined by laboratory analysis of soil samples. The average gradients (**i**) were determined for each flow path shown on Drawing No. 1. The geometric mean of the hydraulic conductivities of all slug tests conducted on the site (**K** = 1.97×10^{-1} ft/day) was used for groundwater flow calculations for the site.

The above equation is based on the simplifying assumptions of a homogeneous, isotropic aquifer in a porous medium. Groundwater flow velocities were calculated using saprolite and PWR data because the site's uppermost aquifer is primarily in those hydrogeologic units. An average linear groundwater flow velocity was calculated across areas where bedrock is the surficial aquifer because rock cores have shown that bedrock is highly fractured to the point that groundwater flow is expected to behave relatively similar to the unconsolidated hydrogeologic units. Also, aquifer tests conducted on bedrock wells and piezometers showed similar range of values for hydraulic conductivity. Groundwater flow velocities within the fractured bedrock aquifer are likely to be variable.

Data and calculations for the horizontal gradients are presented in Table 2. The calculated horizontal gradients from three flow line segments across the site range from 0.021 to 0.068 ft/ft. Calculated linear groundwater velocities ranged from approximately 0.019 to 0.064 ft/day.

5.0 DATA ANALYSIS

Results from the April 2012 sampling event were received April 30, 2012 from Pace Analytical Services, Inc. and are found in Appendix 1.

5.1 Statistical Methods

The background data for inorganic and organic constituents were evaluated using the Shapiro-Wilk Test, Parametric Prediction Limits, Parametric Tolerance Intervals, Aitchison's Adjustment, Non-Parametric Prediction Limits, and Poisson Prediction Limits as appropriate. Background data, tests for normality, outliers, Aitchison's adjustment, tolerance interval, or prediction limits are used, as appropriate based on the background data. The statistical test by which downgradient data are compared to facility background data is based upon the nature of the data and the number of data values that are less than the laboratory limit of detection. All statistical tests are evaluated at the 0.05 level of significance, 95% confidence level, and are conducted as one-tailed tests.

5.2 Statistical Results

Statistical background values were calculated using data from historical semiannual sampling events at the facility through this event. A summary of the April 2012 statistical background calculations are provided in the following table. Detailed statistical analysis worksheets can be found in Appendix 2. The data set from well MW-6 (current background well) in addition to background monitoring event data from MW-3, MW-8, MW-10S, and PZ-19S were evaluated to determine the appropriate procedure for calculation of the background value for each parameter.

Constituent	Data Distribution	Statistical Method used to Establish Background	Background Concentration	Noted Increases
Barium	Log Normal	Non Parametric Prediction Interval	357	None
Cobalt**	N/A	Non-Parametric Prediction Interval	6.80	MW-7**
Iron*	Log-Normal	Upper Prediction Limit	475,958	None
Manganese*	Normal	Parametric Prediction Interval	1,659	MW-7*
Zinc	N/A	Non Parametric Prediction Interval	39.2	None
Alkalinity	Normal	Parametric Prediction Interval	38,439	MW-4,-7 and -8
Chloride	Normal	Parametric Prediction Interval	12,652	None
Sulfate	N/A	Non Parametric Prediction Interval	5,600	MW-2,-4,-7 and P-19S
TDS	Log-Normal	Upper Prediction Limit	457,854	MW-7

1. Concentrations are in micrograms per liter (µg/L)
2. N/A = Not Applicable
3. *= Alternate Source Demonstration submitted August 2010
4. **= Alternate Source Demonstration approved April 2012

Background concentrations for inorganic constituents were determined using statistical procedures as discussed in **Section 5.1**.

5.3 Analytical Results for Groundwater and Comparisons to Standards

The following inorganic and organic constituents were detected in groundwater during the April 2012 sampling event. All concentrations are reported in micrograms per liter (µg/L). Concentrations with a "J" are considered to be estimated. Concentrations with a "B" are attributed to lab or field contamination. Highlighted concentrations were detected above their respective NC 2L or GWPS.

Constituent	NC 2L/ GWPS	Background	Downgradient						Blanks
		MW-6	MW-2	MW-4	MW-7	MW-8	MW-10S	P-19S	
Barium	700	42.8 J	26.1 J	61.7 J	258	31.0 J	NS	74.3 J	ND
*Cobalt***	1	ND	ND	ND	16.9	ND	NS	5.0 J	ND
*Iron**	300	142 J	4240	926	8490	3150	NS	968	ND
*Manganese**	50	6.0 J	38.4 J	571	14000	37.0 J	NS	838	ND
Zinc	1000	ND	ND	ND	ND	10.2	NS	ND	ND
Tetrahydrofuran	NE	ND	ND	22.3	7.9 J	ND	NS	ND	ND
Alkalinity	NE	10100	24300	90100	872000	60700	NS	32400	ND
TDS	500000	127000	142000	361000	1500000	107000	NS	109000	ND
Chloride	250000	9840	ND	25800	150000	ND	NS	11000	ND
Sulfate	250000	ND	8880	134000	281000	ND	NS	26600	ND

1. ND = Not detected above laboratory detection limits.
2. NE = Not established.
3. NS = Not sampled.
4. * = Alternate Source Demonstration submitted August 2010
5. ** = Alternate Source Demonstration approved April 2012
6. GWPS = Ground Water Protection Standard

In general, the inorganic and organic results are consistent with historical data. Historical groundwater data can be found in Table 3. Iron was detected above the NC 2L in MW-2, MW-7, MW-8 and P-19S and manganese was detected above the NC 2L in MW-4, MW-7, and P-19S. An Alternate Source Demonstration (ASD) was submitted along with the First Semiannual Groundwater Monitoring Report of 2010 for iron and manganese. Cobalt was detected above its GWPS in MW-7. An ASD for cobalt was approved in April 2011. TDS and sulfate were detected above the NC 2L in and MW-7 during April 2012 sampling event.

5.4 Analytical Results for Surface Water and Comparisons to Standards

The following inorganic and organic constituents were detected in surface water during the April 2012 sampling event. All concentrations are reported in micrograms per liter (µg/L). Concentrations with a "J" are considered to be estimated. Concentrations with a "B" are attributed to lab or field contamination. Highlighted concentrations were detected above their respective NC 2B standards.

Constituent	NC 2B	SW-1	SW-2	Blanks
Iron	1000	1830	2000	ND
Manganese	NE	461	651	ND
Alkalinity	NE	43500	42500	ND
Total Dissolved Solids	NE	83000	79000	ND
Chloride	230000	7710	7540	ND
Sulfate	NE	6800	6340	ND

1. ND = Not detected above laboratory detection limits.
2. NE = Not established.

Historical surface water data can be found in Table 4. Iron was detected above its respective NC 2B standard in SW-1 and SW-2; however, SW-1 is located where Poppaw Creek enters the site and is considered to be the representative of the background levels. In addition, elevated concentrations of iron in surface waters appear to be naturally occurring due to the concentrations of iron in local soils.

6.0 CONCLUSIONS

Iron was detected above the NC 2L in MW-2, MW-7, MW-8 and P-19S and manganese was detected above the NC 2L in MW-4, MW-7, and P-19S. An Alternate Source Demonstration (ASD) was submitted along with the First Semiannual Groundwater Monitoring Report of 2010 for iron and manganese. Cobalt was detected above its GWPS in MW-7. An ASD for cobalt was approved in April 2011. TDS and sulfate were detected above the NC 2L in and MW-7 during April 2012 sampling event. In general, the results are consistent with historical data.

Based on the analytical results from the April 2012 Coble's Sandrock C&D Debris Landfill will remain in the Detection Monitoring Program for C&D landfills with continued evaluation of C&D indicator parameters. The next semiannual monitoring event is scheduled for October 2012.

7.0 REFERENCES

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United States Geological Survey. Kimesville 7.5 minute Quadrangle.

Tables

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TABLE 1

SUMMARY OF GROUNDWATER ELEVATIONS

Location	Background	Downgradient											
	MW-6	MW-1	MW-2	MW-3	MW-4	MW-5	MW-7	MW-8	MW-9	MW-10S	MW-10D	PZ-19S	PZ-19D
TOC Elevation	652.56	602.46	582.31	613.05	582.64	577.41	583.33	574.26	589.09	592.46	592.76	572.18	571.85
Well Depth	41.00	35.85	22.98	59.82	24.22	17.20	16.00	22.76	40.16	24.34	66.86	13.00	62.20
Apr-00	NA	569.59	569.81	579.91	569.07	NI	NI	NI	NI	NI	NI	NI	NI
Aug-00	627.42	568.21	566.97	578.23	568.08	NI	NI	NI	NI	NI	NI	NI	NI
Oct-00	NA	569.30	568.55	578.25	568.81	NI	NI	NI	NI	NI	NI	NI	NI
Nov-00	627.30	568.09	566.87	577.47	567.04	NI	NI	NI	NI	NI	NI	NI	NI
Apr-01	627.17	571.48	569.72	578.67	569.06	NI	NI	NI	NI	NI	NI	NI	NI
Dec-01	621.78	567.28	565.31	575.90	566.21	NI	NI	NI	NI	NI	NI	NI	NI
Apr-02	623.94	568.17	567.84	576.09	568.21	569.32	NI	NI	NI	NI	NI	NI	NI
Nov-02	626.32	570.60	570.36	578.47	569.74	570.45	NI	NI	NI	NI	NI	NI	NI
Apr-03	633.40	571.66	569.18	579.70	568.84	570.32	574.38	NI	NI	NI	NI	567.41	567.38
Nov-03	632.53	568.49	567.38	578.54	567.47	569.59	572.44	NI	NI	NI	NI	566.78	567.01
Apr-04	630.13	568.54	568.44	578.92	567.83	569.86	573.63	NI	NI	NI	NI	567.04	567.19
Oct-04	628.60	567.86	567.92	577.61	567.91	570.30	573.30	NI	NI	NI	NI	567.15	567.14
Apr-05	630.65	568.90	568.69	578.54	568.16	570.76	574.54	NS	NS	NS	NS	567.19	567.45
Oct-05	625.65	567.16	565.52	576.33	566.43	569.12	571.24	NS	NS	NS	NS	565.66	565.45
27-Apr-06	624.46	567.84	569.36	NS	569.34	NS	572.77	NS	NS	NS	NS	568.10	567.55
11-Oct-06	624.45	567.91	567.22	577.59	568.29	570.11	571.77	567.03	567.92	583.95	583.62	NS	NS
16-Apr-07	629.42	570.33	570.04	NS	569.38	571.49	574.94	569.10	569.76	584.80	585.37	NS	NS
11-Oct-07	624.91	566.74	563.35	NS	564.43	NS	570.18	NS	NS	580.07	580.28	NS	NS
15-Apr-08	625.12	569.67	569.41	NS	568.87	569.99	574.03	568.85	569.57	584.34	584.73	NS	NS
15-Oct-08	625.86	AB	568.11	AB	569.00	570.33	573.64	564.91	AB	NS	NS	NS	NS
18-Mar-09	NS	AB	NS	AB	NS	NS	NS	569.89	AB	585.42	NS	567.97	NS
21-Apr-09	629.77	AB	569.89	AB	569.21	NS	575.52	569.14	AB	585.07	NS	567.90	NS
21-May-09	NS	AB	NS	AB	NS	NS	NS	567.96	AB	584.17	NS	567.28	NS
08-Oct-09	626.40	AB	564.24	AB	565.47	NS	571.25	565.47	AB	582.81	NS	564.00	NS
26-Apr-10	631.51	AB	578.23	AB	568.27	570.13	574.57	567.94	AB	584.10	584.16	567.22	567.00
11-Oct-10	627.03	AB	565.73	AB	567.18	NS	572.48	566.57	AB	583.41	NS	565.80	NS
13-Apr-11	626.21	AB	569.58	AB	568.67	570.34	574.47	569.03	AB	584.63	583.79	567.35	567.50
12-Oct-11	623.62	AB	565.82	AB	566.70	569.31	572.49	567.21	AB	NS	NS	565.56	565.57
17-Apr-12	626.94	AB	568.76	AB	568.76	NS	574.62	568.53	AB	NS	NS	567.02	567.10

Notes:
1. Water levels are measured from top of casing (TOC).
2. NS = Not sampled and/or water levels not measured.
3. AB = Monitoring well has been abandoned.
4. NI = Monitoring well has not been installed.
5. NA = Data not available.

TABLE 2

SUMMARY OF HORIZONTAL HYDRAULIC GRADIENTS AND LINEAR VELOCITIES

GRADIENT CALCULATION SEGMENT	FLOW LINE LENGTH (feet)	FLOW DIRECTION	GROUNDWATER ELEVATION (feet)	HORIZONTAL GRADIENT i (ft/ft)	HYDRAULIC CONDUCTIVITY K (ft/day)	EFFECTIVE POROSITY n	LINEAR VELOCITY V (ft/day)
i_1	1460	NW	630	0.021	1.97E-01	0.21	0.019
			600				
i_2	436	N	590	0.046	1.97E-01	0.21	0.043
			570				
i_3	295	W	590	0.068	1.97E-01	0.21	0.064
			570				
			Average:	0.045		Average:	0.042

NOTES:

1. The hydraulic conductivity (**K**) is taken from the geometric mean of **K** estimated from slug tests performed during hydrogeologic investigations.
2. The effective porosity (**n**) is taken from the average **n** determined by laboratory analysis of soil samples.
3. The horizontal hydraulic gradient (**i**) is the change in groundwater elevation divided by the segment length.
4. The groundwater flow velocity (**V**) is calculated based on the modified Darcy equation: **V=Ki/n**.

TABLE 3

SUMMARY OF HISTORICAL GROUNDWATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)													
		DL	RL	Background	Downgradient										Blanks
				MW-6	MW-1	MW-2	MW-3	MW-4	MW-5	MW-7	MW-8	MW-10S	P-19S		
Antimony	19-Mar-09	2.6	6.0	NS	AB	NS	AB	NS	NS	NS	3.1 J	ND	ND		ND
	22-Apr-09	2.6	6.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	14-May-09	2.6	6.0	NS	AB	NS	AB	NS	NS	NS	ND	ND	ND		ND
	8-Oct-09	2.6	6.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
GWPS = 1.4 µg/L (01/01/10)	27-Apr-10	2.6	6.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
GWPS = 1 µg/L (08/01/10)	12-Oct-10	2.6	6.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	14-Apr-11	2.6	6.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	13-Oct-11	5.0	6.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
	17-Apr-12	5.0	6.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
Arsenic	Apr-00	8	10	NA	ND	ND	10 J	ND	NI	NI	NI	NI	NI		ND
	Nov-00	NR	10	WL	ND	ND	ND	ND	NI	NI	NI	NI	NI		ND
	Apr-01	NR	10	Wl	ND	ND	ND	ND	NI	NI	NI	NI	NI		ND
	Dec-01	NR	10	WL	ND	ND	ND	ND	NI	NI	NI	NI	NI		ND
	Apr-02	NR	10	WL	ND	ND	ND	ND	ND	NI	NI	NI	WL		ND
	Nov-02	NR	10	WL	ND	ND	ND	ND	ND	NI	NI	NI	WL		ND
	Apr-03	NR	10	WL	ND	ND	ND	ND	ND	WL	NI	NI	WL		ND
	Nov-03	NR	10	ND	ND	ND	WL	ND	WL	ND	NI	NI	WL		ND
	Apr-04	NR	10	ND	ND	ND	WL	ND	WL	ND	NI	NI	WL		ND
	Oct-04	NR	10	ND	ND	ND	WL	ND	WL	ND	NI	NI	WL		ND
	Apr-05	NR	10	ND	ND	ND	WL	ND	WL	ND	WL	WL	WL		ND
	Oct-05	NR	10	ND	NS	ND	WL	ND	WL	ND	WL	WL	WL		ND
	28-Apr-06	NR	10	ND	ND	ND	NS	ND	NS	ND	WL	WL	WL		ND
	11-Oct-06	NR	10	ND	ND	ND	WL	ND	WL	ND	WL	WL	WL		ND
	19-Apr-07	2.0	10	ND	ND	ND	NS	2.0 B	WL	ND	WL	WL	WL		2.1 J
	11-Oct-07	3.0	10	ND	NS	ND	NS	ND	NS	ND	WL	WL	WL		ND
NC 2L = 50 µg/L (10/23/07)	15-Apr-08	2.7	10.0	ND	ND	ND	NS	ND	WL	ND	WL	WL	WL		ND
	15-Oct-08	2.7	10.0	ND	AB	ND	AB	ND	WL	ND	WL	WL	WL		ND
	19-Mar-09	2.7	10.0	NS	AB	NS	AB	NS	NS	NS	4.8 J	3.1 J	ND		ND
	22-Apr-09	2.7	10.0	ND	AB	ND	AB	ND	NS	11.4	ND	ND	ND		ND
	14-May-09	2.7	10.0	NS	AB	NS	AB	NS	NS	NS	ND	ND	ND		ND
	08-Oct-09	2.7	10.0	ND	AB	2.9 J	AB	ND	NS	11.0	ND	ND	ND		ND
NC 2L = 10 µg/L (01/01/10)	27-Apr-10	2.7	10.0	ND	AB	ND	AB	ND	NS	5.8 J	ND	ND	ND		ND
	12-Oct-10	2.7	10.0	ND	AB	ND	AB	ND	NS	8.2 J	ND	ND	ND		ND
	14-Apr-11	2.7	10.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	13-Oct-11	5.0	10.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
	17-Apr-12	5.0	10.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
Barium	Apr-00	2	8	NA	240	180	340	ND	NI	NI	NI	NI	NI		ND
	Nov-00	NR	500	WL	ND	ND	ND	ND	NI	NI	NI	NI	NI		ND
	Apr-01	NR	500	WL	ND	ND	ND	ND	NI	NI	NI	NI	NI		ND
	Dec-01	NR	500	WL	ND	ND	ND	ND	NI	NI	NI	NI	NI		ND
	Apr-02	NR	500	WL	ND	ND	ND	ND	ND	NI	NI	NI	WL		ND
	Nov-02	NR	500	WL	ND	ND	ND	ND	ND	NI	NI	NI	WL		ND
	Apr-03	NR	500	WL	ND	ND	ND	ND	ND	WL	NI	NI	WL		ND
	Nov-03	NR	500	ND	ND	ND	WL	ND	WL	ND	NI	NI	WL		ND
	Apr-04	NR	500	ND	ND	ND	WL	ND	WL	ND	NI	NI	WL		ND
	Oct-04	NR	500	ND	ND	ND	WL	ND	WL	ND	NI	NI	WL		ND
	Apr-05	NR	500	ND	ND	ND	WL	ND	WL	ND	WL	WL	WL		ND
	Oct-05	NR	500	ND	NS	ND	WL	ND	WL	ND	WL	WL	WL		ND
	28-Apr-06	NR	500	ND	ND	ND	NS	ND	NS	ND	WL	WL	WL		ND
	11-Oct-06	NR	500	ND	ND	ND	WL	ND	WL	ND	WL	WL	WL		ND
	19-Apr-07	0.20	100	58.8 J	19.4 J	66.0 J	NS	24.9 J	WL	140	WL	WL	WL		0.30 J
	11-Oct-07	2.0	100	38.2 B	NS	478	NS	45.8 B	NS	241	WL	WL	WL		35.8 J
NC 2L = 2,000 µg/L (10/23/07)	15-Apr-08	0.20	100	37.8 J	19.9 J	44.0 J	NS	31.3 J	WL	156	WL	WL	WL		ND
	15-Oct-08	0.20	100	41.3 J	AB	73.8 J	AB	19.9 J	WL	175	WL	WL	WL		ND
	19-Mar-09	0.20	100	NS	AB	NS	AB	NS	NS	NS	357	59.0 J	62.4 J		11.5 J
	22-Apr-09	0.20	100	46.4 B	AB	48.3 B	AB	19.8 B	NS	300	95.0 J	56.5 B	63.2 B		13.4 (13.8) J
	14-May-09	0.20	100	NS	AB	NS	AB	NS	NS	NS	101	49.1 B	74.1		12.5 J
	08-Oct-09	0.20	100	39.7 B	AB	77.9 B	AB	106	NS	259	120	85.5 J	113		18.5 (15.4) J
NC 2L = 700 µg/L (01/01/10)	27-Apr-10	0.20	100	42.1 B	AB	54.9 B	AB	111 B	NS	333	74.9 B	62.0 B	79.7 B		27.2 J
	12-Oct-10	0.20	100	48.8 J	AB	72.5 J	AB	117	NS	285	95.3 J	93.0 J	147		0.54 J
Resample	14-Dec-10	0.20	100	NS	AB	NS	AB	NS	NS	309	NS	NS	94.6 J		ND
	14-Apr-11	0.20	100	46.5 B	AB	35.9 B	AB	43.6 B	NS	250	52.4 B	51.2 B	89.6 J		12.0 J
	13-Oct-11	5.0	100	36.9 J	AB	40.6 J	AB	126	NS	323	61.3 J	NS	107		ND
	17-Apr-12	5.0	100	42.8 J	AB	26.1 J	AB	61.7 J	NS	258	31.0 J	NS	74.3 J		ND
Beryllium	19-Mar-09	0.10	1.0	NS	AB	NS	AB	NS	NS	NS	1.3	0.13 J	ND		ND
GWPS = 4 µg/L (10/23/07)	22-Apr-09	0.10	1.0	ND	AB	ND	AB	ND	NS	ND	0.20 J	ND	ND		ND
	14-May-09	0.10	1.0	NS	AB	NS	AB	NS	NS	NS	0.21	ND	ND		ND
	08-Oct-09	0.10	1.0	ND	AB	ND	AB	ND	NS	ND	0.48 B	0.23 B	ND		0.1 J
	27-Apr-10	0.10	1.0	0.32 J	AB	0.38 J	AB	0.16 J	NS	ND	0.21 J	0.13 J	ND		ND
	12-Oct-10	0.10	1.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	14-Apr-11	0.10	1.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	13-Oct-11	1.0	1.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
	17-Apr-12	1.0	1.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND

TABLE 3

SUMMARY OF HISTORICAL GROUNDWATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)																											
		DL	RL	Background		Downgradient																						Blanks	
				MW-6		MW-1		MW-2		MW-3		MW-4		MW-5		MW-7		MW-8		MW-10S		P-19S							
Cadmium	Apr-00	1	4	NA		2	J	2	J	4		ND		NI		NI		NI		NI		NI						ND	
	Nov-00	NR	1	WL		2		ND		ND		ND		NI		NI		NI		NI		NI						ND	
	Apr-01	NR	1	WL		ND		ND		ND		ND		NI		NI		NI		NI		NI						ND	
	Dec-01	NR	1	WL		3.5		1.0		ND		ND		NI		NI		NI		NI		NI						ND	
	Apr-02	NR	1	WL		ND		ND		ND		ND		ND		NI		NI		NI		WL						ND	
	Nov-02	NR	1	WL		1.3		ND		ND		1.2		1.0		NI		NI		NI		WL						ND	
	Apr-03	NR	1	WL		2.0		1.4		1.9		1.7		2.6		WL		NI		NI		WL						ND	
	Nov-03	NR	1	ND		3.2		1.1		WL		1.4		WL		ND		NI		NI		WL						ND	
	Apr-04	NR	1	1.8		ND		1.7		WL		ND		WL		ND		NI		NI		WL						ND	
	Oct-04	NR	1	1		ND		ND		WL		ND		WL		ND		NI		NI		WL						ND	
	Apr-05	NR	1	ND		ND		ND		WL		ND		WL		ND		WL		WL		WL						ND	
	Oct-05	NR	1	ND		NS		ND		WL		ND		WL		ND		WL		WL		WL						ND	
	28-Apr-06	NR	1	ND		ND		ND		NS		ND		NS		ND		WL		WL		WL						ND	
	11-Oct-06	NR	1.00	ND		ND		ND		WL		ND		WL		ND		WL		WL		WL						ND	
	19-Apr-07	0.50	1	ND		ND		ND		NS		ND		WL		ND		WL		WL		WL						ND	
	11-Oct-07	0.1	1	ND		NS		0.4	J	NS		ND		NS		ND		WL		WL		WL						ND	
NC 2L = 1.75 µg/L (10/23/07)	15-Apr-08	0.50	1.0	ND		ND		ND		NS		ND		WL		ND		WL		WL		WL						ND	
	15-Oct-08	0.50	1.0	ND		AB		ND		AB		ND		WL		ND		WL		WL		WL						ND	
	19-Mar-09	0.50	1.0	NS		AB		NS		AB		NS		NS		NS		ND		ND		ND						ND	
	22-Apr-09	0.50	1.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND						ND	
	14-May-09	0.50	1.0	NS		AB		NS		AB		NS		NS		NS		ND		ND		ND						ND	
	08-Oct-09	0.50	1.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND						ND	
NC 2L = 2 µg/L (01/01/10)	27-Apr-10	0.50	1.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND						ND	
	12-Oct-10	0.50	1.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND						ND	
	14-Apr-11	0.50	1.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND						ND	
	13-Oct-11	1.0	1.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND						ND	
	17-Apr-12	1.0	1.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND						ND	
Chromium	Apr-00	3	12	NA		36		30		76		10	J	NI		NI		NI		NI		NI						ND	
	Nov-00	NR	10	WL		15		ND		ND		ND		NI		NI		NI		NI		NI						ND	
	Apr-01	NR	10	WL		ND		ND		ND		ND		NI		NI		NI		NI		NI						ND	
	Dec-01	NR	10	WL		31		10		ND		ND		NI		NI		NI		NI		NI						ND	
	Apr-02	NR	10	WL		ND		ND		ND		ND		ND		NI		NI		NI		WL						45	
	Nov-02	NR	10	WL		ND		ND		ND		ND		ND		NI		NI		NI		WL						ND	
	Apr-03	NR	10	WL		ND		ND		ND		ND		ND		WL		NI		NI		WL						ND	
	Nov-03	NR	10	ND		ND		ND		WL		ND		WL		ND		NI		NI		WL						ND	
	Apr-04	NR	10	ND		ND		ND		WL		ND		WL		ND		NI		NI		WL						ND	
	Oct-04	NR	10	ND		ND		ND		WL		ND		WL		ND		NI		NI		WL						ND	
	Apr-05	NR	10	ND		ND		ND		WL		ND		WL		ND		WL		WL		WL						ND	
	Oct-05	NR	10	ND		NS		14		WL		ND		WL		ND		WL		WL		WL						ND	
	28-Apr-06	NR	10	ND		ND		ND		NS		ND		NS		ND		WL		WL		WL						ND	
	11-Oct-06	NR	10.0	ND		ND		ND		WL		ND		WL		ND		WL		WL		WL						ND	
	19-Apr-07	2.0	10	ND		ND		10.9		NS		3.8	J	WL		ND		WL		WL		WL						ND	
	11-Oct-07	1.0	10	1.7	J	NS		121		NS		5.8	J	NS		12.7		WL		WL		WL						ND	
Resample	28-Dec-07	1.0	10	NS		NS		15.7		NS		NS		NS		NS		WL		WL		WL						ND	
NC 2L = 50 µg/L (10/23/07)	15-Apr-08	0.40	10.0	1.5	B	2.1	B	11.1		NS		7.7	J	WL		0.47	B	WL		WL		WL						0.61	J
	15-Oct-08	0.40	10.0	1.6	J	AB		15.3		AB		1.3	J	WL		1.8	J	WL		WL		WL						ND	
	19-Mar-09	0.40	10.0	NS		AB		NS		AB		NS		NS		NS		25.0		14.3		0.57	B					0.54	J
	22-Apr-09	0.40	10.0	0.53	J	AB		10.3		AB		2.6	J	NS		1.6	J	6.5	J	10.2		ND						ND	
	14-May-09	0.40	10.0	NS		AB		NS		AB		NS		NS		NS		6.3	J	7.6	J	ND						ND	
	08-Oct-09	0.40	10.0	0.41	J	AB		16.5		AB		0.71	J	NS		10.5		8.6	J	25.1		0.45	J					ND	
NC 2L = 10 µg/L (01/01/10)	27-Apr-10	0.40	10.0	0.41	J	AB		14.2		AB		1.9	J	NS		4.3	J	4.9	J	7.6	J	0.46	J					ND	
Resample	15-Jun-10	0.40	10.0	NS		AB		4.0	J	AB		NS		NS		NS		NS		NS		NS						ND	
	12-Oct-10	0.40	10.0	ND		AB		12.7		AB		2.9	J	NS		4.5	J	7.6	J	3.0	J	0.67	J					ND	
Resample	14-Dec-10	0.40	10.0	NS		AB		1.8	J	AB		NS		NS		NS		NS		NS		NS						ND	
	14-Apr-11	0.40	10.0	0.68	J	AB		3.2	J	AB		3.6	J	NS		5.0	J	3.5	J	8.9	J	0.88	J					ND	
	13-Oct-11	5.0	10.0	ND		AB		5.2	J	AB		ND		NS		ND		ND		NS		ND						ND	
	17-Apr-12	5.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND						ND	
Cobalt	19-Mar-09	0.60	10.0	NS		AB		NS		AB		NS		NS		NS		32.8		4.5	B	9.9	B					4.5	J
GWPS = 70 µg/L (10/23/07)	22-Apr-09	0.60	10.0	NS		AB		NS		AB		NS		NS		NS		9.7	B	1.8	B	10.4	B					5.7	J
	14-May-09	0.60	10.0	NS		AB		NS		AB		NS		NS		NS		11.1	B	4.8	B	10.3	B					4.6	J
	08-Oct-09	0.60	10.0	NS		AB		NS		AB		NS		NS		NS		6.1	J	6.8	J	5.9	J					ND	
	27-Apr-10	0.60	10.0	ND		AB		ND		AB		1.4	J	NS		25.6		3.4	J	ND		4.4	J					ND	
GWPS = 1 µg/L (10/01/10)	12-Oct-10	0.60	10.0	ND		AB		ND		AB		4.2	B	NS		30.5		2.5	B	0.65	B	15.1						2.4	J
Resample	14-Dec-10	0.60	10.0	NS		AB		NS		AB		NS		NS		18.8		NS		NS		7.0	B					3.1	J
	14-Apr-11	0.60	10.0	2.7	B	AB		0.81	B	AB		6.0	B	NS		21.0	B	8.0	B	7.5	B	5.0	B					4.5	J
	13-Oct-11	5.0	10.0	ND		AB		ND		AB		7.9	J	NS		12.1		ND		NS		12.8						ND	
	17-Apr-12	5.0	10.0	ND		AB		ND		AB		ND		NS		16.9		ND		NS		5.0	J					ND	
Copper	19-Mar-09	0.30	10.0	NS		AB		NS		AB		NS		NS		NS		9.1	J	15.6		ND						ND	
NC 2L = 1,000 µg/L (10/23/07)	22-Apr-09	0.30	10.0	NS		AB		NS		AB		NS		NS		NS		2.1	B	15.3	B	0.52	B					0.78	J
	14-May-09	0.30	10.0	NS		AB		NS		AB		NS		NS		NS		1.9	J	11.8		ND						ND	
	08-Oct-09	0.30	10.0	NS		AB		NS		AB		NS		NS		NS		2.4	J	27.8		0.44	J					ND	
	27-Apr-10	0.30	10.0	ND		AB		9.4	J	AB		ND		NS		ND		1.4	J	8.0	J	1.1	J					ND	
	12-Oct-10	0.30	10.0	ND		AB		10.2		AB		ND		NS		ND		1.5	J	3.3	J	1.0	J					ND	
	14-Apr-11	0.30	10.0	1.4	B	AB		2.9	J	AB		2.6	J	NS		6.0	J	2.3	J	11.0		1.7	B					0.44	J
	13-Oct-11	5.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND						ND	
	17-Apr-12	5.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND						ND	

TABLE 3

SUMMARY OF HISTORICAL GROUNDWATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)																											
		DL	RL	Background		Downgradient																						Blanks	
				MW-6		MW-1		MW-2		MW-3		MW-4		MW-5		MW-7		MW-8		MW-10S		P-19S							
Iron	19-Mar-09	14.0	300	NS		AB		NS		AB		NS		NS		NS		54500		4810		3150		21.6	J				
	22-Apr-09	14.0	300	NS		AB		NS		AB		NS		NS		NS		14600		3470		4130		ND					
	14-May-09	14.0	300	NS		AB		NS		AB		NS		NS		NS		15600		2680		2020		ND					
	08-Oct-09	14.0	300	NS		AB		NS		AB		NS		NS		NS		19400		9670		8060		ND					
NC 2L = 300 µg/L (01/01/10)	27-Apr-10	14.0	300	242	J	AB		10900		AB		642		NS		11300		11000		2940		1070		15.8	J				
Resample	15-Jun-10	14.0	300	NS		AB		2910		AB		887		NS		13000		NS		NS		NS		26.5	J				
	12-Oct-10	14.0	300	206	J	AB		12600		AB		559		NS		16800		14900		819		665		ND					
	14-Apr-11	14.0	300	918		AB		3020		AB		3520		NS		3370		7180		2900		595		ND					
	13-Oct-11	50.0	300	78.6	J	AB		5530		AB		177	J	NS		15100		8410		NS		960		ND					
	17-Apr-12	50.0	300	142	J	AB		4240		AB		926		NS		8490		3150		NS		968		ND					
Lead	Apr-00	3	12	NA		5	J	5	J	19		ND		NI		NI		NI		NI		NI		ND					
	Nov-00	NR	10	WL		ND		ND		ND		ND		NI		NI		NI		NI		NI		ND					
	Apr-01	NR	10	WL		ND		ND		ND		ND		NI		NI		NI		NI		NI		ND					
	Dec-01	NR	10	WL		11		ND		ND		ND		NI		NI		NI		NI		NI		ND					
	Apr-02	NR	10	WL		ND		ND		ND		ND		ND		NI		NI		NI		WL		ND					
	Nov-02	NR	10	WL		ND		ND		ND		ND		ND		NI		NI		NI		WL		ND					
	Apr-03	NR	10	WL		ND		ND		ND		ND		ND		WL		NI		NI		WL		ND					
	Nov-03	NR	10	ND		ND		ND		WL		ND		WL		ND		NI		NI		WL		ND					
	Apr-04	NR	10	ND		ND		ND		WL		ND		WL		ND		NI		NI		WL		ND					
	Oct-04	NR	10	ND		ND		ND		WL		ND		WL		ND		NI		NI		WL		ND					
	Apr-05	NR	10	ND		ND		ND		WL		ND		WL		ND		WL		WL		WL		ND					
	Oct-05	NR	10	ND		NS		ND		WL		ND		WL		ND		WL		WL		WL		ND					
	28-Apr-06	NR	10	ND		ND		ND		NS		ND		NS		ND		WL		WL		WL		ND					
	11-Oct-06	NR	10.0	ND		ND		ND		WL		ND		WL		ND		WL		WL		WL		ND					
	19-Apr-07	2.0	10	ND		ND		ND		NS		ND		WL		ND		WL		WL		WL		ND					
	11-Oct-07	6.0	10	ND		NS		ND		NS		ND		NS		ND		WL		WL		WL		ND					
NC 2L = 15 µg/L (10/23/07)	15-Apr-08	4.0	10.0	ND		ND		ND		NS		ND		WL		ND		WL		WL		WL		ND					
	15-Oct-08	4.0	10.0	ND		AB		ND		AB		ND		WL		ND		WL		WL		WL		ND					
	19-Mar-09	4.0	10.0	NS		AB		NS		AB		NS		NS		NS		ND		ND		ND		ND					
	22-Apr-09	4.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND		ND					
	14-May-09	4.0	10.0	NS		AB		NS		AB		NS		NS		NS		ND		ND		ND		ND					
	08-Oct-09	4.0	10.0	ND		AB		ND		AB		ND		NS		6.9	J	ND		ND		ND		ND					
	27-Apr-10	4.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND		ND					
	12-Oct-10	4.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND		ND					
	14-Apr-11	4.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND		ND					
	13-Oct-11	5.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND		ND					
	17-Apr-12	5.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND		ND					
Manganese	19-Mar-09	0.30	50.0	NS		AB		NS		AB		NS		NS		NS		830		359		1280		5.2	J				
	22-Apr-09	0.30	50.0	NS		AB		NS		AB		NS		NS		NS		188		553		850		4.7	J				
	14-May-09	0.30	50.0	NS		AB		NS		AB		NS		NS		NS		196		640		819		4.0	J				
	08-Oct-09	0.30	50.0	NS		AB		NS		AB		NS		NS		NS		236		1050		1890		6.4	J				
NC 2L = 50 µg/L (01/01/10)	27-Apr-10	0.30	50.0	9.4	B	AB		99.6		AB		750		NS		18600	D	137		347		793		4.8	J				
Resample	15-Jun-10	0.30	50.0	NS		AB		29.3	B	AB		914		NS		19900	D	NS		NS		NS		7.4	J				
	12-Oct-10	0.30	50.0	9.2	J	AB		103		AB		1390		NS		16900		180		592		1530		0.33	J				
	14-Apr-11	0.30	50.0	25.6	J	AB		31.2	J	AB		62.6		NS		13700		88.0		250		786		1.7	J				
	13-Oct-11	5.0	50.0	ND		AB		138		AB		2150		NS		18600		111		NS		1410		ND					
	17-Apr-12	5.0	50.0	6.0	J	AB		38.4	J	AB		571		NS		14000		37.0	J	NS		838		ND					
Mercury	19-Mar-09	0.070	0.20	NS		AB		NS		AB		NS		NS		NS		0.10	B	0.098	B	0.070		0.086	J				
NC 2L = 1.05 µg/L (10/23/07)	22-Apr-09	0.070	0.20	ND		AB		ND		AB		ND		NS		0.12	J	ND		ND		ND		ND					
	14-May-09	0.070	0.20	NS		AB		NS		AB		NS		NS		NS		ND		ND		ND		ND					
	08-Oct-09	0.070	0.20	ND		AB		ND		AB		ND		NS		0.25		0.075	J	ND		ND		ND					
NC 2L = 1 µg/L (01/01/10)	27-Apr-10	0.070	0.20	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND		ND					
	12-Oct-10	0.070	0.20	ND		AB		ND		AB		0.10	J	NS		0.077	J	ND		ND		ND		ND					
	14-Apr-11	0.10	0.20	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND		ND					
	13-Oct-11	0.10	0.20	ND		AB		ND		AB		ND		NS		0.10	J	ND		NS		ND		ND					
	17-Apr-12	0.10	0.20	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND		ND					
Nickel	19-Mar-09	1.7	50.0	NS		AB		NS		AB		NS		NS		NS		25.0		8.2	B	2.0	B	1.8	J				
NC 2L = 100 µg/L (10/23/07)	22-Apr-09	1.7	50.0	ND		AB		NS		AB		NS		NS		NS		6.6	B	6.3	B	ND		1.8	J				
	14-May-09	1.7	50.0	NS		AB		NS		AB		NS		NS		NS		6.1	J	4.8	J	ND		ND					
	08-Oct-09	1.7	50.0	ND		AB		NS		AB		NS		NS		NS		9.0	J	13.8	J	2.2	J	ND					
	27-Apr-10	1.7	50.0	ND		AB		11.7	J	AB		ND		NS		ND		2.5	J	3.5	J	ND		ND					
	12-Oct-10	1.7	50.0	ND		AB		8.1	J	AB		2.2	J	NS		ND		3.9	J	ND		2.0	J	ND					
	14-Apr-11	1.7	50.0	ND		AB		ND		AB		ND		NS		2.0	B	ND		2.7	B	ND		3.8	J				
	13-Oct-11	5.0	50.0	ND		AB		5.8	J	AB		7.4	J	NS		ND		ND		NS		ND		ND					
	17-Apr-12	5.0	50.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND		ND					

TABLE 3

SUMMARY OF HISTORICAL GROUNDWATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)																											
		DL	RL	Background		Downgradient																						Blanks	
				MW-6		MW-1		MW-2		MW-3		MW-4		MW-5		MW-7		MW-8		MW-10S		P-19S							
Selenium	Apr-00	4	16	NA		ND		ND		13	J	ND		NI		NI		NI		NI		NI		ND					
	Nov-00	NR	20	WL		ND		ND		ND		ND		NI		NI		NI		NI		NI		ND					
	Apr-01	NR	20	WL		ND		ND		ND		ND		NI		NI		NI		NI		NI		ND					
	Dec-01	NR	20	WL		ND		ND		ND		ND		NI		NI		NI		NI		NI		ND					
	Apr-02	NR	20	WL		ND		ND		ND		ND		ND		NI		NI		NI		WL		ND					
	Nov-02	NR	20	WL		ND		ND		ND		ND		ND		NI		NI		NI		WL		ND					
	Apr-03	NR	20	WL		ND		ND		ND		ND		ND		WL		NI		NI		WL		ND					
	Nov-03	NR	20	ND		ND		ND		WL		ND		WL		ND		NI		NI		WL		ND					
	Apr-04	NR	20	ND		ND		ND		WL		ND		WL		ND		NI		NI		WL		ND					
	Oct-04	NR	20	ND		ND		ND		WL		ND		WL		ND		NI		NI		WL		ND					
	Apr-05	NR	20	ND		ND		ND		WL		ND		WL		ND		WL		WL		WL		ND					
	Oct-05	NR	20	ND		NS		ND		WL		ND		WL		ND		WL		WL		WL		ND					
	28-Apr-06	NR	20	ND		ND		ND		NS		ND		NS		ND		WL		WL		WL		ND					
	11-Oct-06	NR	20.0	ND		ND		ND		WL		ND		WL		ND		WL		WL		WL		ND					
	19-Apr-07	2.0	10	2.3	B	ND		ND		NS		ND		WL		ND		WL		WL		WL		3.5	J				
	11-Oct-07	2.0	10	ND		NS		ND		NS		ND		NS		ND		WL		WL		WL		ND					
NC 2L = 50 µg/L (10/23/07)	15-Apr-08	3.8	10.0	ND		ND		ND		NS		ND		WL		5.1	J	WL		WL		WL		ND					
	15-Oct-08	3.8	10.0	ND		AB		4.4	B	AB		ND		WL		ND		WL		WL		WL		5.6	J				
	19-Mar-09	3.8	10.0	NS		AB		NS		AB		NS		NS		NS		5.4	J	ND		ND		ND					
	22-Apr-09	3.8	10.0	ND		AB		ND		AB		ND		NS		5.1	J	ND		ND		ND		ND					
	14-May-09	3.8	10.0	NS		AB		NS		AB		NS		NS		NS		ND		ND		ND		ND					
	08-Oct-09	3.8	10.0	ND		AB		ND		AB		ND		NS		7.0	J	ND		ND		ND		ND					
NC 2L = 20 µg/L (01/01/10)	27-Apr-10	3.8	10.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND		ND					
	12-Oct-10	3.8	10.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND		ND					
	14-Apr-11	3.8	10.0	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND		ND					
	13-Oct-11	10.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND		ND					
	17-Apr-12	10.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND		ND					
Silver	15-Apr-08	0.10	10.0	ND		ND		ND		NS		0.32	J	WL		ND		WL		WL		WL		ND					
NC 2L = 17.5 µg/L (10/23/07)	15-Oct-08	0.10	10.0	0.27	J	AB		0.21	J	AB		ND		WL		2.8	J	WL		WL		WL		ND					
	19-Mar-09	0.10	10.0	NS		AB		NS		AB		NS		NS		NS		0.55	J	0.32	J	ND		ND					
	22-Apr-09	0.10	10.0	0.18	B	AB		0.29	B	AB		0.21	B	NS		2.9	J	0.33	B	0.46	B	0.24	B	0.14	J				
	14-May-09	0.10	10.0	NS		AB		NS		AB		NS		NS		NS		0.18	B	0.25	B	0.11	B	0.29	J				
	08-Oct-09	0.10	10.0	0.25	J	AB		0.51	J	AB		1.3	J	NS		2.4	J	0.41	B	0.6	J	0.27	B	ND (0.1)	J				
NC 2L = 20 µg/L (01/01/10)	27-Apr-10	0.10	10.0	ND		AB		0.20	J	AB		0.57	J	NS		1.5	J	ND		ND		ND		ND					
	12-Oct-10	0.10	10.0	ND		AB		ND		AB		0.94	J	NS		1.3	J	ND		ND		ND		ND					
	14-Apr-11	0.10	10.0	ND		AB		0.22	B	AB		0.11	B	NS		1.4	J	0.32	B	0.25	B	ND		0.21	J				
	13-Oct-11	5.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND		ND					
	17-Apr-12	5.0	10.0	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND		ND					
Thallium	19-Mar-09	3.0	5.5	NS		AB		NS		AB		NS		NS		NS		4.9	J	ND		3.8	J	ND					
GWPS = 0.28 µg/L (10/23/07)	22-Apr-09	3.0	5.5	NS		AB		NS		AB		NS		NS		NS		ND		ND		ND		ND					
	14-May-09	3.0	5.5	NS		AB		NS		AB		NS		NS		NS		ND		ND		ND		ND					
	08-Oct-09	3.0	5.5	NS		AB		NS		AB		NS		NS		NS		ND		ND		ND		ND					
	27-Apr-10	3.0	5.5	ND		AB		4.5	B	AB		4.6	B	NS		6.6	B	ND		ND		ND		3.0	J				
GWPS = 0.2 µg/L (10/01/10)	12-Oct-10	3.0	5.5	ND		AB		ND		AB		5.5		NS		7.4		ND		ND		ND		ND					
Resample	14-Dec-10	3.0	5.5	NS		AB		NS		AB		ND		NS		3.1	J	NS		NS		NS		ND					
	14-Apr-11	3.0	5.5	ND		AB		ND		AB		ND		NS		ND		ND		ND		ND		ND					
	13-Oct-11	5.4	5.5	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND		ND					
	17-Apr-12	5.4	5.5	ND		AB		ND		AB		ND		NS		ND		ND		NS		ND		ND					
Vanadium	19-Mar-09	0.20	25.0	NS		AB		NS		AB		NS		NS		NS		73.1		16.0	J	1.6	B	0.86	J				
GWPS = 3.5 µg/L (10/23/07)	22-Apr-09	0.20	25.0	NS		AB		NS		AB		NS		NS		NS		17.6	J	15.6	J	2.6	B	1.2	J				
	14-May-09	0.20	25.0	NS		AB		NS		AB		NS		NS		NS		18.4	J	12.5	J	1.5	B	0.85	J				
	08-Oct-09	0.20	25.0	NS		AB		NS		AB		NS		NS		NS		23.3	J	25.6		4.3	J	0.63	J				
	27-Apr-10	0.20	25.0	0.55	B	AB		19.6	J	AB		1.6	B	NS		3.1	J	12.2	J	8.5	J	3.0	J	0.48	J				
GWPS = 0.3 µg/L (10/01/10)	12-Oct-10	0.20	25.0	ND		AB		21.0	J	AB		ND		NS		ND		16.4	J	0.32	J	2.4	J	ND					
	14-Apr-11	0.20	25.0	0.85	J	AB		6.0	J	AB		7.6	J	NS		4.0	J	8.4	J	7.7	J	2.0	J	ND					
	13-Oct-11	5.0	25.0	ND		AB		11.2	J	AB		ND		NS		ND		9.0	J	NS		5.0	J	ND					
	17-Apr-12	5.0	25.0	ND		AB		9.9	J	AB		ND		NS		ND		ND		NS		ND		ND					
Zinc	19-Mar-09	0.40	10.0	NS		AB		NS		AB		NS		NS		NS		161		11.0	B	4.1	B	6.7	J				
NC 2L = 1,050 µg/L (10/23/07)	22-Apr-09	0.40	10.0	NS		AB		NS		AB		NS		NS		NS		34.9		5.9	B	3.8	B	1.6	J				
	14-May-09	0.40	10.0	NS		AB		NS		AB		NS		NS		NS		32.3		4.0	B	1.2	B	2.9	J				
	08-Oct-09	0.40	10.0	NS		AB		NS		AB		NS		NS		NS		39.2		14.0	B	1.9	B	2.9	J				
NC 2L = 1,000 µg/L (01/01/10)	27-Apr-10	0.40	10.0	ND		AB		23.2		AB		ND		NS		ND		19.9		1.6	J	ND		ND					
	12-Oct-10	0.40	10.0	ND		AB		22.8		AB		5.4	J	NS		ND		31.4		ND		1.0	J	ND					
	14-Apr-11	0.40	10.0	12.8	B	AB		11.3	B	AB		13.1	B	NS		9.4	B	20.6	B	13.7	B	10.3	B	28.9					
	13-Oct-11	10.0	10.0	ND		AB		11.4		AB		ND		NS		ND		16.5		NS		ND		ND					
	17-Apr-12	10.0	10.0	ND		AB		ND		AB		ND		NS		ND		10.2		NS		ND		ND					
Acetone	27-Apr-10	2.2	100	ND		AB		ND		AB		5.6	J	NS		3.7	J	3.1	J	4.3	J	5.1	J	ND					
NC 2L = 6,000 µg/L (01/01/10)	12-Oct-10	2.2	100	ND		AB		ND		AB		11.5	B	NS		7.3	B	ND		ND		3.5	B	8.0	J				
	14-Apr-11	2.2	100	ND		AB		ND		AB		ND		NS		ND		ND		ND		2.6	J	ND					
	13-Oct-11	2.2	100	ND		AB		ND		AB		5.1	B	NS		3.0	B	ND		NS		ND		2.4	J				
	17-Apr-12	2.2	100	ND		AB		ND		AB		ND		NS		7.8	J	ND		NS		3.0	J	ND					

TABLE 3

SUMMARY OF HISTORICAL GROUNDWATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)													
		DL	RL	Background	Downgradient										Blanks
				MW-6	MW-1	MW-2	MW-3	MW-4	MW-5	MW-7	MW-8	MW-10S	P-19S		
Benzene	08-Oct-09	0.25	1.0	ND	AB	ND	AB	0.46 J	NS	ND	ND	ND	ND		ND
NC 2L = 1 µg/L (10/23/07)	27-Apr-10	0.25	1.0	ND	AB	ND	AB	0.86 J	NS	0.69 J	ND	ND	ND		ND
	12-Oct-10	0.25	1.0	ND	AB	ND	AB	0.98 J	NS	ND	ND	ND	ND		ND
	14-Apr-11	0.25	1.0	ND	AB	ND	AB	ND	NS	0.25 J	ND	ND	ND		ND
	13-Oct-11	0.25	1.0	ND	AB	ND	AB	1.6	NS	ND	ND	NS	ND		ND
Resample	15-Nov-11	0.25	1.0	NS	AB	NS	AB	ND	NS	NS	NS	NS	NS		ND
	17-Apr-12	0.25	1.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
1,4-Dichlorobenzene	27-Apr-10	0.33	1.0	ND	AB	ND	AB	0.46 J	NS	ND	ND	ND	ND		ND
NC 2L = 6 µg/L (01/01/10)	12-Oct-10	0.33	1.0	ND	AB	ND	AB	0.40 J	NS	ND	ND	ND	ND		ND
	14-Apr-11	0.33	1.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	13-Oct-11	0.33	1.0	ND	AB	ND	AB	0.70 J	NS	ND	ND	NS	ND		ND
	17-Apr-12	0.33	1.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
Cis-1,2-Dichloroethylene	11-Oct-07	0.2	5	ND	AB	ND	NS	ND	NS	0.4 J	WL	WL	WL		ND
NC 2L = 70 µg/L (10/23/07)	15-Apr-08	0.19	5.0	ND	ND	ND	NS	ND	WL	ND	WL	WL	WL		ND
	15-Oct-08	0.19	5.0	ND	AB	ND	AB	ND	WL	ND	WL	WL	WL		ND
	19-Mar-09	0.19	5.0	NS	AB	NS	AB	NS	NS	NS	ND	ND	ND		ND
	22-Apr-09	0.19	5.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	14-May-09	0.19	5.0	NS	AB	NS	AB	NS	NS	NS	ND	ND	ND		ND
	08-Oct-09	0.19	5.0	ND	AB	ND	AB	ND	NS	0.26 J	ND	ND	ND		ND
	27-Apr-10	0.19	5.0	ND	AB	ND	AB	ND	NS	0.28 J	ND	ND	ND		ND
	12-Oct-10	0.19	5.0	ND	AB	ND	AB	ND	NS	0.19 J	ND	ND	ND		ND
	14-Apr-11	0.19	5.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	13-Oct-11	0.19	5.0	ND	AB	ND	AB	ND	NS	0.22 J	ND	NS	ND		ND
	17-Apr-12	0.19	5.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
4-Methyl-2-pentanone(MIBK)	08-Oct-09	0.33	100.0	ND	AB	ND	AB	0.46 J	NS	ND	ND	ND	ND		ND
GWPS = 560 µg/L (10/23/07)	27-Apr-10	0.33	100	ND	AB	ND	AB	0.41 J	NS	ND	ND	ND	ND		ND
	12-Oct-10	0.33	100	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	14-Apr-11	0.33	100	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	13-Oct-11	0.33	100	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
	17-Apr-12	0.33	100	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
Tetrahydrofuran	12-Oct-10	3.1	10.0	ND	AB	ND	AB	83.0	NS	7.4 J	ND	ND	ND		ND
NC 2L/GWPS = NE (10/01/10)	14-Apr-11	3.1	10.0	ND	AB	ND	AB	4.8 J	NS	6.3 J	ND	ND	ND		ND
	13-Oct-11	3.1	10.0	ND	AB	ND	AB	93.0	NS	6.4 J	ND	NS	ND		ND
	17-Apr-12	3.1	10.0	ND	AB	ND	AB	22.3	NS	7.9 J	ND	NS	ND		ND
Xylene(Total)	08-Oct-09	0.66	2.0	ND	AB	ND	AB	0.74 B	NS	ND	ND	ND	ND		0.76 J
NC 2L = 500 µg/L (10/23/07)	27-Apr-10	0.66	2.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	12-Oct-10	0.66	2.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	14-Apr-11	0.66	2.0	ND	AB	ND	AB	ND	NS	ND	ND	ND	ND		ND
	13-Oct-11	0.66	2.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
	17-Apr-12	0.66	2.0	ND	AB	ND	AB	ND	NS	ND	ND	NS	ND		ND
Alkalinity	19-Mar-09	5000	5000	NS	AB	NS	AB	NS	NS	NS	61000 B	52800 B	30500 B		26400
	22-Apr-09	5000	5000	NS	AB	NS	AB	NS	NS	NS	57300 B	52400 B	32500 B		23900
	14-May-09	5000	5000	NS	AB	NS	AB	NS	NS	NS	55700 B	59400 B	30700 B		22900
	08-Oct-09	5000	5000	NS	AB	NS	AB	NS	NS	NS	58000 B	74000 B	70000 B		26000
NC 2L/GWPS = NE (01/01/10)	27-Apr-10	5000	5000	8200 B	AB	18700 B	AB	72600 B	NS	868000	61500 B	51200 B	24600 B		20500
	12-Oct-10	5000	5000	12400	AB	25700	AB	110000	NS	904000	56600	104000	8200		ND
	14-Apr-11	5000	5000	14000	AB	20100	AB	18100	NS	630000	58400	40800	19600		ND
	13-Oct-11	5000	5000	17700	AB	29200	AB	256000	NS	915000	57300	NS	11500		ND
	17-Apr-12	5000	5000	10100	AB	24300	AB	90100	NS	872000	60700	NS	32400		ND
Total Dissolved Solids	19-Mar-09	NR	40000	NS	AB	NS	AB	NS	NS	NS	104000	270000	100000		14000 J
	22-Apr-09	20000	20000	NS	AB	NS	AB	NS	NS	NS	104000 B	204000 B	84000 B		78000
	14-May-09	20000	20000	NS	AB	NS	AB	NS	NS	NS	94000 B	210000 B	110000 B		78000
	08-Oct-09	20000	20000	NS	AB	NS	AB	NS	NS	NS	164000 B	288000 B	152000 B		88000
NC 2L = 500,000 µg/L (01/01/10)	27-Apr-10	100000	100000	114000 B	AB	160000 B	AB	568000	NS	1550000	112000 B	180000 B	110000 B		60000
Resample	15-Jun-10	100000	100000	NS	AB	NS	AB	696000	NS	1560000	NS	NS	NS		ND
	12-Oct-10	25000	25000	141000	AB	389000	AB	703000	NS	1620000	137000	301000	196000		ND
Resample	14-Dec-10	25000	25000	NS	AB	NS	AB	352000	NS	1660000	NS	NS	NS		ND
	14-Apr-11	25000	25000	132000	AB	102000	AB	123000	NS	1380000	103000	149000	91000		ND
	13-Oct-11	25000	25000	170000	AB	224000	AB	1340000	NS	1690000	126000	NS	200000		ND
	17-Apr-12	25000	25000	127000	AB	142000	AB	361000	NS	1500000	107000	NS	109000		ND

TABLE 3

SUMMARY OF HISTORICAL GROUNDWATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)																	
		DL	RL	Background		Downgradient												Blanks	
				MW-6		MW-1	MW-2		MW-3	MW-4		MW-5	MW-7		MW-8		MW-10S		P-19S			
Chloride	19-Mar-09	5000	5000	NS		AB	NS		AB	NS		NS	NS		6700	B	13100	B	10900	B	12000	
	22-Apr-09	5000	5000	NS		AB	NS		AB	NS		NS	NS		6900	B	13700	B	9500	B	11800	
	14-May-09	5000	5000	NS		AB	NS		AB	NS		NS	NS		7800	B	16400	B	11200	B	10700	
	08-Oct-09	5000	5000	NS		AB	NS		AB	NS		NS	NS		5500	B	17200	B	13100	B	11400	
NC 2L = 250,000 µg/L (01/01/10)	27-Apr-10	5000	5000	7900	B	AB	ND		AB	51100	D	NS	127000		ND		17500	B	12600	B	8000	
	12-Oct-10	5000	5000	9900		AB	ND		AB	52200		NS	149000		ND		24200		17900		ND	
	14-Apr-11	5000	5000	9410		AB	ND		AB	7120		NS	97600	D	ND		11900		12400		ND	
	13-Oct-11	5000	5000	9050		AB	ND		AB	93200		NS	161000		ND		NS		15700		ND	
	17-Apr-12	5000	5000	9840		AB	ND		AB	25800		NS	150000		ND		ND		11000		ND	
Sulfate	19-Mar-09	5000	250000	NS		AB	NS		AB	NS		NS	NS		8100	B	31400	B	16500	B	10700	J
	22-Apr-09	5000	250000	NS		AB	NS		AB	NS		NS	NS		5800	B	23300	B	16600	B	12200	J
	14-May-09	5000	250000	NS		AB	NS		AB	NS		NS	NS		11200	B	30400	B	15900	B	10700	J
	08-Oct-09	5000	250000	NS		AB	NS		AB	NS		NS	NS		ND		38500	B	6300	B	12100	J
NC 2L = 250,000 (01/01/10)	27-Apr-10	5000	250000	ND		AB	11800	B	AB	262000	D	NS	301000	D	ND		29300	B	24000	B	10600	J
	12-Oct-10	5000	5000	5600		AB	16000		AB	ND		NS	366000		6900		79300		89300		ND	
	14-Apr-11	5000	250000	ND		AB	25000	J	AB	34200	J	NS	393000	J,D	ND		17800	J	26400	J	ND	
	13-Oct-11	5000	5000	ND		AB	22300		AB	10600		NS	268000		ND		NS		94100		ND	
	17-Apr-12	5000	5000	ND		AB	8880		AB	134000		NS	281000		ND		NS		26600		ND	

Notes:

1. All concentrations are in micrograms per liter (ug/L).
2. MW = Groundwater monitoring well.
3. RL = Laboratory reporting limit (NC SWSL {or lower} beginning in April 2007 to present).
4. DL = Laboratory detection limit.
6. ND = Not detected above laboratory reporting limit November 2000 to October 2006, not detected above laboratory detection limit April 2000 and April 2007 to present.
7. J = Estimated value between the DL and the RL April 2000 and the DL and NC SWSL (or lower) from April 2007 to present.
8. B = Blank qualified data.
9. NC 2L Standard = North Carolina's groundwater quality standard established under 15A NCAC 2L, .0202. (specific concentration established by date).
10. GWPS = Groundwater Protection Standards (specific concentration established by date).
11. Shaded values are above the NC 2L or GWP Standards.
12. AB = Monitoring well has been abandoned.
13. NS = Not sampled and/or water levels not measured.
14. NR = Not reported. Detections limits not required prior to April 2007 sampling event.
15. WL = Water levels only.
16. NA = Not available.
17. NC SWSL = North Carolina Solid Waste Section limits.
18. D = Dilution; Laboratory performed a sample dilution, which may cause results to be estimated.

TABLE 4

SUMMARY OF HISTORICAL SURFACE WATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)				
		DL	RL	SW-1	SW-2	Blanks
Arsenic	Apr-00	8	10	ND	ND	ND
	Nov-00	NR	10	ND	ND	ND
	Apr-01	NR	10	ND	ND	ND
	Dec-01	NR	10	ND	ND	ND
	Apr-02	NR	10	ND	ND	ND
	Nov-02	NR	10	ND	ND	ND
	Apr-03	NR	10	ND	ND	ND
	Nov-03	NR	10	ND	ND	ND
	Apr-04	NR	10	ND	ND	ND
	Oct-04	NR	10	ND	ND	ND
	Apr-05	NR	10	ND	ND	ND
	Oct-05	NR	10	ND	Dry	ND
	28-Apr-06	NR	10	ND	ND	ND
	11-Oct-06	NR	10	ND	ND	ND
	19-Apr-07	2.0	10	ND	2.6 B	2.1 J
NC 2B = 50 µg/L (05/1/07)	11-Oct-07	3.0	10	Dry	Dry	ND
	15-Apr-08	2.7	10.0	ND	ND	ND
	15-Oct-08	2.7	10.0	ND	4.4 J	ND
	22-Apr-09	2.7	10.0	ND	ND	ND
	08-Oct-09	2.7	10.0	Dry	Dry	ND
	27-Apr-10	2.7	10.0	ND	ND	ND
	12-Oct-10	2.7	10.0	ND	ND	ND
	14-Apr-11	2.7	10.0	ND	ND	ND
	13-Oct-11	5.0	10.0	ND	ND	ND
	17-Apr-12	5.0	10.0	ND	ND	ND
Barium	Apr-00	2	8	ND	ND	ND
	Nov-00	NR	500	ND	ND	ND
	Apr-01	NR	500	ND	ND	ND
	Dec-01	NR	500	ND	ND	ND
	Apr-02	NR	500	ND	ND	ND
	Nov-02	NR	500	ND	ND	ND
	Apr-03	NR	500	ND	ND	ND
	Nov-03	NR	500	ND	ND	ND
	Apr-04	NR	500	ND	ND	ND
	Oct-04	NR	500	ND	ND	ND
	Apr-05	NR	500	ND	ND	ND
	Oct-05	NR	500	ND	Dry	ND
	28-Apr-06	NR	500	ND	ND	ND
	11-Oct-06	NR	500	ND	ND	ND
	19-Apr-07	0.20	100	28.1 J	40.7 J	0.30 J
NC 2B = NE µg/L (05/1/07)	11-Oct-07	2.0	100	Dry	Dry	35.8 J
	15-Apr-08	0.20	100	19.9 J	20.0 J	ND
	15-Oct-08	0.20	100	32.5 J	41.2 J	ND
	22-Apr-09	0.20	100	24.5 B	24.9 B	13.4 J
	08-Oct-09	0.20	100	Dry	Dry	18.5 J
	27-Apr-10	0.20	100	24.5 B	61.8 B	27.2 J
	12-Oct-10	0.20	100	46.2 J	50.5 J	0.54 J
	14-Apr-11	0.20	100	30.2 B	31.2 B	12.0 J
	13-Oct-11	5.0	100	77.2 J	83.9 J	ND
	17-Apr-12	5.0	100	33.9 J	38.4 J	ND

TABLE 4

SUMMARY OF HISTORICAL SURFACE WATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)				
		DL	RL	SW-1	SW-2	Blanks
Beryllium	27-Apr-10	0.10	1.0	0.28 J	0.11 J	ND
NC 2B = 6.5 µg/L (05/1/07)	12-Oct-10	0.10	1.0	ND	ND	ND
	14-Apr-11	0.10	1.0	ND	ND	ND
	13-Oct-11	1.0	1.0	ND	ND	ND
	17-Apr-12	1.0	1.0	ND	ND	ND
Cadmium	Apr-00	1	4	ND	ND	ND
	Nov-00	NR	1	ND	ND	ND
	Apr-01	NR	1	ND	ND	ND
	Dec-01	NR	1	1.4	ND	ND
	Apr-02	NR	1	ND	ND	ND
	Nov-02	NR	1	ND	ND	ND
	Apr-03	NR	1	1.2	1.2	ND
	Nov-03	NR	1	ND	ND	ND
	Apr-04	NR	1	ND	ND	ND
	Oct-04	NR	1	ND	ND	ND
	Apr-05	NR	1	ND	ND	ND
	Oct-05	NR	1	ND	Dry	ND
	28-Apr-06	NR	1	ND	ND	ND
	11-Oct-06	NR	1.00	ND	ND	ND
	19-Apr-07	0.50	1	ND	ND	ND
NC 2B = 2 µg/L (05/1/07)	11-Oct-07	0.1	1	Dry	Dry	ND
	15-Apr-08	0.50	1.0	ND	ND	ND
	15-Oct-08	0.50	1.0	ND	ND	ND
	22-Apr-09	0.50	1.0	ND	ND	ND
	08-Oct-09	0.50	1.0	Dry	Dry	ND
	27-Apr-10	0.50	1.0	ND	ND	ND
	12-Oct-10	0.50	1.0	ND	ND	ND
	14-Apr-11	0.50	1.0	ND	ND	ND
	13-Oct-11	1.0	1.0	ND	ND	ND
	17-Apr-12	1.0	1.0	ND	ND	ND
Chromium	Apr-00	3	12	ND	ND	ND
	Nov-00	NR	10	ND	ND	ND
	Apr-01	NR	10	ND	ND	ND
	Dec-01	NR	10	ND	ND	ND
	Apr-02	NR	10	ND	310	45
	Nov-02	NR	10	ND	ND	ND
	Apr-03	NR	10	ND	ND	ND
	Nov-03	NR	10	ND	ND	ND
	Apr-04	NR	10	ND	ND	ND
	Oct-04	NR	10	ND	ND	ND
	Apr-05	NR	10	ND	ND	ND
	Oct-05	NR	10	ND	Dry	ND
	28-Apr-06	NR	10	ND	ND	ND
	11-Oct-06	NR	10.0	ND	ND	ND
	19-Apr-07	2.0	10	ND	ND	ND
NC 2B = 50 µg/L (05/1/07)	11-Oct-07	1.0	10	Dry	Dry	ND
	15-Apr-08	0.40	10.0	ND	0.93 B	0.61 J
	15-Oct-08	0.40	10.0	ND	ND	ND
	22-Apr-09	0.40	10.0	ND	ND	ND
	08-Oct-09	0.40	10.0	Dry	Dry	ND
	27-Apr-10	0.40	10.0	ND	0.93 J	ND
	12-Oct-10	0.40	10.0	0.94 J	0.46 J	ND
	14-Apr-11	0.40	10.0	ND	0.62 J	ND
	13-Oct-11	5.0	10.0	ND	ND	ND
	17-Apr-12	5.0	10.0	ND	ND	ND

TABLE 4

SUMMARY OF HISTORICAL SURFACE WATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)							
		DL	RL	SW-1		SW-2		Blanks	
Cobalt	27-Apr-10	0.60	10.0	1.8	J	1.8	J	ND	
NC 2B= NE µg/L (05/1/07)	12-Oct-10	0.60	10.0	1.4	B	2.1	B	2.4	J
	14-Apr-11	0.60	10.0	6.8	B	4.3	B	4.5	J
	13-Oct-11	5.0	10.0	5.5	J	8.3	J	ND	
	17-Apr-12	5.0	10.0	ND		ND		ND	
Copper	27-Apr-10	0.30	10.0	1.4	J	ND		ND	
NC 2B = 7 µg/L (05/01/07)	12-Oct-10	0.30	10.0	1.6	J	1.6	J	ND	
	14-Apr-11	0.30	10.0	2.6	J	2.6	J	0.44	J
	13-Oct-11	5.0	10.0	ND		ND		ND	
	17-Apr-12	5.0	10.0	ND		ND		ND	
Iron	27-Apr-10	14.0	300	1480		717		15.8	J
NC 2B = 1,000 µg/L (05/01/07)	12-Oct-10	14.0	300	446		845		ND	
	14-Apr-11	14.0	300	2050		2110		ND	
	13-Oct-11	50.0	300	1280		2250		ND	
	17-Apr-12	50.0	300	1830		2000		ND	
Lead	Apr-00	3	12	ND		ND		ND	
	Nov-00	NR	10	ND		ND		ND	
	Apr-01	NR	10	ND		ND		ND	
	Dec-01	NR	10	ND		ND		ND	
	Apr-02	NR	10	ND		ND		ND	
	Nov-02	NR	10	ND		ND		ND	
	Apr-03	NR	10	ND		ND		ND	
	Nov-03	NR	10	ND		ND		ND	
	Apr-04	NR	10	ND		ND		ND	
	Oct-04	NR	10	ND		ND		ND	
	Apr-05	NR	10	ND		ND		ND	
	Oct-05	NR	10	ND		Dry		ND	
	28-Apr-06	NR	10	ND		ND		ND	
	11-Oct-06	NR	10.0	ND		ND		ND	
	19-Apr-07	2.0	10	ND		ND		ND	
NC 2B = 25 µg/L (05/01/07)	11-Oct-07	6.0	10	Dry		Dry		ND	
	15-Apr-08	4.0	10.0	ND		ND		ND	
	15-Oct-08	4.0	10.0	ND		ND		ND	
	22-Apr-09	4.0	10.0	ND		ND		ND	
	08-Oct-09	4.0	10.0	Dry		Dry		ND	
	27-Apr-10	4.0	10.0	ND		ND		ND	
	12-Oct-10	4.0	10.0	ND		ND		ND	
	14-Apr-11	4.0	10.0	ND		ND		ND	
	13-Oct-11	5.0	10.0	ND		ND		ND	
	17-Apr-12	5.0	10.0	ND		ND		ND	
Manganese	27-Apr-10	0.30	50.0	378		653		4.8	J
NC 2B = NE µg/L (05/01/07)	12-Oct-10	0.30	50.0	298		549		0.33	J
	14-Apr-11	0.30	50.0	232		246		1.7	J
	13-Oct-11	5.00	50.0	2660		3220		ND	
	17-Apr-12	5.00	50.0	461		651		ND	

TABLE 4

SUMMARY OF HISTORICAL SURFACE WATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)				
		DL	RL	SW-1	SW-2	Blanks
Selenium	Apr-00	4	16	ND	ND	ND
	Nov-00	NR	20	ND	ND	ND
	Apr-01	NR	20	ND	ND	ND
	Dec-01	NR	20	ND	ND	ND
	Apr-02	NR	20	ND	ND	ND
	Nov-02	NR	20	ND	ND	ND
	Apr-03	NR	20	ND	ND	ND
	Nov-03	NR	20	ND	ND	ND
	Apr-04	NR	20	ND	ND	ND
	Oct-04	NR	20	ND	ND	ND
	Apr-05	NR	20	ND	ND	ND
	Oct-05	NR	20	ND	Dry	ND
	28-Apr-06	NR	20	ND	ND	ND
	11-Oct-06	NR	20.0	ND	ND	ND
	19-Apr-07	2.0	10	ND	ND	3.5 J
NC 2B = 5 µg/L (05/01/07)	11-Oct-07	2.0	10	Dry	Dry	ND
	15-Apr-08	3.8	10.0	ND	ND	ND
	15-Oct-08	3.8	10.0	ND	8.5 B	5.6 J
	22-Apr-09	3.8	10.0	ND	ND	ND
	08-Oct-09	3.8	10.0	Dry	Dry	ND
	27-Apr-10	3.8	10.0	ND	ND	ND
	12-Oct-10	3.8	10.0	ND	ND	ND
	14-Apr-11	3.8	10.0	ND	ND	ND
	13-Oct-11	10.0	10.0	ND	ND	ND
	17-Apr-12	10.0	10.0	ND	ND	ND
Silver	15-Apr-08	0.10	10.0	ND	ND	ND
NC 2B = 0.06 µg/L (05/01/07)	15-Oct-08	0.10	10.0	0.13 J	0.11 J	ND
	22-Apr-09	0.10	10.0	0.16 B	0.30 B	0.14 J
	08-Oct-09	0.10	10.0	Dry	Dry	ND
	27-Apr-10	0.10	10.0	0.38 J	ND	ND
	12-Oct-10	0.10	10.0	ND	ND	ND
	14-Apr-11	0.10	10.0	ND	ND	0.21 J
	13-Oct-11	5.0	10.0	ND	ND	ND
	17-Apr-12	5.0	10.0	ND	ND	ND
Vanadium	27-Apr-10	0.20	25.0	2.0 J	0.93 J	0.48 J
NC 2B = NE µg/L (05/01/07)	12-Oct-10	0.20	25.0	ND	ND	ND
	14-Apr-11	0.20	25.0	2.5 J	2.5 J	ND
	13-Oct-11	5.0	25.0	ND	ND	ND
	17-Apr-12	5.0	25.0	ND	ND	ND
Zinc	12-Oct-10	0.40	10.0	2.3 J	ND	ND
NC 2B = 50 µg/L (05/01/07)	14-Apr-11	0.40	10.0	3.3 B	7.7 B	28.9
	13-Oct-11	10.0	10.0	ND	ND	ND
	17-Apr-12	10.0	10.0	ND	ND	ND
Acetone	14-Apr-11	2.2	100	ND	2.4 J	ND
NC 2B = NE µg/L (05/01/07)	13-Oct-11	2.2	100	8.1 B	12.9 J	2.4 J
	17-Apr-12	2.2	100	ND	ND	ND
2-Butanone	13-Oct-11	0.96	100	ND	2.0 J	ND
NC 2B = NE µg/L (05/01/07)	17-Apr-12	0.96	100	ND	ND	ND
Chloromethane	13-Oct-11	0.11	1.0	0.11 J	ND	ND
NC 2B = NE µg/L (05/01/07)	17-Apr-12	0.1	1.0	ND	ND	ND

TABLE 4

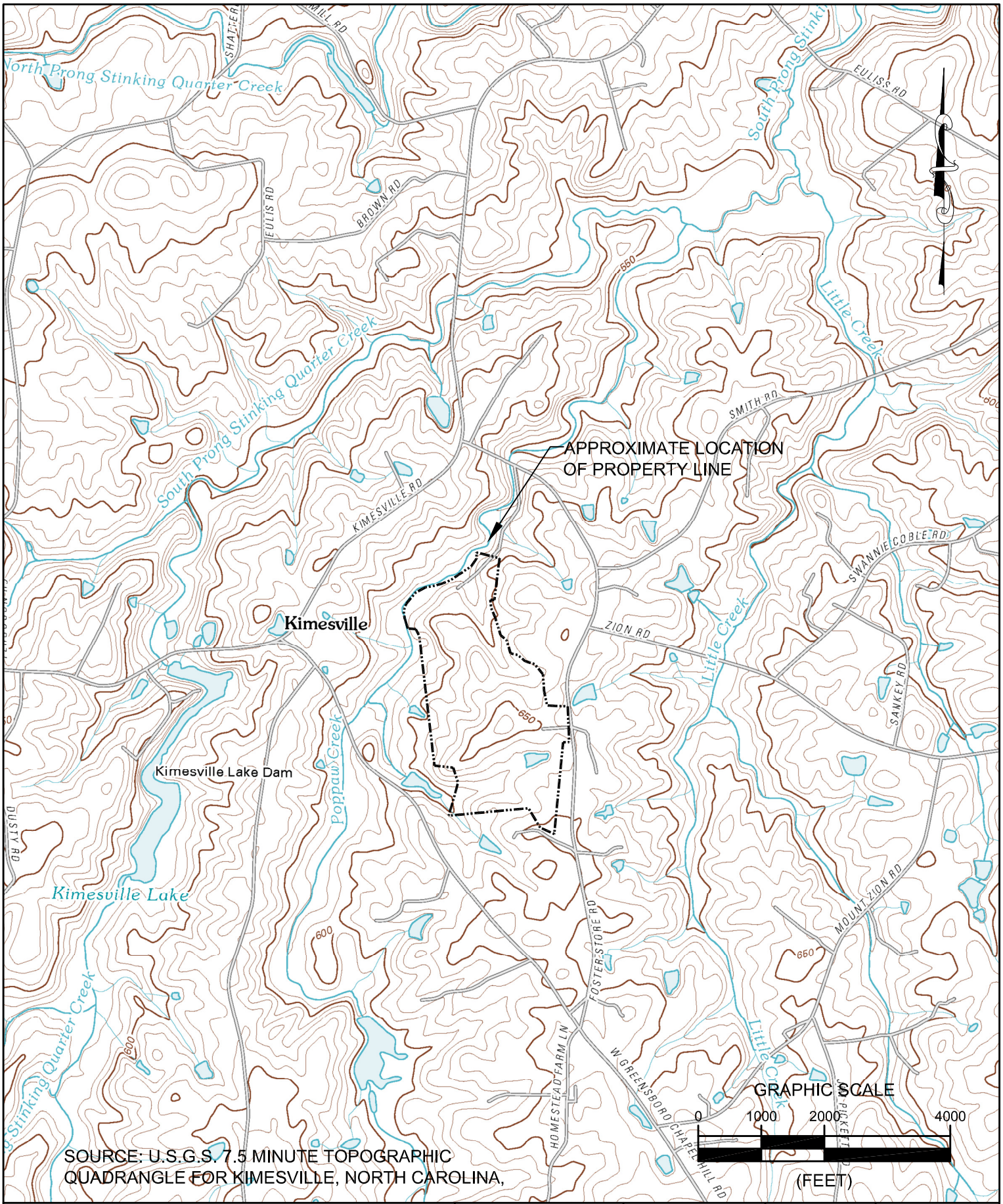
SUMMARY OF HISTORICAL SURFACE WATER CONSTITUENTS

Constituent	Date	Concentration (µg/L)				
		DL	RL	SW-1	SW-2	Blanks
Tetrahydrofuran	13-Oct-11	3.1	10.0	ND	5.3 J	ND
NC 2B = NE µg/L (05/01/07)	17-Apr-12	3.1	10.0	ND	ND	ND
Toluene	13-Oct-11	0.26	1.0	ND	0.3 J	ND
NC 2B = 11 µg/L (05/01/07)	17-Apr-12	0.26	1.0	ND	ND	ND
Trichlorofluoromethane	13-Oct-11	0.20	1.0	ND	4.0	ND
NC 2B = NE µg/L (05/01/07)	17-Apr-12	0.20	1.0	ND	ND	ND
Alkalinity	27-Apr-10	5000	5000	38900 B	61500 B	20500
NC 2B = NE µg/L (05/01/07)	12-Oct-10	5000	5000	ND	27800	ND
	14-Apr-11	5000	5000	27400	26900	ND
	13-Oct-11	5000	5000	63500	68800	ND
	17-Apr-12	5000	5000	43500	42500	ND
Total Dissolved Solids	27-Apr-10	100000	100000	88000 B	182000 B	60000
NC 2B = NE µg/L (05/01/07)	12-Oct-10	25000	25000	99000	98000	ND
	14-Apr-11	25000	25000	49000	59000	ND
	13-Oct-11	25000	25000	190000	228000	ND
	17-Apr-12	25000	25000	83000	79000	ND
Chloride	27-Apr-10	5000	5000	7200 B	8100 B	8000
NC 2B = 230000 µg/L (05/01/07)	12-Oct-10	5000	5000	8800	7100	ND
	14-Apr-11	5000	5000	5470	ND	ND
	13-Oct-11	5000	5000	19900	13700	ND
	17-Apr-12	5000	5000	7710	7540	ND
Sulfate	27-Apr-10	5000	250000	7800 B	23600 B	10600
NC 2B = NE µg/L (05/01/07)	12-Oct-10	5000	5000	21300	18200	ND
	14-Apr-11	5000	250000	7090 J	7060 J	ND
	13-Oct-11	5000	5000	33800	76700	ND
	17-Apr-12	5000	5000	6800	6340	ND

1. All concentrations are in micrograms per liter (mg/L).
2. SW = Surface water monitoring point.
3. RL = Laboratory reporting limit (NC SWSL {or lower} beginning in April 2007 to present).
4. DL = Laboratory detection limit.
5. ND = Not detected above laboratory reporting limit November 2000 to October 2006, not detected above laboratory detection limit April 2000 and April 2007 to present.
6. J = Estimated value between the DL and the RL April 2000 and the DL and NC SWSL (or lower) from April 2007 to present.
7. B = Blank qualified data.
8. NC 2B Standard = North Carolina's surface water standards (specific concentration established by date).
9. Shaded values are above the NC 2B Surface Water Standards
10. - = No data available/not reported.
11. NC SWSL = North Carolina Solid Waste Section limits.
12. The classification of the surface waters for Coble's Sandrock is Freshwater Aqudic Life.
13. NR = Not reported. Detections limits not required prior to April 2007 sampling event.
14. Dry = Surface water monitoring point was dry. No sample collected.
15. NE = Concentration not established.

Figure

Figure No. 1 Site Location Map



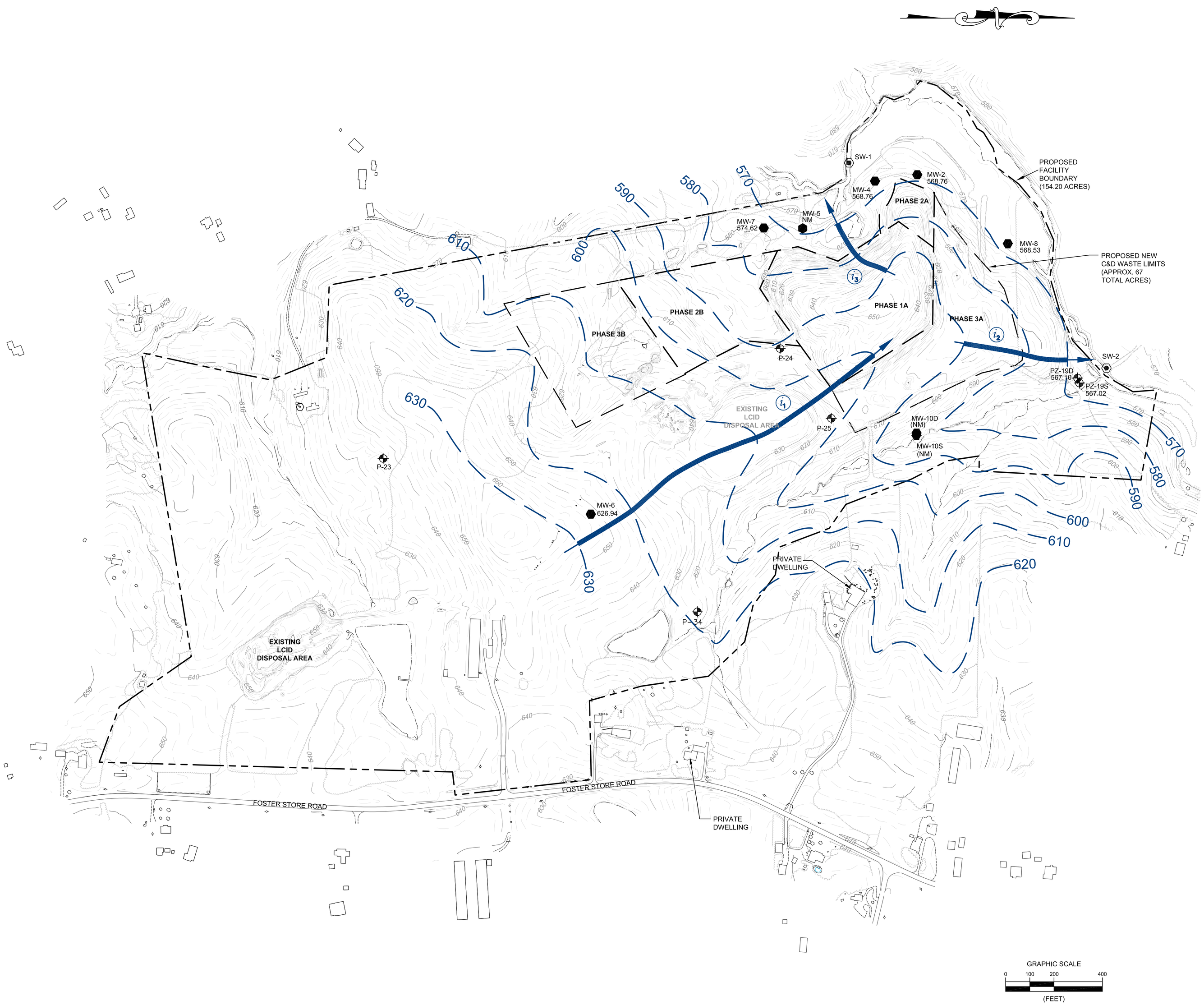
SOURCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLE FOR KIMESVILLE, NORTH CAROLINA,

COBLE'S SANDROCK C&D DEBRIS LANDFILL KIMESVILLE, NC	JOYCE ENGINEERING 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED ACE DRAWN HRW CHECKED ACE APPROVED GVB DATE 6/6/12	SCALE AS SHOWN	PROJECT NO. 419.1201.12
SITE LOCATION MAP		© 2012 Joyce Engineering All rights reserved.	NC CORP LIC: C-0782	FIGURE NO. 1

L:\Coble Sandrock\dwg\ANNUAL REPORTS\, 2011 SITE LOCATION MAP.dwg

Drawing

Drawing No. 1 Groundwater Surface Contour Map, April 12, 2012



LEGEND

- EXISTING 2' CONTOURS
- EXISTING 10' CONTOURS
- GROUNDWATER CONTOURS
- EXISTING CELL BOUNDARIES
- GROUNDWATER FLOW DIRECTION WITH GRADIENT CALCULATION SEGMENT
- SEGMENT USED FOR GRADIENT CALCULATIONS — i_1
- PIEZOMETER LOCATION — P-32
- GROUNDWATER MONITORING WELL LOCATION AND IDENTIFICATION — MW-6 629.94

NOTES:

1. TOPOGRAPHIC CONTOUR INTERVAL= 2 FEET.
2. GROUNDWATER SURFACE CONTOUR = 10 FEET.

GRAPHIC SCALE

0 100 200 400

(FEET)

DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

DESIGNED	ACE
DRAWN	HRW
CHECKED	ACE
APPROVED	GVB
DATE	6/6/12

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NC CORP LIC: C-0782

COBLE'S SANDROCK, INC.
KIMESVILLE, NORTH CAROLINA

GROUNDWATER SURFACE CONTOUR MAP
APRIL 16, 2012

PROJECT NO.
419.1201.12

SCALE
AS NOTED

DRAWING NO.
1

L:\Coble Sandrock\dwg\GW Event Maps\Coble's Sandrock GW Map APR 2012.dwg Layout=Layout1

Appendices

Appendix 1 Laboratory Analytical Report and Field Data Logs
Appendix 2 Statistical Analyses Worksheets

Appendix 1 Laboratory Analytical Report and Field Data Logs

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Pace Analytical Services, Inc.
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(704)875-9092

April 30, 2012

Mr. Jeremey Kerly
Joyce Engineering-NC
2211 West Meadowview Rd
Suite 101
Greensboro, NC 27407

RE: Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Dear Mr. Kerly:
Enclosed are the analytical results for sample(s) received by the laboratory on April 19, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kevin Godwin

kevin.godwin@pacelabs.com
Project Manager

Enclosures

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CERTIFICATIONS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Charlotte Certification IDs

9800 Kincey Ave. Ste 100, Huntersville, NC 28078
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Certification #: 99006001
South Carolina Drinking Water Cert. #: 99006003
Virginia Drinking Water Certification #: 00213
Connecticut Certification #: PH-0104
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Louisiana DHH Drinking Water # LA 100031
West Virginia Certification #: 357
Virginia/VELAP Certification #: 460144

Asheville Certification IDs

2225 Riverside Dr., Asheville, NC 28804
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia Certification #: 00072
West Virginia Certification #: 356
Virgina/VELAP Certification #: 460147

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SAMPLE SUMMARY

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92116828001	**0105-MW2**	Water	04/17/12 11:15	04/19/12 15:38
92116828002	**0105-MW4**	Water	04/17/12 11:35	04/19/12 15:38
92116828003	**0105-MW6**	Water	04/17/12 10:10	04/19/12 15:38
92116828004	**0105-MW7**	Water	04/17/12 11:45	04/19/12 15:38
92116828005	**0105-MW8**	Water	04/17/12 11:05	04/19/12 15:38
92116828006	**0105-P19S**	Water	04/17/12 10:35	04/19/12 15:38
92116828007	**0105-SW1**	Water	04/17/12 12:00	04/19/12 15:38
92116828008	**0105-SW2**	Water	04/17/12 10:45	04/19/12 15:38
92116828009	**0105-FIELD BLANK**	Water	04/17/12 12:15	04/19/12 15:38
92116828010	**0105-TRIP BLANK**	Water	04/16/12 10:00	04/19/12 15:38

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SAMPLE ANALYTE COUNT

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92116828001	**0105-MW2**	EPA 6010	JMW	17	PASI-A
		EPA 7470	SHB	1	PASI-A
		EPA 8260	MCK	56	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 2540C	LMD	1	PASI-A
		EPA 300.0	SAE	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
92116828002	**0105-MW4**	EPA 6010	JMW	17	PASI-A
		EPA 7470	SHB	1	PASI-A
		EPA 8260	MCK	56	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 2540C	LMD	1	PASI-A
		EPA 300.0	SAE	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
92116828003	**0105-MW6**	EPA 6010	JMW	17	PASI-A
		EPA 7470	SHB	1	PASI-A
		EPA 8260	MCK	56	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 2540C	LMD	1	PASI-A
		EPA 300.0	SAE	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
92116828004	**0105-MW7**	EPA 6010	JMW	17	PASI-A
		EPA 7470	SHB	1	PASI-A
		EPA 8260	MCK	56	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 2540C	LMD	1	PASI-A
		EPA 300.0	SAE	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
92116828005	**0105-MW8**	EPA 6010	JMW	17	PASI-A
		EPA 7470	SHB	1	PASI-A
		EPA 8260	MCK	56	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 2540C	LMD	1	PASI-A
		EPA 300.0	SAE	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
92116828006	**0105-P19S**	EPA 6010	JMW	17	PASI-A
		EPA 7470	SHB	1	PASI-A

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SAMPLE ANALYTE COUNT

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 8260	MCK	56	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 2540C	LMD	1	PASI-A
		EPA 300.0	SAE	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
92116828007	**0105-SW1**	EPA 6010	JMW	17	PASI-A
		EPA 7470	SHB	1	PASI-A
		EPA 8260	MCK	56	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 2540C	LMD	1	PASI-A
		EPA 300.0	SAE	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
92116828008	**0105-SW2**	EPA 6010	JMW	17	PASI-A
		EPA 7470	SHB	1	PASI-A
		EPA 8260	MCK	56	PASI-C
		SM 2320B	AES	1	PASI-A
		SM 2540C	LMD	1	PASI-A
		EPA 300.0	SAE	1	PASI-A
		SM 4500-Cl-E	JDA	1	PASI-A
92116828009	**0105-FIELD BLANK**	EPA 6010	JMW	17	PASI-A
		EPA 7470	SHB	1	PASI-A
		EPA 8260	MCK	56	PASI-C
92116828010	**0105-TRIP BLANK**	EPA 8260	MCK	56	PASI-C

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HITS ONLY

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92116828001	**0105-MW2**					
EPA 6010	Barium	26.1J	ug/L	100	04/24/12 15:46	
EPA 6010	Iron	4240	ug/L	300	04/24/12 15:46	
EPA 6010	Manganese	38.4J	ug/L	50.0	04/24/12 15:46	
EPA 6010	Vanadium	9.9J	ug/L	25.0	04/24/12 15:46	
SM 2320B	Alkalinity, Total as CaCO3	24300	ug/L	5000	04/25/12 11:05	
SM 2540C	Total Dissolved Solids	142000	ug/L	25000	04/20/12 23:31	
EPA 300.0	Sulfate	8880	ug/L	5000	04/24/12 20:27	
92116828002	**0105-MW4**					
EPA 6010	Barium	61.7J	ug/L	100	04/24/12 15:56	
EPA 6010	Iron	926	ug/L	300	04/24/12 15:56	
EPA 6010	Manganese	571	ug/L	50.0	04/24/12 15:56	
EPA 8260	Tetrahydrofuran	22.3	ug/L	10.0	04/23/12 08:01	
SM 2320B	Alkalinity, Total as CaCO3	90100	ug/L	5000	04/25/12 11:05	
SM 2540C	Total Dissolved Solids	361000	ug/L	25000	04/20/12 23:31	
EPA 300.0	Sulfate	134000	ug/L	50000	04/25/12 10:56	
SM 4500-Cl-E	Chloride	25800	ug/L	5000	04/27/12 15:23	
92116828003	**0105-MW6**					
EPA 6010	Barium	42.8J	ug/L	100	04/24/12 16:01	
EPA 6010	Iron	142J	ug/L	300	04/24/12 16:01	
EPA 6010	Manganese	6.0J	ug/L	50.0	04/24/12 16:01	
SM 2320B	Alkalinity, Total as CaCO3	10100	ug/L	5000	04/25/12 11:05	
SM 2540C	Total Dissolved Solids	127000	ug/L	25000	04/20/12 23:32	
SM 4500-Cl-E	Chloride	9840	ug/L	5000	04/27/12 15:25	
92116828004	**0105-MW7**					
EPA 6010	Barium	258	ug/L	100	04/24/12 16:04	
EPA 6010	Cobalt	16.9	ug/L	10.0	04/24/12 16:04	
EPA 6010	Iron	8490	ug/L	300	04/24/12 16:04	
EPA 6010	Manganese	14000	ug/L	500	04/25/12 13:32	
EPA 8260	Acetone	7.8J	ug/L	100	04/23/12 08:35	
EPA 8260	Tetrahydrofuran	7.9J	ug/L	10.0	04/23/12 08:35	
SM 2320B	Alkalinity, Total as CaCO3	872000	ug/L	5000	04/25/12 11:05	
SM 2540C	Total Dissolved Solids	1500000	ug/L	100000	04/20/12 23:32	
EPA 300.0	Sulfate	281000	ug/L	100000	04/25/12 11:10	
SM 4500-Cl-E	Chloride	150000	ug/L	25000	04/27/12 15:37	
92116828005	**0105-MW8**					
EPA 6010	Barium	31.0J	ug/L	100	04/24/12 16:12	
EPA 6010	Iron	3150	ug/L	300	04/24/12 16:12	
EPA 6010	Manganese	37.0J	ug/L	50.0	04/24/12 16:12	
EPA 6010	Zinc	10.2	ug/L	10.0	04/24/12 16:12	
SM 2320B	Alkalinity, Total as CaCO3	60700	ug/L	5000	04/25/12 11:05	
SM 2540C	Total Dissolved Solids	107000	ug/L	25000	04/20/12 23:32	
92116828006	**0105-P19S**					
EPA 6010	Barium	74.3J	ug/L	100	04/24/12 16:29	
EPA 6010	Cobalt	5.0J	ug/L	10.0	04/24/12 16:29	

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HITS ONLY

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
92116828006	**0105-P19S**					
EPA 6010	Iron	968	ug/L	300	04/24/12 16:29	
EPA 6010	Manganese	838	ug/L	50.0	04/24/12 16:29	
EPA 8260	Acetone	3.0J	ug/L	100	04/23/12 09:08	
SM 2320B	Alkalinity, Total as CaCO3	32400	ug/L	5000	04/25/12 11:05	
SM 2540C	Total Dissolved Solids	109000	ug/L	25000	04/20/12 23:33	
EPA 300.0	Sulfate	26600	ug/L	5000	04/24/12 22:16	
SM 4500-Cl-E	Chloride	11000	ug/L	5000	04/27/12 15:27	
92116828007	**0105-SW1**					
EPA 6010	Barium	33.9J	ug/L	100	04/24/12 16:32	
EPA 6010	Iron	1830	ug/L	300	04/24/12 16:32	
EPA 6010	Manganese	461	ug/L	50.0	04/24/12 16:32	
SM 2320B	Alkalinity, Total as CaCO3	43500	ug/L	5000	04/25/12 11:05	
SM 2540C	Total Dissolved Solids	83000	ug/L	25000	04/20/12 23:33	
EPA 300.0	Sulfate	6800	ug/L	5000	04/24/12 22:57	
SM 4500-Cl-E	Chloride	7710	ug/L	5000	04/27/12 15:28	
92116828008	**0105-SW2**					
EPA 6010	Barium	38.4J	ug/L	100	04/24/12 16:35	
EPA 6010	Iron	2000	ug/L	300	04/24/12 16:35	
EPA 6010	Manganese	651	ug/L	50.0	04/24/12 16:35	
SM 2320B	Alkalinity, Total as CaCO3	42500	ug/L	5000	04/25/12 11:05	
SM 2540C	Total Dissolved Solids	79000	ug/L	25000	04/20/12 23:34	
EPA 300.0	Sulfate	6340	ug/L	5000	04/24/12 23:10	
SM 4500-Cl-E	Chloride	7540	ug/L	5000	04/27/12 15:28	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-MW2 **Lab ID: 92116828001** Collected: 04/17/12 11:15 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	04/23/12 11:05	04/24/12 15:46	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:46	7440-38-2	
Barium	**26.1J**	ug/L	100	5.0	1	04/23/12 11:05	04/24/12 15:46	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 15:46	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 15:46	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:46	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:46	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:46	7440-50-8	
Iron	**4240**	ug/L	300	50.0	1	04/23/12 11:05	04/24/12 15:46	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:46	7439-92-1	
Manganese	**38.4J**	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 15:46	7439-96-5	
Nickel	ND	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 15:46	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 15:46	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:46	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	04/23/12 11:05	04/24/12 15:46	7440-28-0	
Vanadium	**9.9J**	ug/L	25.0	5.0	1	04/23/12 11:05	04/24/12 15:46	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 15:46	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	04/26/12 10:45	04/27/12 14:27	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		04/23/12 07:44	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		04/23/12 07:44	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		04/23/12 07:44	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		04/23/12 07:44	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		04/23/12 07:44	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		04/23/12 07:44	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		04/23/12 07:44	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		04/23/12 07:44	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		04/23/12 07:44	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		04/23/12 07:44	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		04/23/12 07:44	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		04/23/12 07:44	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		04/23/12 07:44	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		04/23/12 07:44	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		04/23/12 07:44	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		04/23/12 07:44	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		04/23/12 07:44	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		04/23/12 07:44	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		04/23/12 07:44	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		04/23/12 07:44	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		04/23/12 07:44	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		04/23/12 07:44	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		04/23/12 07:44	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		04/23/12 07:44	107-06-2	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-MW2 **Lab ID: 92116828001** Collected: 04/17/12 11:15 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,2-Dichloroethene (Total)	ND	ug/L	5.0	0.49	1		04/23/12 07:44	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		04/23/12 07:44	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		04/23/12 07:44	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		04/23/12 07:44	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		04/23/12 07:44	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		04/23/12 07:44	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		04/23/12 07:44	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		04/23/12 07:44	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		04/23/12 07:44	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		04/23/12 07:44	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		04/23/12 07:44	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		04/23/12 07:44	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		04/23/12 07:44	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		04/23/12 07:44	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		04/23/12 07:44	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		04/23/12 07:44	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	3.1	1		04/23/12 07:44	109-99-9	
Toluene	ND	ug/L	1.0	0.26	1		04/23/12 07:44	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		04/23/12 07:44	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		04/23/12 07:44	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		04/23/12 07:44	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		04/23/12 07:44	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		04/23/12 07:44	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		04/23/12 07:44	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		04/23/12 07:44	75-01-4	
Xylene (Total)	ND	ug/L	2.0	0.66	1		04/23/12 07:44	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		04/23/12 07:44	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		04/23/12 07:44	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	105	%	70-130		1		04/23/12 07:44	460-00-4	
Dibromofluoromethane (S)	105	%	70-130		1		04/23/12 07:44	1868-53-7	
1,2-Dichloroethane-d4 (S)	106	%	70-130		1		04/23/12 07:44	17060-07-0	
Toluene-d8 (S)	98	%	70-130		1		04/23/12 07:44	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**24300**	ug/L	5000	5000	1		04/25/12 11:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**142000**	ug/L	25000	25000	1		04/20/12 23:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**8880**	ug/L	5000	5000	1		04/24/12 20:27	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	ND	ug/L	5000	5000	1		04/27/12 15:21	16887-00-6	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-MW4 **Lab ID: 92116828002** Collected: 04/17/12 11:35 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	04/23/12 11:05	04/24/12 15:56	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:56	7440-38-2	
Barium	**61.7J**	ug/L	100	5.0	1	04/23/12 11:05	04/24/12 15:56	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 15:56	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 15:56	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:56	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:56	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:56	7440-50-8	
Iron	**926**	ug/L	300	50.0	1	04/23/12 11:05	04/24/12 15:56	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:56	7439-92-1	
Manganese	**571**	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 15:56	7439-96-5	
Nickel	ND	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 15:56	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 15:56	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 15:56	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	04/23/12 11:05	04/24/12 15:56	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	04/23/12 11:05	04/24/12 15:56	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 15:56	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	04/26/12 10:45	04/27/12 14:35	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		04/23/12 08:01	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		04/23/12 08:01	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		04/23/12 08:01	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		04/23/12 08:01	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		04/23/12 08:01	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		04/23/12 08:01	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		04/23/12 08:01	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		04/23/12 08:01	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		04/23/12 08:01	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		04/23/12 08:01	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		04/23/12 08:01	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		04/23/12 08:01	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		04/23/12 08:01	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		04/23/12 08:01	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		04/23/12 08:01	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		04/23/12 08:01	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		04/23/12 08:01	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		04/23/12 08:01	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		04/23/12 08:01	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		04/23/12 08:01	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		04/23/12 08:01	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		04/23/12 08:01	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		04/23/12 08:01	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		04/23/12 08:01	107-06-2	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-MW4 **Lab ID: 92116828002** Collected: 04/17/12 11:35 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,2-Dichloroethene (Total)	ND	ug/L	5.0	0.49	1		04/23/12 08:01	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		04/23/12 08:01	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		04/23/12 08:01	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		04/23/12 08:01	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		04/23/12 08:01	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		04/23/12 08:01	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		04/23/12 08:01	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		04/23/12 08:01	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		04/23/12 08:01	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		04/23/12 08:01	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		04/23/12 08:01	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		04/23/12 08:01	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		04/23/12 08:01	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		04/23/12 08:01	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		04/23/12 08:01	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		04/23/12 08:01	127-18-4	
Tetrahydrofuran	**22.3**	ug/L	10.0	3.1	1		04/23/12 08:01	109-99-9	
Toluene	ND	ug/L	1.0	0.26	1		04/23/12 08:01	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		04/23/12 08:01	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		04/23/12 08:01	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		04/23/12 08:01	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		04/23/12 08:01	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		04/23/12 08:01	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		04/23/12 08:01	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		04/23/12 08:01	75-01-4	
Xylene (Total)	ND	ug/L	2.0	0.66	1		04/23/12 08:01	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		04/23/12 08:01	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		04/23/12 08:01	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	106	%	70-130		1		04/23/12 08:01	460-00-4	
Dibromofluoromethane (S)	103	%	70-130		1		04/23/12 08:01	1868-53-7	
1,2-Dichloroethane-d4 (S)	106	%	70-130		1		04/23/12 08:01	17060-07-0	
Toluene-d8 (S)	98	%	70-130		1		04/23/12 08:01	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**90100**	ug/L	5000	5000	1		04/25/12 11:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**361000**	ug/L	25000	25000	1		04/20/12 23:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**134000**	ug/L	50000	50000	10		04/25/12 10:56	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	**25800**	ug/L	5000	5000	1		04/27/12 15:23	16887-00-6	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-MW6 **Lab ID: 92116828003** Collected: 04/17/12 10:10 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	04/23/12 11:05	04/24/12 16:01	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:01	7440-38-2	
Barium	**42.8J**	ug/L	100	5.0	1	04/23/12 11:05	04/24/12 16:01	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:01	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:01	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:01	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:01	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:01	7440-50-8	
Iron	**142J**	ug/L	300	50.0	1	04/23/12 11:05	04/24/12 16:01	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:01	7439-92-1	
Manganese	**6.0J**	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:01	7439-96-5	
Nickel	ND	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:01	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:01	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:01	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	04/23/12 11:05	04/24/12 16:01	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	04/23/12 11:05	04/24/12 16:01	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:01	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	04/26/12 10:45	04/27/12 14:38	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		04/23/12 08:18	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		04/23/12 08:18	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		04/23/12 08:18	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		04/23/12 08:18	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		04/23/12 08:18	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		04/23/12 08:18	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		04/23/12 08:18	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		04/23/12 08:18	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		04/23/12 08:18	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		04/23/12 08:18	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		04/23/12 08:18	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		04/23/12 08:18	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		04/23/12 08:18	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		04/23/12 08:18	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		04/23/12 08:18	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		04/23/12 08:18	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		04/23/12 08:18	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		04/23/12 08:18	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		04/23/12 08:18	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		04/23/12 08:18	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		04/23/12 08:18	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		04/23/12 08:18	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		04/23/12 08:18	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		04/23/12 08:18	107-06-2	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-MW6 **Lab ID: 92116828003** Collected: 04/17/12 10:10 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,2-Dichloroethene (Total)	ND	ug/L	5.0	0.49	1		04/23/12 08:18	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		04/23/12 08:18	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		04/23/12 08:18	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		04/23/12 08:18	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		04/23/12 08:18	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		04/23/12 08:18	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		04/23/12 08:18	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		04/23/12 08:18	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		04/23/12 08:18	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		04/23/12 08:18	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		04/23/12 08:18	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		04/23/12 08:18	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		04/23/12 08:18	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		04/23/12 08:18	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		04/23/12 08:18	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		04/23/12 08:18	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	3.1	1		04/23/12 08:18	109-99-9	
Toluene	ND	ug/L	1.0	0.26	1		04/23/12 08:18	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		04/23/12 08:18	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		04/23/12 08:18	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		04/23/12 08:18	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		04/23/12 08:18	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		04/23/12 08:18	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		04/23/12 08:18	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		04/23/12 08:18	75-01-4	
Xylene (Total)	ND	ug/L	2.0	0.66	1		04/23/12 08:18	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		04/23/12 08:18	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		04/23/12 08:18	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	103	%	70-130		1		04/23/12 08:18	460-00-4	
Dibromofluoromethane (S)	102	%	70-130		1		04/23/12 08:18	1868-53-7	
1,2-Dichloroethane-d4 (S)	107	%	70-130		1		04/23/12 08:18	17060-07-0	
Toluene-d8 (S)	99	%	70-130		1		04/23/12 08:18	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**10100**	ug/L	5000	5000	1		04/25/12 11:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**127000**	ug/L	25000	25000	1		04/20/12 23:32		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	ND	ug/L	5000	5000	1		04/24/12 21:22	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	**9840**	ug/L	5000	5000	1		04/27/12 15:25	16887-00-6	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-MW7 **Lab ID: 92116828004** Collected: 04/17/12 11:45 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	04/23/12 11:05	04/24/12 16:04	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:04	7440-38-2	
Barium	**258**	ug/L	100	5.0	1	04/23/12 11:05	04/24/12 16:04	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:04	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:04	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:04	7440-47-3	
Cobalt	**16.9**	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:04	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:04	7440-50-8	
Iron	**8490**	ug/L	300	50.0	1	04/23/12 11:05	04/24/12 16:04	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:04	7439-92-1	
Manganese	**14000**	ug/L	500	50.0	10	04/23/12 11:05	04/25/12 13:32	7439-96-5	
Nickel	ND	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:04	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:04	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:04	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	04/23/12 11:05	04/24/12 16:04	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	04/23/12 11:05	04/24/12 16:04	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:04	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	04/26/12 10:45	04/27/12 14:41	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	**7.8J**	ug/L	100	2.2	1		04/23/12 08:35	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		04/23/12 08:35	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		04/23/12 08:35	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		04/23/12 08:35	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		04/23/12 08:35	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		04/23/12 08:35	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		04/23/12 08:35	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		04/23/12 08:35	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		04/23/12 08:35	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		04/23/12 08:35	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		04/23/12 08:35	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		04/23/12 08:35	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		04/23/12 08:35	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		04/23/12 08:35	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		04/23/12 08:35	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		04/23/12 08:35	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		04/23/12 08:35	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		04/23/12 08:35	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		04/23/12 08:35	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		04/23/12 08:35	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		04/23/12 08:35	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		04/23/12 08:35	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		04/23/12 08:35	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		04/23/12 08:35	107-06-2	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-MW7 **Lab ID: 92116828004** Collected: 04/17/12 11:45 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,2-Dichloroethene (Total)	ND	ug/L	5.0	0.49	1		04/23/12 08:35	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		04/23/12 08:35	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		04/23/12 08:35	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		04/23/12 08:35	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		04/23/12 08:35	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		04/23/12 08:35	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		04/23/12 08:35	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		04/23/12 08:35	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		04/23/12 08:35	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		04/23/12 08:35	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		04/23/12 08:35	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		04/23/12 08:35	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		04/23/12 08:35	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		04/23/12 08:35	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		04/23/12 08:35	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		04/23/12 08:35	127-18-4	
Tetrahydrofuran	**7.9J**	ug/L	10.0	3.1	1		04/23/12 08:35	109-99-9	
Toluene	ND	ug/L	1.0	0.26	1		04/23/12 08:35	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		04/23/12 08:35	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		04/23/12 08:35	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		04/23/12 08:35	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		04/23/12 08:35	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		04/23/12 08:35	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		04/23/12 08:35	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		04/23/12 08:35	75-01-4	
Xylene (Total)	ND	ug/L	2.0	0.66	1		04/23/12 08:35	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		04/23/12 08:35	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		04/23/12 08:35	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	103	%	70-130		1		04/23/12 08:35	460-00-4	
Dibromofluoromethane (S)	102	%	70-130		1		04/23/12 08:35	1868-53-7	
1,2-Dichloroethane-d4 (S)	108	%	70-130		1		04/23/12 08:35	17060-07-0	
Toluene-d8 (S)	99	%	70-130		1		04/23/12 08:35	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**872000**	ug/L	5000	5000	1		04/25/12 11:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1500000**	ug/L	100000	100000	1		04/20/12 23:32		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**281000**	ug/L	100000	100000	20		04/25/12 11:10	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	**150000**	ug/L	25000	25000	5		04/27/12 15:37	16887-00-6	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-MW8 **Lab ID: 92116828005** Collected: 04/17/12 11:05 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	04/23/12 11:05	04/24/12 16:12	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:12	7440-38-2	
Barium	**31.0J**	ug/L	100	5.0	1	04/23/12 11:05	04/24/12 16:12	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:12	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:12	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:12	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:12	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:12	7440-50-8	
Iron	**3150**	ug/L	300	50.0	1	04/23/12 11:05	04/24/12 16:12	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:12	7439-92-1	
Manganese	**37.0J**	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:12	7439-96-5	
Nickel	ND	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:12	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:12	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:12	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	04/23/12 11:05	04/24/12 16:12	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	04/23/12 11:05	04/24/12 16:12	7440-62-2	
Zinc	**10.2**	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:12	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	04/26/12 10:45	04/27/12 14:51	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		04/23/12 08:51	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		04/23/12 08:51	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		04/23/12 08:51	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		04/23/12 08:51	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		04/23/12 08:51	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		04/23/12 08:51	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		04/23/12 08:51	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		04/23/12 08:51	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		04/23/12 08:51	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		04/23/12 08:51	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		04/23/12 08:51	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		04/23/12 08:51	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		04/23/12 08:51	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		04/23/12 08:51	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		04/23/12 08:51	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		04/23/12 08:51	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		04/23/12 08:51	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		04/23/12 08:51	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		04/23/12 08:51	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		04/23/12 08:51	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		04/23/12 08:51	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		04/23/12 08:51	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		04/23/12 08:51	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		04/23/12 08:51	107-06-2	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-MW8 **Lab ID: 92116828005** Collected: 04/17/12 11:05 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,2-Dichloroethene (Total)	ND	ug/L	5.0	0.49	1		04/23/12 08:51	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		04/23/12 08:51	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		04/23/12 08:51	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		04/23/12 08:51	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		04/23/12 08:51	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		04/23/12 08:51	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		04/23/12 08:51	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		04/23/12 08:51	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		04/23/12 08:51	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		04/23/12 08:51	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		04/23/12 08:51	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		04/23/12 08:51	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		04/23/12 08:51	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		04/23/12 08:51	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		04/23/12 08:51	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		04/23/12 08:51	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	3.1	1		04/23/12 08:51	109-99-9	
Toluene	ND	ug/L	1.0	0.26	1		04/23/12 08:51	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		04/23/12 08:51	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		04/23/12 08:51	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		04/23/12 08:51	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		04/23/12 08:51	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		04/23/12 08:51	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		04/23/12 08:51	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		04/23/12 08:51	75-01-4	
Xylene (Total)	ND	ug/L	2.0	0.66	1		04/23/12 08:51	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		04/23/12 08:51	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		04/23/12 08:51	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	102	%	70-130		1		04/23/12 08:51	460-00-4	
Dibromofluoromethane (S)	100	%	70-130		1		04/23/12 08:51	1868-53-7	
1,2-Dichloroethane-d4 (S)	105	%	70-130		1		04/23/12 08:51	17060-07-0	
Toluene-d8 (S)	96	%	70-130		1		04/23/12 08:51	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**60700**	ug/L	5000	5000	1		04/25/12 11:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**107000**	ug/L	25000	25000	1		04/20/12 23:32		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	ND	ug/L	5000	5000	1		04/24/12 21:49	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	ND	ug/L	5000	5000	1		04/27/12 15:26	16887-00-6	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-P19S **Lab ID: 92116828006** Collected: 04/17/12 10:35 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010	Preparation Method: EPA 3010							
Antimony	ND	ug/L	6.0	5.0	1	04/23/12 11:05	04/24/12 16:29	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:29	7440-38-2	
Barium	**74.3J**	ug/L	100	5.0	1	04/23/12 11:05	04/24/12 16:29	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:29	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:29	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:29	7440-47-3	
Cobalt	**5.0J**	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:29	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:29	7440-50-8	
Iron	**968**	ug/L	300	50.0	1	04/23/12 11:05	04/24/12 16:29	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:29	7439-92-1	
Manganese	**838**	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:29	7439-96-5	
Nickel	ND	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:29	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:29	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:29	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	04/23/12 11:05	04/24/12 16:29	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	04/23/12 11:05	04/24/12 16:29	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:29	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470	Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	0.10	1	04/26/12 10:45	04/27/12 14:54	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	**3.0J**	ug/L	100	2.2	1		04/23/12 09:08	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		04/23/12 09:08	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		04/23/12 09:08	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		04/23/12 09:08	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		04/23/12 09:08	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		04/23/12 09:08	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		04/23/12 09:08	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		04/23/12 09:08	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		04/23/12 09:08	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		04/23/12 09:08	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		04/23/12 09:08	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		04/23/12 09:08	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		04/23/12 09:08	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		04/23/12 09:08	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		04/23/12 09:08	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		04/23/12 09:08	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		04/23/12 09:08	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		04/23/12 09:08	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		04/23/12 09:08	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		04/23/12 09:08	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		04/23/12 09:08	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		04/23/12 09:08	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		04/23/12 09:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		04/23/12 09:08	107-06-2	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-P19S **Lab ID: 92116828006** Collected: 04/17/12 10:35 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,2-Dichloroethene (Total)	ND	ug/L	5.0	0.49	1		04/23/12 09:08	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		04/23/12 09:08	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		04/23/12 09:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		04/23/12 09:08	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		04/23/12 09:08	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		04/23/12 09:08	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		04/23/12 09:08	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		04/23/12 09:08	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		04/23/12 09:08	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		04/23/12 09:08	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		04/23/12 09:08	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		04/23/12 09:08	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		04/23/12 09:08	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		04/23/12 09:08	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		04/23/12 09:08	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		04/23/12 09:08	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	3.1	1		04/23/12 09:08	109-99-9	
Toluene	ND	ug/L	1.0	0.26	1		04/23/12 09:08	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		04/23/12 09:08	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		04/23/12 09:08	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		04/23/12 09:08	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		04/23/12 09:08	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		04/23/12 09:08	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		04/23/12 09:08	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		04/23/12 09:08	75-01-4	
Xylene (Total)	ND	ug/L	2.0	0.66	1		04/23/12 09:08	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		04/23/12 09:08	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		04/23/12 09:08	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	101	%	70-130		1		04/23/12 09:08	460-00-4	
Dibromofluoromethane (S)	103	%	70-130		1		04/23/12 09:08	1868-53-7	
1,2-Dichloroethane-d4 (S)	105	%	70-130		1		04/23/12 09:08	17060-07-0	
Toluene-d8 (S)	97	%	70-130		1		04/23/12 09:08	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**32400**	ug/L	5000	5000	1		04/25/12 11:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**109000**	ug/L	25000	25000	1		04/20/12 23:33		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**26600**	ug/L	5000	5000	1		04/24/12 22:16	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	**11000**	ug/L	5000	5000	1		04/27/12 15:27	16887-00-6	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-SW1 **Lab ID: 92116828007** Collected: 04/17/12 12:00 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	04/23/12 11:05	04/24/12 16:32	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:32	7440-38-2	
Barium	**33.9J**	ug/L	100	5.0	1	04/23/12 11:05	04/24/12 16:32	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:32	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:32	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:32	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:32	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:32	7440-50-8	
Iron	**1830**	ug/L	300	50.0	1	04/23/12 11:05	04/24/12 16:32	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:32	7439-92-1	
Manganese	**461**	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:32	7439-96-5	
Nickel	ND	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:32	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:32	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:32	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	04/23/12 11:05	04/24/12 16:32	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	04/23/12 11:05	04/24/12 16:32	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:32	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	04/26/12 10:45	04/27/12 14:57	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		04/23/12 09:25	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		04/23/12 09:25	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		04/23/12 09:25	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		04/23/12 09:25	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		04/23/12 09:25	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		04/23/12 09:25	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		04/23/12 09:25	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		04/23/12 09:25	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		04/23/12 09:25	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		04/23/12 09:25	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		04/23/12 09:25	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		04/23/12 09:25	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		04/23/12 09:25	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		04/23/12 09:25	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		04/23/12 09:25	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		04/23/12 09:25	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		04/23/12 09:25	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		04/23/12 09:25	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		04/23/12 09:25	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		04/23/12 09:25	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		04/23/12 09:25	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		04/23/12 09:25	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		04/23/12 09:25	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		04/23/12 09:25	107-06-2	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-SW1 **Lab ID: 92116828007** Collected: 04/17/12 12:00 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,2-Dichloroethene (Total)	ND	ug/L	5.0	0.49	1		04/23/12 09:25	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		04/23/12 09:25	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		04/23/12 09:25	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		04/23/12 09:25	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		04/23/12 09:25	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		04/23/12 09:25	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		04/23/12 09:25	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		04/23/12 09:25	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		04/23/12 09:25	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		04/23/12 09:25	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		04/23/12 09:25	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		04/23/12 09:25	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		04/23/12 09:25	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		04/23/12 09:25	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		04/23/12 09:25	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		04/23/12 09:25	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	3.1	1		04/23/12 09:25	109-99-9	
Toluene	ND	ug/L	1.0	0.26	1		04/23/12 09:25	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		04/23/12 09:25	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		04/23/12 09:25	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		04/23/12 09:25	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		04/23/12 09:25	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		04/23/12 09:25	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		04/23/12 09:25	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		04/23/12 09:25	75-01-4	
Xylene (Total)	ND	ug/L	2.0	0.66	1		04/23/12 09:25	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		04/23/12 09:25	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		04/23/12 09:25	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	102	%	70-130		1		04/23/12 09:25	460-00-4	
Dibromofluoromethane (S)	102	%	70-130		1		04/23/12 09:25	1868-53-7	
1,2-Dichloroethane-d4 (S)	109	%	70-130		1		04/23/12 09:25	17060-07-0	
Toluene-d8 (S)	95	%	70-130		1		04/23/12 09:25	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**43500**	ug/L	5000	5000	1		04/25/12 11:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**83000**	ug/L	25000	25000	1		04/20/12 23:33		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**6800**	ug/L	5000	5000	1		04/24/12 22:57	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	**7710**	ug/L	5000	5000	1		04/27/12 15:28	16887-00-6	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-SW2 **Lab ID: 92116828008** Collected: 04/17/12 10:45 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010		Preparation Method: EPA 3010						
Antimony	ND	ug/L	6.0	5.0	1	04/23/12 11:05	04/24/12 16:35	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:35	7440-38-2	
Barium	**38.4J**	ug/L	100	5.0	1	04/23/12 11:05	04/24/12 16:35	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:35	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:35	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:35	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:35	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:35	7440-50-8	
Iron	**2000**	ug/L	300	50.0	1	04/23/12 11:05	04/24/12 16:35	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:35	7439-92-1	
Manganese	**651**	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:35	7439-96-5	
Nickel	ND	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:35	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:35	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:35	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	04/23/12 11:05	04/24/12 16:35	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	04/23/12 11:05	04/24/12 16:35	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:35	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470		Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	0.10	1	04/26/12 10:45	04/27/12 14:59	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		04/23/12 09:42	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		04/23/12 09:42	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		04/23/12 09:42	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		04/23/12 09:42	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		04/23/12 09:42	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		04/23/12 09:42	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		04/23/12 09:42	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		04/23/12 09:42	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		04/23/12 09:42	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		04/23/12 09:42	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		04/23/12 09:42	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		04/23/12 09:42	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		04/23/12 09:42	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		04/23/12 09:42	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		04/23/12 09:42	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		04/23/12 09:42	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		04/23/12 09:42	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		04/23/12 09:42	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		04/23/12 09:42	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		04/23/12 09:42	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		04/23/12 09:42	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		04/23/12 09:42	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		04/23/12 09:42	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		04/23/12 09:42	107-06-2	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-SW2 **Lab ID: 92116828008** Collected: 04/17/12 10:45 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,2-Dichloroethene (Total)	ND	ug/L	5.0	0.49	1		04/23/12 09:42	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		04/23/12 09:42	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		04/23/12 09:42	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		04/23/12 09:42	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		04/23/12 09:42	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		04/23/12 09:42	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		04/23/12 09:42	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		04/23/12 09:42	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		04/23/12 09:42	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		04/23/12 09:42	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		04/23/12 09:42	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		04/23/12 09:42	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		04/23/12 09:42	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		04/23/12 09:42	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		04/23/12 09:42	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		04/23/12 09:42	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	3.1	1		04/23/12 09:42	109-99-9	
Toluene	ND	ug/L	1.0	0.26	1		04/23/12 09:42	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		04/23/12 09:42	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		04/23/12 09:42	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		04/23/12 09:42	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		04/23/12 09:42	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		04/23/12 09:42	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		04/23/12 09:42	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		04/23/12 09:42	75-01-4	
Xylene (Total)	ND	ug/L	2.0	0.66	1		04/23/12 09:42	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		04/23/12 09:42	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		04/23/12 09:42	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	101	%	70-130		1		04/23/12 09:42	460-00-4	
Dibromofluoromethane (S)	107	%	70-130		1		04/23/12 09:42	1868-53-7	
1,2-Dichloroethane-d4 (S)	108	%	70-130		1		04/23/12 09:42	17060-07-0	
Toluene-d8 (S)	99	%	70-130		1		04/23/12 09:42	2037-26-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**42500**	ug/L	5000	5000	1		04/25/12 11:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**79000**	ug/L	25000	25000	1		04/20/12 23:34		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**6340**	ug/L	5000	5000	1		04/24/12 23:10	14808-79-8	
4500 Chloride	Analytical Method: SM 4500-Cl-E								
Chloride	**7540**	ug/L	5000	5000	1		04/27/12 15:28	16887-00-6	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-FIELD BLANK **Lab ID: 92116828009** Collected: 04/17/12 12:15 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 ICP Groundwater	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Antimony	ND	ug/L	6.0	5.0	1	04/23/12 11:05	04/24/12 16:38	7440-36-0	
Arsenic	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:38	7440-38-2	
Barium	ND	ug/L	100	5.0	1	04/23/12 11:05	04/24/12 16:38	7440-39-3	
Beryllium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:38	7440-41-7	
Cadmium	ND	ug/L	1.0	1.0	1	04/23/12 11:05	04/24/12 16:38	7440-43-9	
Chromium	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:38	7440-47-3	
Cobalt	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:38	7440-48-4	
Copper	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:38	7440-50-8	
Iron	ND	ug/L	300	50.0	1	04/23/12 11:05	04/24/12 16:38	7439-89-6	
Lead	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:38	7439-92-1	
Manganese	ND	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:38	7439-96-5	
Nickel	ND	ug/L	50.0	5.0	1	04/23/12 11:05	04/24/12 16:38	7440-02-0	
Selenium	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:38	7782-49-2	
Silver	ND	ug/L	10.0	5.0	1	04/23/12 11:05	04/24/12 16:38	7440-22-4	
Thallium	ND	ug/L	5.5	5.4	1	04/23/12 11:05	04/24/12 16:38	7440-28-0	
Vanadium	ND	ug/L	25.0	5.0	1	04/23/12 11:05	04/24/12 16:38	7440-62-2	
Zinc	ND	ug/L	10.0	10.0	1	04/23/12 11:05	04/24/12 16:38	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	04/26/12 10:45	04/27/12 15:06	7439-97-6	
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		04/23/12 09:59	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		04/23/12 09:59	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		04/23/12 09:59	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		04/23/12 09:59	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		04/23/12 09:59	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		04/23/12 09:59	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		04/23/12 09:59	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		04/23/12 09:59	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		04/23/12 09:59	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		04/23/12 09:59	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		04/23/12 09:59	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		04/23/12 09:59	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		04/23/12 09:59	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		04/23/12 09:59	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		04/23/12 09:59	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		04/23/12 09:59	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		04/23/12 09:59	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		04/23/12 09:59	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		04/23/12 09:59	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		04/23/12 09:59	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		04/23/12 09:59	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		04/23/12 09:59	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		04/23/12 09:59	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		04/23/12 09:59	107-06-2	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-FIELD BLANK **Lab ID: 92116828009** Collected: 04/17/12 12:15 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,2-Dichloroethene (Total)	ND	ug/L	5.0	0.49	1		04/23/12 09:59	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		04/23/12 09:59	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		04/23/12 09:59	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		04/23/12 09:59	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		04/23/12 09:59	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		04/23/12 09:59	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		04/23/12 09:59	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		04/23/12 09:59	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		04/23/12 09:59	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		04/23/12 09:59	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		04/23/12 09:59	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		04/23/12 09:59	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		04/23/12 09:59	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		04/23/12 09:59	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		04/23/12 09:59	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		04/23/12 09:59	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	3.1	1		04/23/12 09:59	109-99-9	
Toluene	ND	ug/L	1.0	0.26	1		04/23/12 09:59	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		04/23/12 09:59	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		04/23/12 09:59	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		04/23/12 09:59	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		04/23/12 09:59	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		04/23/12 09:59	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		04/23/12 09:59	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		04/23/12 09:59	75-01-4	
Xylene (Total)	ND	ug/L	2.0	0.66	1		04/23/12 09:59	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		04/23/12 09:59	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		04/23/12 09:59	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	101	%	70-130		1		04/23/12 09:59	460-00-4	
Dibromofluoromethane (S)	102	%	70-130		1		04/23/12 09:59	1868-53-7	
1,2-Dichloroethane-d4 (S)	106	%	70-130		1		04/23/12 09:59	17060-07-0	
Toluene-d8 (S)	99	%	70-130		1		04/23/12 09:59	2037-26-5	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-TRIP BLANK **Lab ID: 92116828010** Collected: 04/16/12 10:00 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
Acetone	ND	ug/L	100	2.2	1		04/23/12 10:15	67-64-1	
Acrylonitrile	ND	ug/L	200	1.9	1		04/23/12 10:15	107-13-1	
Benzene	ND	ug/L	1.0	0.25	1		04/23/12 10:15	71-43-2	
Bromochloromethane	ND	ug/L	3.0	0.17	1		04/23/12 10:15	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		04/23/12 10:15	75-27-4	
Bromoform	ND	ug/L	3.0	0.26	1		04/23/12 10:15	75-25-2	
Bromomethane	ND	ug/L	10.0	0.29	1		04/23/12 10:15	74-83-9	
2-Butanone (MEK)	ND	ug/L	100	0.96	1		04/23/12 10:15	78-93-3	
Carbon disulfide	ND	ug/L	100	1.2	1		04/23/12 10:15	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.25	1		04/23/12 10:15	56-23-5	
Chlorobenzene	ND	ug/L	3.0	0.23	1		04/23/12 10:15	108-90-7	
Chloroethane	ND	ug/L	10.0	0.54	1		04/23/12 10:15	75-00-3	
Chloroform	ND	ug/L	5.0	0.14	1		04/23/12 10:15	67-66-3	
Chloromethane	ND	ug/L	1.0	0.11	1		04/23/12 10:15	74-87-3	
1,2-Dibromo-3-chloropropane	ND	ug/L	13.0	2.5	1		04/23/12 10:15	96-12-8	
Dibromochloromethane	ND	ug/L	3.0	0.21	1		04/23/12 10:15	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.27	1		04/23/12 10:15	106-93-4	
Dibromomethane	ND	ug/L	10.0	0.21	1		04/23/12 10:15	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.30	1		04/23/12 10:15	95-50-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.33	1		04/23/12 10:15	106-46-7	
trans-1,4-Dichloro-2-butene	ND	ug/L	100	1.0	1		04/23/12 10:15	110-57-6	
Dichlorodifluoromethane	ND	ug/L	5.0	0.21	1		04/23/12 10:15	75-71-8	
1,1-Dichloroethane	ND	ug/L	5.0	0.32	1		04/23/12 10:15	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.12	1		04/23/12 10:15	107-06-2	
1,2-Dichloroethene (Total)	ND	ug/L	5.0	0.49	1		04/23/12 10:15	540-59-0	
1,1-Dichloroethene	ND	ug/L	5.0	0.56	1		04/23/12 10:15	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.19	1		04/23/12 10:15	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	0.49	1		04/23/12 10:15	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	0.27	1		04/23/12 10:15	78-87-5	
cis-1,3-Dichloropropene	ND	ug/L	1.0	0.13	1		04/23/12 10:15	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.26	1		04/23/12 10:15	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	0.30	1		04/23/12 10:15	100-41-4	
2-Hexanone	ND	ug/L	50.0	0.46	1		04/23/12 10:15	591-78-6	
Iodomethane	ND	ug/L	10.0	0.32	1		04/23/12 10:15	74-88-4	
Methylene Chloride	ND	ug/L	1.0	0.97	1		04/23/12 10:15	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	100	0.33	1		04/23/12 10:15	108-10-1	
Styrene	ND	ug/L	1.0	0.26	1		04/23/12 10:15	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0	0.33	1		04/23/12 10:15	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	3.0	0.40	1		04/23/12 10:15	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.46	1		04/23/12 10:15	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	3.1	1		04/23/12 10:15	109-99-9	
Toluene	ND	ug/L	1.0	0.26	1		04/23/12 10:15	108-88-3	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.48	1		04/23/12 10:15	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.29	1		04/23/12 10:15	79-00-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		04/23/12 10:15	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.20	1		04/23/12 10:15	75-69-4	

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ANALYTICAL RESULTS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Sample: 0105-TRIP BLANK **Lab ID: 92116828010** Collected: 04/16/12 10:00 Received: 04/19/12 15:38 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level Landfill	Analytical Method: EPA 8260								
1,2,3-Trichloropropane	ND	ug/L	1.0	0.41	1		04/23/12 10:15	96-18-4	
Vinyl acetate	ND	ug/L	50.0	0.35	1		04/23/12 10:15	108-05-4	
Vinyl chloride	ND	ug/L	1.0	0.62	1		04/23/12 10:15	75-01-4	
Xylene (Total)	ND	ug/L	2.0	0.66	1		04/23/12 10:15	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	0.66	1		04/23/12 10:15	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.23	1		04/23/12 10:15	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	102	%	70-130		1		04/23/12 10:15	460-00-4	
Dibromofluoromethane (S)	104	%	70-130		1		04/23/12 10:15	1868-53-7	
1,2-Dichloroethane-d4 (S)	106	%	70-130		1		04/23/12 10:15	17060-07-0	
Toluene-d8 (S)	99	%	70-130		1		04/23/12 10:15	2037-26-5	

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QUALITY CONTROL DATA

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

QC Batch: MERP/4192 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008, 92116828009

METHOD BLANK: 754109 Matrix: Water
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008, 92116828009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	04/27/12 14:20	

LABORATORY CONTROL SAMPLE: 754110

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.2	87	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 754111 754112

Parameter	Units	92116828001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.2	2.2	88	89	75-125	1	25	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 754113 754114

Parameter	Units	92116851013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	2.5	2.5	2.2	2.2	88	87	75-125	2	25	

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QUALITY CONTROL DATA

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

QC Batch: MPRP/10427 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET NC Groundwater
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008, 92116828009

METHOD BLANK: 753649 | Matrix: Water
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008, 92116828009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	6.0	04/24/12 14:54	
Arsenic	ug/L	ND	10.0	04/24/12 14:54	
Barium	ug/L	ND	100	04/24/12 14:54	
Beryllium	ug/L	ND	1.0	04/24/12 14:54	
Cadmium	ug/L	ND	1.0	04/24/12 14:54	
Chromium	ug/L	ND	10.0	04/24/12 14:54	
Cobalt	ug/L	ND	10.0	04/24/12 14:54	
Copper	ug/L	ND	10.0	04/24/12 14:54	
Iron	ug/L	ND	300	04/24/12 14:54	
Lead	ug/L	ND	10.0	04/24/12 14:54	
Manganese	ug/L	ND	50.0	04/24/12 14:54	
Nickel	ug/L	ND	50.0	04/24/12 14:54	
Selenium	ug/L	ND	10.0	04/24/12 14:54	
Silver	ug/L	ND	10.0	04/24/12 14:54	
Thallium	ug/L	ND	5.5	04/24/12 14:54	
Vanadium	ug/L	ND	25.0	04/24/12 14:54	
Zinc	ug/L	ND	10.0	04/24/12 14:54	

LABORATORY CONTROL SAMPLE: 753650

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	496	99	80-120	
Arsenic	ug/L	500	491	98	80-120	
Barium	ug/L	500	500	100	80-120	
Beryllium	ug/L	500	491	98	80-120	
Cadmium	ug/L	500	499	100	80-120	
Chromium	ug/L	500	500	100	80-120	
Cobalt	ug/L	500	494	99	80-120	
Copper	ug/L	500	502	100	80-120	
Iron	ug/L	5000	5100	102	80-120	
Lead	ug/L	500	500	100	80-120	
Manganese	ug/L	500	499	100	80-120	
Nickel	ug/L	500	492	98	80-120	
Selenium	ug/L	500	495	99	80-120	
Silver	ug/L	250	250	100	80-120	
Thallium	ug/L	500	491	98	80-120	
Vanadium	ug/L	500	504	101	80-120	
Zinc	ug/L	500	483	97	80-120	

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QUALITY CONTROL DATA

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 753651 753652

Parameter	Units	92116828001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	ug/L	ND	500	500	495	497	99	99	75-125	0	25	
Arsenic	ug/L	ND	500	500	497	494	99	99	75-125	1	25	
Barium	ug/L	26.1J	500	500	525	522	100	99	75-125	1	25	
Beryllium	ug/L	ND	500	500	503	502	101	100	75-125	0	25	
Cadmium	ug/L	ND	500	500	497	496	99	99	75-125	0	25	
Chromium	ug/L	ND	500	500	509	507	101	100	75-125	0	25	
Cobalt	ug/L	ND	500	500	497	495	99	99	75-125	0	25	
Copper	ug/L	ND	500	500	517	513	103	102	75-125	1	25	
Iron	ug/L	4240	5000	5000	9320	9180	102	99	75-125	2	25	
Lead	ug/L	ND	500	500	487	486	97	97	75-125	0	25	
Manganese	ug/L	38.4J	500	500	534	531	99	99	75-125	1	25	
Nickel	ug/L	ND	500	500	497	495	99	99	75-125	0	25	
Selenium	ug/L	ND	500	500	505	502	100	100	75-125	1	25	
Silver	ug/L	ND	250	250	251	251	100	100	75-125	0	25	
Thallium	ug/L	ND	500	500	481	483	96	97	75-125	0	25	
Vanadium	ug/L	9.9J	500	500	520	517	102	101	75-125	1	25	
Zinc	ug/L	ND	500	500	494	492	97	97	75-125	0	25	

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QUALITY CONTROL DATA

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

QC Batch: MSV/18879 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV Low Level Landfill
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008, 92116828009, 92116828010

METHOD BLANK: 753553 Matrix: Water
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008, 92116828009, 92116828010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	5.0	04/23/12 00:30	
1,1,1-Trichloroethane	ug/L	ND	1.0	04/23/12 00:30	
1,1,2,2-Tetrachloroethane	ug/L	ND	3.0	04/23/12 00:30	
1,1,2-Trichloroethane	ug/L	ND	1.0	04/23/12 00:30	
1,1-Dichloroethane	ug/L	ND	5.0	04/23/12 00:30	
1,1-Dichloroethene	ug/L	ND	5.0	04/23/12 00:30	
1,2,3-Trichloropropane	ug/L	ND	1.0	04/23/12 00:30	
1,2-Dibromo-3-chloropropane	ug/L	ND	13.0	04/23/12 00:30	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	04/23/12 00:30	
1,2-Dichlorobenzene	ug/L	ND	5.0	04/23/12 00:30	
1,2-Dichloroethane	ug/L	ND	1.0	04/23/12 00:30	
1,2-Dichloroethene (Total)	ug/L	ND	5.0	04/23/12 00:30	
1,2-Dichloropropane	ug/L	ND	1.0	04/23/12 00:30	
1,4-Dichlorobenzene	ug/L	ND	1.0	04/23/12 00:30	
2-Butanone (MEK)	ug/L	ND	100	04/23/12 00:30	
2-Hexanone	ug/L	ND	50.0	04/23/12 00:30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	04/23/12 00:30	
Acetone	ug/L	ND	100	04/23/12 00:30	
Acrylonitrile	ug/L	ND	200	04/23/12 00:30	
Benzene	ug/L	ND	1.0	04/23/12 00:30	
Bromochloromethane	ug/L	ND	3.0	04/23/12 00:30	
Bromodichloromethane	ug/L	ND	1.0	04/23/12 00:30	
Bromoform	ug/L	ND	3.0	04/23/12 00:30	
Bromomethane	ug/L	ND	10.0	04/23/12 00:30	
Carbon disulfide	ug/L	ND	100	04/23/12 00:30	
Carbon tetrachloride	ug/L	ND	1.0	04/23/12 00:30	
Chlorobenzene	ug/L	ND	3.0	04/23/12 00:30	
Chloroethane	ug/L	ND	10.0	04/23/12 00:30	
Chloroform	ug/L	ND	5.0	04/23/12 00:30	
Chloromethane	ug/L	ND	1.0	04/23/12 00:30	
cis-1,2-Dichloroethene	ug/L	ND	5.0	04/23/12 00:30	
cis-1,3-Dichloropropene	ug/L	ND	1.0	04/23/12 00:30	
Dibromochloromethane	ug/L	ND	3.0	04/23/12 00:30	
Dibromomethane	ug/L	ND	10.0	04/23/12 00:30	
Dichlorodifluoromethane	ug/L	ND	5.0	04/23/12 00:30	
Ethylbenzene	ug/L	ND	1.0	04/23/12 00:30	
Iodomethane	ug/L	ND	10.0	04/23/12 00:30	
m&p-Xylene	ug/L	ND	2.0	04/23/12 00:30	
Methylene Chloride	ug/L	ND	1.0	04/23/12 00:30	
o-Xylene	ug/L	ND	1.0	04/23/12 00:30	
Styrene	ug/L	ND	1.0	04/23/12 00:30	

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QUALITY CONTROL DATA

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

METHOD BLANK: 753553 Matrix: Water

Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008, 92116828009, 92116828010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Tetrachloroethene	ug/L	ND	1.0	04/23/12 00:30	
Tetrahydrofuran	ug/L	ND	10.0	04/23/12 00:30	
Toluene	ug/L	ND	1.0	04/23/12 00:30	
trans-1,2-Dichloroethene	ug/L	ND	5.0	04/23/12 00:30	
trans-1,3-Dichloropropene	ug/L	ND	1.0	04/23/12 00:30	
trans-1,4-Dichloro-2-butene	ug/L	ND	100	04/23/12 00:30	
Trichloroethene	ug/L	ND	1.0	04/23/12 00:30	
Trichlorofluoromethane	ug/L	ND	1.0	04/23/12 00:30	
Vinyl acetate	ug/L	ND	50.0	04/23/12 00:30	
Vinyl chloride	ug/L	ND	1.0	04/23/12 00:30	
Xylene (Total)	ug/L	ND	2.0	04/23/12 00:30	
1,2-Dichloroethane-d4 (S)	%	102	70-130	04/23/12 00:30	
4-Bromofluorobenzene (S)	%	106	70-130	04/23/12 00:30	
Dibromofluoromethane (S)	%	101	70-130	04/23/12 00:30	
Toluene-d8 (S)	%	97	70-130	04/23/12 00:30	

LABORATORY CONTROL SAMPLE: 753554

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	50	52.9	106	70-130	
1,1,1-Trichloroethane	ug/L	50	46.7	93	70-130	
1,1,2,2-Tetrachloroethane	ug/L	50	52.2	104	70-130	
1,1,2-Trichloroethane	ug/L	50	57.4	115	70-130	
1,1-Dichloroethane	ug/L	50	45.4	91	70-130	
1,1-Dichloroethene	ug/L	50	49.9	100	70-132	
1,2,3-Trichloropropane	ug/L	50	51.5	103	70-130	
1,2-Dibromo-3-chloropropane	ug/L	50	52.6	105	70-130	
1,2-Dibromoethane (EDB)	ug/L	50	50.9	102	70-130	
1,2-Dichlorobenzene	ug/L	50	51.1	102	70-130	
1,2-Dichloroethane	ug/L	50	51.7	103	70-130	
1,2-Dichloroethene (Total)	ug/L	100	95.9	96	70-130	
1,2-Dichloropropane	ug/L	50	54.7	109	70-130	
1,4-Dichlorobenzene	ug/L	50	50.5	101	70-130	
2-Butanone (MEK)	ug/L	100	105	105	70-145	
2-Hexanone	ug/L	100	108	108	70-144	
4-Methyl-2-pentanone (MIBK)	ug/L	100	109	109	70-140	
Acetone	ug/L	100	109	109	50-175	
Acrylonitrile	ug/L	250	265	106	70-143	
Benzene	ug/L	50	55.3	111	70-130	
Bromochloromethane	ug/L	50	49.8	100	70-130	
Bromodichloromethane	ug/L	50	52.3	105	70-130	
Bromoform	ug/L	50	56.8	114	70-130	
Bromomethane	ug/L	50	48.8	98	54-130	
Carbon disulfide	ug/L	50	53.0J	106	70-131	

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QUALITY CONTROL DATA

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

LABORATORY CONTROL SAMPLE: 753554

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Carbon tetrachloride	ug/L	50	53.7	107	70-132	
Chlorobenzene	ug/L	50	49.9	100	70-130	
Chloroethane	ug/L	50	56.2	112	64-134	
Chloroform	ug/L	50	50.3	101	70-130	
Chloromethane	ug/L	50	46.3	93	64-130	
cis-1,2-Dichloroethene	ug/L	50	49.3	99	70-131	
cis-1,3-Dichloropropene	ug/L	50	54.8	110	70-130	
Dibromochloromethane	ug/L	50	53.5	107	70-130	
Dibromomethane	ug/L	50	55.5	111	70-131	
Dichlorodifluoromethane	ug/L	50	47.0	94	56-130	
Ethylbenzene	ug/L	50	51.4	103	70-130	
Iodomethane	ug/L	100	111	111	49-180	
m&p-Xylene	ug/L	100	100	100	70-130	
Methylene Chloride	ug/L	50	49.0	98	63-130	
o-Xylene	ug/L	50	49.1	98	70-130	
Styrene	ug/L	50	51.7	103	70-130	
Tetrachloroethene	ug/L	50	51.8	104	70-130	
Tetrahydrofuran	ug/L	500	526	105	70-130	
Toluene	ug/L	50	51.7	103	70-130	
trans-1,2-Dichloroethene	ug/L	50	46.6	93	70-130	
trans-1,3-Dichloropropene	ug/L	50	55.3	111	70-132	
trans-1,4-Dichloro-2-butene	ug/L	50	53.6J	107	70-141	
Trichloroethene	ug/L	50	53.3	107	70-130	
Trichlorofluoromethane	ug/L	50	55.3	111	62-133	
Vinyl acetate	ug/L	100	93.0	93	66-157	
Vinyl chloride	ug/L	50	53.4	107	69-130	
Xylene (Total)	ug/L	150	149	100	70-130	
1,2-Dichloroethane-d4 (S)	%			93	70-130	
4-Bromofluorobenzene (S)	%			107	70-130	
Dibromofluoromethane (S)	%			92	70-130	
Toluene-d8 (S)	%			98	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 753555 753556

Parameter	Units	92116828001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethene	ug/L	ND	50	50	57.4	55.9	115	112	70-166	3	30	
Benzene	ug/L	ND	50	50	50.5	51.1	101	102	70-148	1	30	
Chlorobenzene	ug/L	ND	50	50	55.8	56.6	112	113	70-146	2	30	
Toluene	ug/L	ND	50	50	55.1	56.7	110	113	70-155	3	30	
Trichloroethene	ug/L	ND	50	50	58.5	59.6	117	119	69-151	2	30	
1,2-Dichloroethane-d4 (S)	%						101	102	70-130			
4-Bromofluorobenzene (S)	%						105	106	70-130			
Dibromofluoromethane (S)	%						96	99	70-130			
Toluene-d8 (S)	%						97	98	70-130			

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QUALITY CONTROL DATA

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

QC Batch: WET/20599 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008

METHOD BLANK: 754707 Matrix: Water
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	ug/L	ND	5000	04/25/12 11:05	

LABORATORY CONTROL SAMPLE: 754708

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	ug/L	50000	50600	101	90-110	

SAMPLE DUPLICATE: 754709

Parameter	Units	92116828001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	ug/L	24300	24300	0	20	

SAMPLE DUPLICATE: 754710

Parameter	Units	92116851013 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	ug/L	14.2 mg/L	13200	7	20	

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QUALITY CONTROL DATA

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

QC Batch: WET/20556 — Analysis Method: SM 2540C
QC Batch Method: SM 2540C — Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008

METHOD BLANK: 753434 — Matrix: Water
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	ug/L	ND	25000	04/20/12 23:29	

LABORATORY CONTROL SAMPLE: 753435

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	ug/L	250000	236000	94	80-120	

SAMPLE DUPLICATE: 753436

Parameter	Units	92116469001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	ug/L	266 mg/L	273000	3	10	

SAMPLE DUPLICATE: 753437

Parameter	Units	92116828008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	ug/L	79000	81000	2	10	

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QUALITY CONTROL DATA

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

QC Batch: WETA/11997 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008

METHOD BLANK: 753588 Matrix: Water
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	ug/L	ND	5000	04/24/12 17:31	

LABORATORY CONTROL SAMPLE: 753589

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	20000	19400	97	90-110	

MATRIX SPIKE SAMPLE: 753590

Parameter	Units	92116412004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	20600J	20000	36300	79	90-110	M1

MATRIX SPIKE SAMPLE: 753592

Parameter	Units	92116828001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	ug/L	8880	20000	27500	93	90-110	

SAMPLE DUPLICATE: 753591

Parameter	Units	92116412004 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	ug/L	20600J	20600	0	20	

SAMPLE DUPLICATE: 753593

Parameter	Units	92116828001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	ug/L	8880	8660	2	20	

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2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

QC Batch: WETA/12028 Analysis Method: SM 4500-Cl-E
QC Batch Method: SM 4500-Cl-E Analysis Description: 4500 Chloride
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008

METHOD BLANK: 756112 Matrix: Water
Associated Lab Samples: 92116828001, 92116828002, 92116828003, 92116828004, 92116828005, 92116828006, 92116828007, 92116828008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	ug/L	ND	5000	04/27/12 15:13	

LABORATORY CONTROL SAMPLE: 756113

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	ug/L	20000	19900	99	90-110	

MATRIX SPIKE SAMPLE: 756115

Parameter	Units	92116828001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	ug/L	ND	20000	24400	109	75-125	

SAMPLE DUPLICATE: 756114

Parameter	Units	92116828001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	ug/L	ND	ND		20	

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QUALIFIERS

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Acid preservation may not be appropriate for 2-Chloroethylvinyl ether, Styrene, and Vinyl chloride.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-A	Pace Analytical Services - Asheville
PASI-C	Pace Analytical Services - Charlotte

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92116828001	**0105-MW2**	EPA 3010	MPRP/10427	EPA 6010	ICP/9605
92116828002	**0105-MW4**	EPA 3010	MPRP/10427	EPA 6010	ICP/9605
92116828003	**0105-MW6**	EPA 3010	MPRP/10427	EPA 6010	ICP/9605
92116828004	**0105-MW7**	EPA 3010	MPRP/10427	EPA 6010	ICP/9605
92116828005	**0105-MW8**	EPA 3010	MPRP/10427	EPA 6010	ICP/9605
92116828006	**0105-P19S**	EPA 3010	MPRP/10427	EPA 6010	ICP/9605
92116828007	**0105-SW1**	EPA 3010	MPRP/10427	EPA 6010	ICP/9605
92116828008	**0105-SW2**	EPA 3010	MPRP/10427	EPA 6010	ICP/9605
92116828009	**0105-FIELD BLANK**	EPA 3010	MPRP/10427	EPA 6010	ICP/9605
92116828001	**0105-MW2**	EPA 7470	MERP/4192	EPA 7470	MERC/4120
92116828002	**0105-MW4**	EPA 7470	MERP/4192	EPA 7470	MERC/4120
92116828003	**0105-MW6**	EPA 7470	MERP/4192	EPA 7470	MERC/4120
92116828004	**0105-MW7**	EPA 7470	MERP/4192	EPA 7470	MERC/4120
92116828005	**0105-MW8**	EPA 7470	MERP/4192	EPA 7470	MERC/4120
92116828006	**0105-P19S**	EPA 7470	MERP/4192	EPA 7470	MERC/4120
92116828007	**0105-SW1**	EPA 7470	MERP/4192	EPA 7470	MERC/4120
92116828008	**0105-SW2**	EPA 7470	MERP/4192	EPA 7470	MERC/4120
92116828009	**0105-FIELD BLANK**	EPA 7470	MERP/4192	EPA 7470	MERC/4120
92116828001	**0105-MW2**	EPA 8260	MSV/18879		
92116828002	**0105-MW4**	EPA 8260	MSV/18879		
92116828003	**0105-MW6**	EPA 8260	MSV/18879		
92116828004	**0105-MW7**	EPA 8260	MSV/18879		
92116828005	**0105-MW8**	EPA 8260	MSV/18879		
92116828006	**0105-P19S**	EPA 8260	MSV/18879		
92116828007	**0105-SW1**	EPA 8260	MSV/18879		
92116828008	**0105-SW2**	EPA 8260	MSV/18879		
92116828009	**0105-FIELD BLANK**	EPA 8260	MSV/18879		
92116828010	**0105-TRIP BLANK**	EPA 8260	MSV/18879		
92116828001	**0105-MW2**	SM 2320B	WET/20599		
92116828002	**0105-MW4**	SM 2320B	WET/20599		
92116828003	**0105-MW6**	SM 2320B	WET/20599		
92116828004	**0105-MW7**	SM 2320B	WET/20599		
92116828005	**0105-MW8**	SM 2320B	WET/20599		
92116828006	**0105-P19S**	SM 2320B	WET/20599		
92116828007	**0105-SW1**	SM 2320B	WET/20599		
92116828008	**0105-SW2**	SM 2320B	WET/20599		
92116828001	**0105-MW2**	SM 2540C	WET/20556		
92116828002	**0105-MW4**	SM 2540C	WET/20556		
92116828003	**0105-MW6**	SM 2540C	WET/20556		
92116828004	**0105-MW7**	SM 2540C	WET/20556		
92116828005	**0105-MW8**	SM 2540C	WET/20556		
92116828006	**0105-P19S**	SM 2540C	WET/20556		
92116828007	**0105-SW1**	SM 2540C	WET/20556		
92116828008	**0105-SW2**	SM 2540C	WET/20556		
92116828001	**0105-MW2**	EPA 300.0	WETA/11997		
92116828002	**0105-MW4**	EPA 300.0	WETA/11997		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: COBLES SANDROCK 419.1201.12.01
Pace Project No.: 92116828

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92116828003	**0105-MW6**	EPA 300.0	WETA/11997		
92116828004	**0105-MW7**	EPA 300.0	WETA/11997		
92116828005	**0105-MW8**	EPA 300.0	WETA/11997		
92116828006	**0105-P19S**	EPA 300.0	WETA/11997		
92116828007	**0105-SW1**	EPA 300.0	WETA/11997		
92116828008	**0105-SW2**	EPA 300.0	WETA/11997		
92116828001	**0105-MW2**	SM 4500-Cl-E	WETA/12028		
92116828002	**0105-MW4**	SM 4500-Cl-E	WETA/12028		
92116828003	**0105-MW6**	SM 4500-Cl-E	WETA/12028		
92116828004	**0105-MW7**	SM 4500-Cl-E	WETA/12028		
92116828005	**0105-MW8**	SM 4500-Cl-E	WETA/12028		
92116828006	**0105-P19S**	SM 4500-Cl-E	WETA/12028		
92116828007	**0105-SW1**	SM 4500-Cl-E	WETA/12028		
92116828008	**0105-SW2**	SM 4500-Cl-E	WETA/12028		

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Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A
Required Client Information:

Company:	Joyce Engineering-Greensboro
Address:	2211 W. Meadowview Rd
	Greensboro, NC 27407
Email To:	aeverhart@joyceengineering.com
Phone:	336-323-0023 Fax:
Requested Due Date/TAT:	10 Day (Default)

Section B
Required Project Information:

Report To:	Jeremey Kerly
Copy To:	Alex Everhart
Purchase Order No.	
Client Project ID:	Coble's Sandrock 419.1201.12.01
Container Order Number:	

Section C
Invoice Information:

Attention:	Lecia Jones
Company Name:	Joyce Engineering
Address:	1604 Ownby Lane, Richmond, VA 23220
Pace Quote Reference:	
Pace Project Manager:	Godwin, Kevin
Pace Profile #:	

Regulatory Agency
State / Location
North Carolina

SAMPLE ID
One Character per box.
(A-Z, 0-9 / , -)
Sample Ids must be unique

MATRIX	CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Other	OT
Tissue	TS

ITEM#	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test (Y/N): NC App I Metals	NC App I 8260	Mercury	Chloride	Manganese	Sulfate	Iron	Alkalinity	TDS	THF			Residual Chlorine (Y/N)	92 11682 8
1	0105-MW2 (MS/MSD)	WT	G			4/17	1115	7	21									X	X	X	X	X	X	X	X	X	X				001
2	0105-MW4	WT	G			4/17	1135	7	7									X	X	X	X	X	X	X	X	X	X				002
3	0105-MW6	WT	G				1010	7	7									X	X	X	X	X	X	X	X	X	X				003
4	0105-MW7	WT	G				1145	7	7									X	X	X	X	X	X	X	X	X	X				004
5	0105-MW8	WT	G				1105	7	7									X	X	X	X	X	X	X	X	X	X				005
6	~~0105-MW10S~~	~~WT~~	~~G~~															~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~				
7	0105-P19S	WT	G				1035	7	7									X	X	X	X	X	X	X	X	X	X				006
8	0105-SW1	WT	G				1200	7	7									X	X	X	X	X	X	X	X	X	X				007
9	0105-SW2	WT	G				1045	7	7									X	X	X	X	X	X	X	X	X	X				008
10	0105-Field Blank	WT	G				1215	4	4									X	X	X		X		X			X				009
11	0105-Trip Blank	WT	G			4/16	1000	2	2										X								X				010
12																															

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Adam Cox	4/19	1222	[signature]	4/19/12	1222				
	[signature]	4/19/12	1538	[signature]	4/19/12	1538	3.0	Y	N	Y

SAMPLER NAME AND SIGNATURE	
PRINT Name of SAMPLER:	ADAM COX ROBERT WINFIELD
SIGNATURE of SAMPLER:	Adam Cox, [signature]
DATE Signed:	4/17/12

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

Pace Analytical	Document Name: **Sample Condition Upon Receipt (SCUR)**	Document Revised: January 30, 2012 Page 1 of 2
	Document Number: **F-CHR-CS-03-rev.06**	Issuing Authority: Pace Huntersville Quality Office

Client Name: Joyce Project # 92116828

Where Received: ☑ Huntersville ☐ Asheville ☐ Eden

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other_____

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Optional
Proj. Due Date:
Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other_____

Thermometer Used: IR Gun T1101 T1102 **Type of Ice:** Wet Blue None ☑ Samples on ice, cooling process has begun

Temp Correction Factor **T1101**: No Correction **T1102**: Subtract 1.2°C

Corrected Cooler Temp.: 3.0 C **Biological Tissue is Frozen:** Yes No N/A

Date and Initials of person examining contents: [illegible]

Temp should be above freezing to 6°C

Comments:

Chain of Custody Present:	☑Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☑Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☑Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes	☑No	☐N/A	6.
Rush Turn Around Time Requested:	☐Yes	☑No	☐N/A	7.
Sufficient Volume:	☑Yes	☐No	☐N/A	8.
Correct Containers Used:	☑Yes	☐No	☐N/A	9.
-Pace Containers Used:	☑Yes	☐No	☐N/A	
Containers Intact:	☑Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☑N/A	11.
Sample Labels match COC:	☑Yes	☐No	☐N/A	12.
-Includes date/time/ID/Analysis Matrix: WT				
All containers needing preservation have been checked.	☑Yes	☐No	☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes	☐No	☐N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☐Yes	☐No		Initial when completed
Samples checked for dechlorination:	☐Yes	☐No	☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes	☑No	☐N/A	15.
Trip Blank Present:	☑Yes	☐No	☐N/A	16.
Trip Blank Custody Seals Present	☑Yes	☐No	☐N/A	
Pace Trip Blank Lot # (if purchased):_____				

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

SCURF Review: [illegible] **Date:** 4/19/12 **SRF Review:** RES **Date:** [illegible]

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

DATE: 4/16-17/12

JOYCE ENGINEERING

GROUND WATER SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project No. /Task No.:** 419.1201.12.01

Well ID: 0105-MW2 MS/MSD **Sampler(s):** A. Cox / R. Winfield

Well Location: near top of hill; west side of LF

Well Diameter: 2 inches

Initial Depth to Water (DTW): 13.55 feet

Depth to Bottom (DTB): 22.98 feet

Water Column Thickness (WCT): 9.43 feet [DTB-DTW]

Calculation for One Well Volume (WV):

For 2" Well: WCT X 0.163 = 1.5 gallons

For 4" Well: WCT X 0.653 = _____ gallons

For THREE Well Volumes: WV X 3 = 4.5 gallons

Actual Amount Purged/Bailed: 4.5 gallons

Purged with: disposable bailer

Sampled with: disposable bailer

Depth to Water before Sampling: 13.66 feet

Gallons	Time	Temp(°C)	pH	Cond. (µS)	Turb.(ntu)	Initials
0	1306	15.4	5.97	97.3	132	AC
1.5	1308	15.1	5.95	111.2	143	AC
3.0	1310	15.2	5.92	90.9	227	AC
4.5	1312	15.5	5.98	90.4	929	AC
	4/17/12					
Before Sampling	1115	16.0	6.12	93.4	81.5	AC

Comments (weather conditions, odor, color, silt, etc.):

4/16- Sunny 80's

4/17- Sunny 70's

Signature: Adam Cox **Date:** 4/17/12

QA/QC Sign Off: Carey A. Davis **Date:** 4/17/2012

DATE: 4/16-17/12

JOYCE ENGINEERING

GROUND WATER SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project No. /Task No.:** 419.1201.12.01

Well ID: 0105-MW4 **Sampler(s):** A. Cox / R. Winfield

Well Location: between MW-5 and MW-2

Well Diameter: 2 inches

Initial Depth to Water (DTW): 13.88 feet

Depth to Bottom (DTB): 24.22 feet

Water Column Thickness (WCT): 10.34 feet [DTB-DTW]

Calculation for One Well Volume (WV):

For 2" Well: WCT X 0.163 = 1.7 gallons

For 4" Well: WCT X 0.653 = _____ gallons

For THREE Well Volumes: WV X 3 = 5.1 gallons

Actual Amount Purged/Bailed: 5.1 gallons

Purged with: disposable bailer

Sampled with: disposable bailer

Depth to Water before Sampling: 13.92 feet

Gallons	Time	Temp(°C)	pH	Cond. (µS)	Turb.(ntu)	Initials
0	1318	16.7	5.77	81.8	91.8	RW
1.7	1321	16.0	5.69	73.9	87.5	RW
3.4	1324	16.0	5.56	218	889	RW
5.1	1327	16.1	5.71	617	>1000	RW
	4/17/12					
Before Sampling	1135	16.8	5.84	541	16.1	RW

Comments (weather conditions, odor, color, silt, etc.):

4/16- Sunny 80's

4/17- Sunny 80's

Signature: [signature] **Date:** 4/17/12

QA/QC Sign Off: Carey A. Davis **Date:** 4/17/2012

DATE: 4/16-17/12

JOYCE ENGINEERING

GROUND WATER SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project No. /Task No.:** 419.1201.12.01

Well ID: 0105-MW6 **Sampler(s):** A. Cox / R. Winfield

Well Location: flush mount in field that is fenced before the fill area (former P-3)

Well Diameter: 2 inches

Initial Depth to Water (DTW): 25.62 feet

Depth to Bottom (DTB): 41.00 feet

Water Column Thickness (WCT): 15.38 feet [DTB-DTW]

Calculation for One Well Volume (WV):

For 2" Well: WCT X 0.163 = 2.5 gallons

For 4" Well: WCT X 0.653 = _____ gallons

For THREE Well Volumes: WV X 3 = 7.5 gallons

Actual Amount Purged/Bailed: 7.5 gallons

Purged with: disposable bailer

Sampled with: disposable bailer

Depth to Water before Sampling: 25.65 feet

Gallons	Time	Temp(°C)	pH	Cond. (µS)	Turb.(ntu)	Initials
0	1147	17.6	6.24	181.0	1.71	RW
2.5	1152	16.7	5.68	181.2	37.5	RW
5.0	1156	16.5	5.68	192.9	62.1	RW
7.5	1201	16.4	5.74	192.3	114	RW
	4/17/12					
Before Sampling	1010	17.2	7.43	182.2	16.8	RW

Comments (weather conditions, odor, color, silt, etc.):

4/13- Sunny 70's

4/14- Sunny 60's

Signature: [signature] **Date:** 4/17/12

QA/QC Sign Off: Carey A. Davis **Date:** 4/17/2012

DATE: 4/16-17/12

JOYCE ENGINEERING

GROUND WATER SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project No. /Task No.:** 419.1201.12.01

Well ID: 0105-MW7 **Sampler(s):** A. Cox / R. Winfield

Well Location: Westside of the landfill near MW5

Well Diameter: 2 inches

Initial Depth to Water (DTW): 8.71 feet

Depth to Bottom (DTB): 16.00 feet

Water Column Thickness (WCT): 7.29 feet [DTB-DTW]

Calculation for One Well Volume (WV):

For 2" Well: WCT X 0.163 = 1.2 gallons

For 4" Well: WCT X 0.653 = _____ gallons

For THREE Well Volumes: WV X 3 = 3.6 gallons

Actual Amount Purged/Bailed: 3.6 gallons

Purged with: disposable bailer

Sampled with: disposable bailer

Depth to Water before Sampling: 8.81 feet

Gallons	Time	Temp(°C)	pH	Cond. (MS)	Turb.(ntu)	Initials
0	1410	19.5	6.29	2.43	50.1	AC
1.2	1412	19.0	6.44	1910	118	AC
2.4	1414	18.9	6.47	1828	99.6	AC
4.6	1416	18.6	6.48	1815	107.4	AC
	4/17/12					
Before Sampling	1145	19.4	6.32	1945	3.16	AC

Comments (weather conditions, odor, color, silt, etc.):

4/16- Sunny 80's

4/17- Sunny 80's

Signature: Adam Cox **Date:** 4/17/12

QA/QC Sign Off: Casey A. Davis **Date:** 4/17/2012

DATE: 4/16-17/12

JOYCE ENGINEERING

GROUND WATER SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project No. /Task No.:** 419.1201.12.01

Well ID: 0105-MW8 **Sampler(s):** A. Cox / R. Winfield

Well Location: backside of the landfill along perimeter road

Well Diameter: 2 inches

Initial Depth to Water (DTW): 5.73 feet

Depth to Bottom (DTB): 22.76 feet

Water Column Thickness (WCT): 17.03 feet [DTB-DTW]

Calculation for One Well Volume (WV):

For 2" Well: WCT X 0.163 = 2.8 gallons

For 4" Well: WCT X 0.653 = _____ gallons

For THREE Well Volumes: WV X 3 = 8.4 gallons

Actual Amount Purged/Bailed: 8.4 gallons

Purged with: disposable bailer

Sampled with: disposable bailer

Depth to Water before Sampling: 5.80 feet

Gallons	Time	Temp(°C)	pH	Cond. (µS)	Turb.(ntu)	Initials
0	1244	15.7	6.13	141.8	9.08	RW
2.8	1246	15.0	6.29	140.1	>1000	RW
5.6	1250	15.2	6.35	138.3	>1000	RW
8.4	1252	14.9	6.37	138.6	>1000	RW
	4/17/12					
Before Sampling	1105	16.3	6.88	139.2	57.2	RW

Comments (weather conditions, odor, color, silt, etc.):

4/13- Sunny 80's

4/14- Sunny 70's

Signature: [signature] **Date:** 4/17/12

QA/QC Sign Off: Casey A. Davis **Date:** 4/17/2012

DATE: 4/16-17/12

JOYCE ENGINEERING

GROUND WATER SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project No. /Task No.:** 419.1201.12.01

Well ID: 0105-MW10S **Sampler(s):** A. Cox / R. Winfield

Well Location: side of the landfill along perimeter road

Well Diameter: 2 inches

Initial Depth to Water (DTW): - feet

Depth to Bottom (DTB): 24.34 feet

Water Column Thickness (WCT): - feet [DTB-DTW]

Calculation for One Well Volume (WV):

For 2" Well: WCT X 0.163 = - gallons

For 4" Well: WCT X 0.653 = _____ gallons

For THREE Well Volumes: WV X 3 = _____ gallons

Actual Amount Purged/Bailed: - gallons

Purged with: disposable bailer

Sampled with: disposable bailer

Depth to Water before Sampling: - feet

Gallons	Time	Temp(°C)	pH	Cond. (µS)	Turb.(ntu)	Initials
Before Sampling						

Comments (weather conditions, odor, color, silt, etc.):

Inaccessible- area has thick, heavy briars and is generally overgrown

Signature: [signature] **Date:** 4/17/12

QA/QC Sign Off: Casey A. Davis **Date:** 4/17/2012

DATE: 4/16-17/12

JOYCE ENGINEERING

GROUND WATER SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project No. /Task No.:** 419.1101.12.01

Well ID: 0105-P19S **Sampler(s):** A. Cox / R. Winfield

Well Location: backside of the landfill towards bridge in the woods

Well Diameter: 2 inches

Initial Depth to Water (DTW): 5.16 feet

Depth to Bottom (DTB): 13.00 feet

Water Column Thickness (WCT): 7.84 feet [DTB-DTW]

Calculation for One Well Volume (WV):

For 2" Well: WCT X 0.163 = 1.3 gallons

For 4" Well: WCT X 0.653 = _____ gallons

For THREE Well Volumes: WV X 3 = 3.9 gallons

Actual Amount Purged/Bailed: 3.9 gallons

Purged with: disposable bailer

Sampled with: disposable bailer

Depth to Water before Sampling: 5.21 feet

Gallons	Time	Temp(°C)	pH	Cond. (µS)	Turb.(ntu)	Initials
0	1224	15.2	5.71	184	68.9	AC
1.3	1226	13.9	5.71	176	60.4	AC
2.6	1227	14.1	5.72	175	122	AC
3.9	1228	13.6	5.75	178	122	AC
	4/17/12					
Before Sampling	1035	15.2	6.60	176	10.64	AC

Comments (weather conditions, odor, color, silt, etc.):

4/16- Sunny 80's

4/17- Sunny 70's

Signature: Adam Cox **Date:** 4/17/12

QA/QC Sign Off: Casey A. Davis **Date:** 4/17/2012

DATE: 4/17/12

JOYCE ENGINEERING

SURFACE WATER MONITORING LOG

Project Name: COBLE'S SANDROCK LF **Project/Task No.:** 419.1201.12.01

Surface Point ID: 0105-SW1 **Sampler(s):** A. Cox / R. Winfield

Location: Stream near MW4

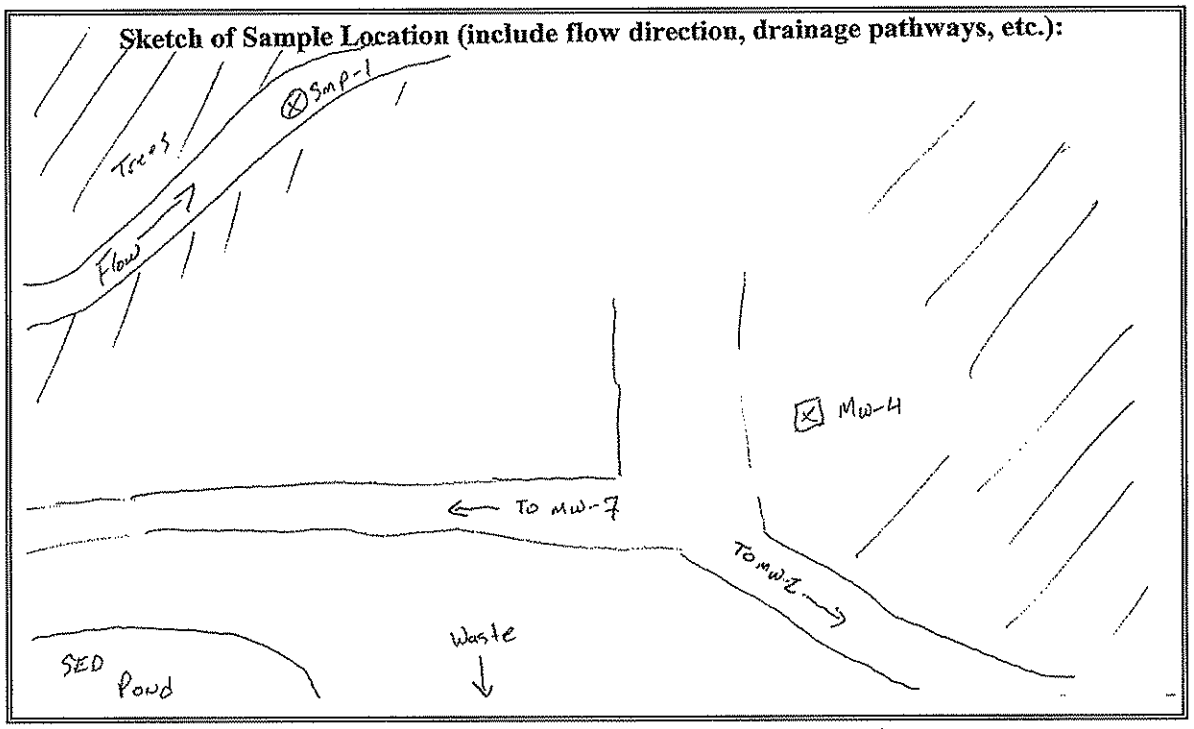
Field Parameters:

Time of Sampling:	1200	
pH:	7.50	
Temperature:	20.6	(°C)
Conductivity:	158.6	(µS)
Turbidity:	6.11	(ntu)

Comments/Sample Description (weather conditions, odor, color, silt, etc.):

Sunny 80's

Sketch of Sample Location (include flow direction, drainage pathways, etc.):



Signature: Adam Cox **Date:** 4/17/12

QA/QC Sign Off: Carey A. Davis **Date:** 4/17/2012

DATE: 4/17/12

JOYCE ENGINEERING

SURFACE WATER MONITORING LOG

Project Name: COBLE'S SANDROCK LF **Project/Task No.:** 419.1101.12.01

Surface Point ID: 0105-SW2 **Sampler(s):** A. Cox / R. Winfield

Location: off bridge in woods

Field Parameters:

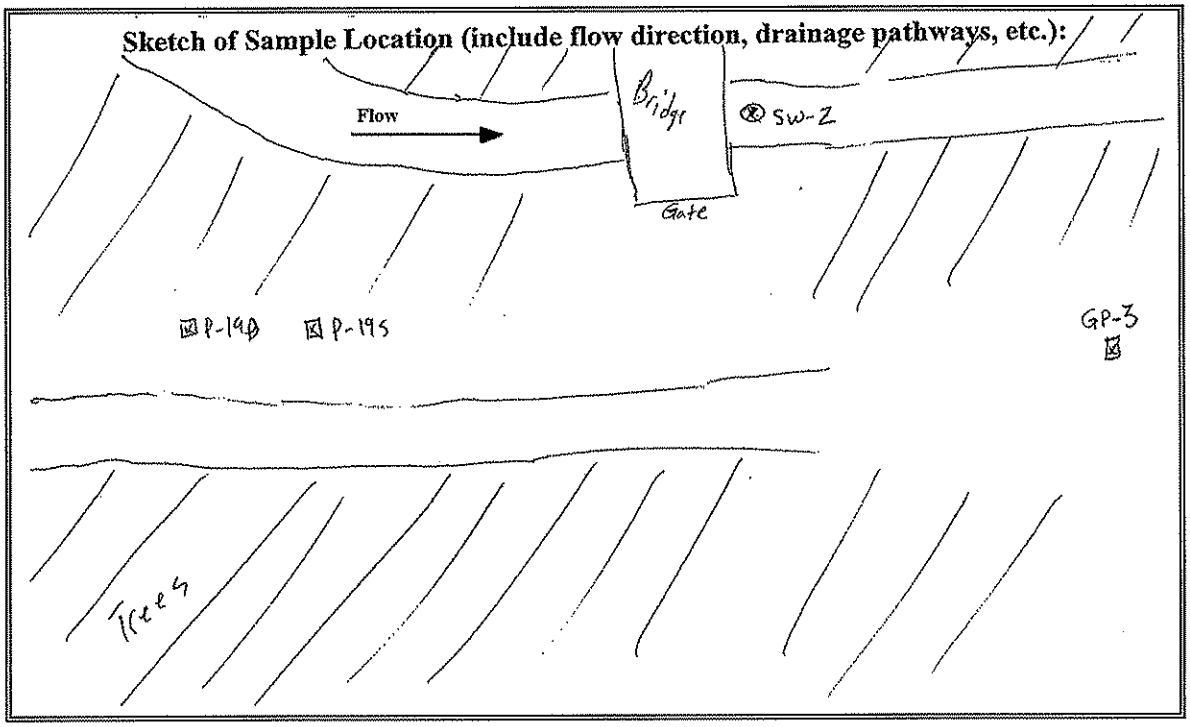
Time of Sampling:	1045	
pH:	6.88	
Temperature:	18.2	(°C)
Conductivity:	143.6	(µS)
Turbidity:	7.99	(ntu)

Comments/Sample Description (weather conditions, odor, color, silt, etc.):

Sunny, 70's

Field Blank 4/17/12 @ 1045

Sketch of Sample Location (include flow direction, drainage pathways, etc.):



Signature: Adam Cox **Date:** 4/17/12

QA/QC Sign Off: Carey A. Davis **Date:** 4/17/2012

Appendix 2 Statistical Analyses Worksheets

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Analyte: **Alkalinity**

Sample No.	Sample Date	Location	Concentration		Quantitation Limit	Sorted Concentration	
1	27-Apr-10	MW-6	8,200	B	5,000	10,100	17,700
2	12-Oct-10	MW-6	12,400		5,000	12,400	14,000
3	14-Apr-11	MW-6	14,000		5,000	14,000	12,400
4	13-Oct-11	MW-6	17,700		5,000	17,700	10,100
5	17-Apr-12	MW-6	10,100		5,000		
6	19-Mar-09	MW-8	61,000	B	5,000		
7	22-Apr-09	MW-8	57,300	B	5,000		
8	14-May-09	MW-8	55,700	B	5,000		
9	08-Oct-09	MW-8	58,000	B	5,000		
10	19-Mar-09	MW-10S	52,800	B	5,000		
11	22-Apr-09	MW-10S	52,400	B	5,000		
12	14-May-09	MW-10S	59,400	B	5,000		
13	08-Oct-09	MW-10S	74,000	B	5,000		
14	19-Mar-09	P-19S	30,500	B	5,000		
15	22-Apr-09	P-19S	32,500	B	5,000		
16	14-May-09	P-19S	30,700	B	5,000		
17	08-Oct-09	P-19S	70,000	B	5,000		

Number of Data: 4
Number of Truncated Data: 0
Percentage of Truncated Data: 0%

Parametric Prediction Interval (UTL): 38,439 µg/L

- All concentrations in micrograms per liter (µg/L).
- B = Blank qualified data not used in statistical calculations.
- Background data included from MW-8, MW-10S, and P-19S.
- Background well MW-6.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **Alkalinity**

Complete the following table where

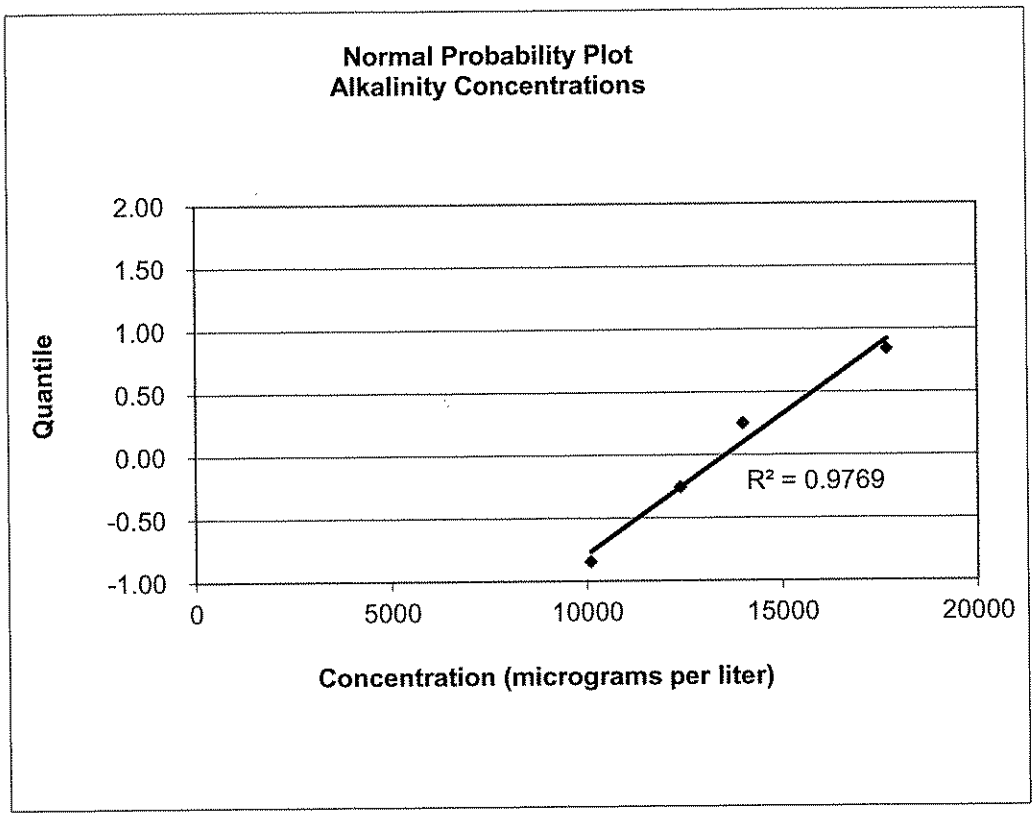
i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
LN[X(i)] = Natural Log Value of sample concentrations arranged from smallest to largest
[i/(n+1)] = Cumulative probability
n = number of samples = 4

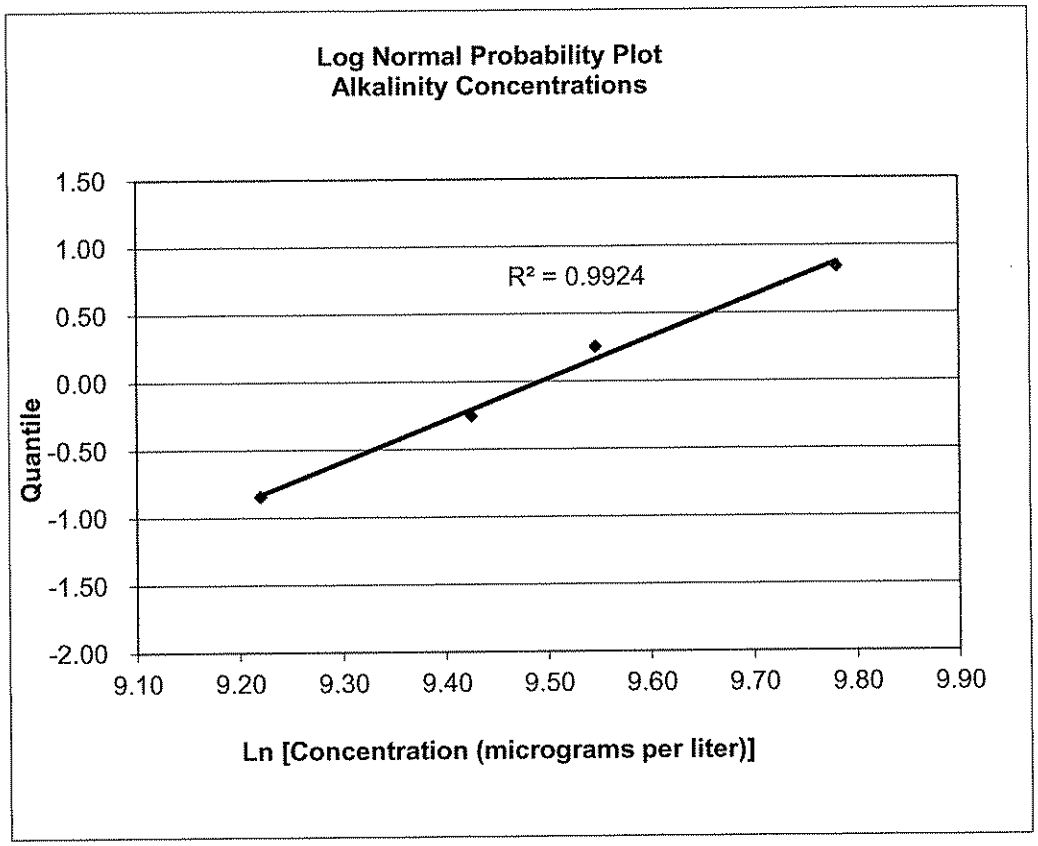
X(i)	LN[X(i)]	i	Rank	[Rank/(n+1)]	Quantiles
10100	9.22	1	1	0.200	-0.84
12400	9.43	2	2	0.400	-0.25
14000	9.55	3	3	0.600	0.25
17700	9.78	4	4	0.800	0.84

Plot analysis indicates that the data more closely follow a normal distribution in the log-transformed format.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **Alkalinity**





JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Determination of reported background value as an outlier

Analyte: **Alkalinity**

Background Data

Sample No.	Sample Date	Location	ln(Concentration) (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	B flagged	B	5,000
2	12-Oct-10	MW-6	9.425		5,000
3	14-Apr-11	MW-6	9.547		5,000
4	13-Oct-11	MW-6	9.781		5,000
5	17-Apr-12	MW-6	9.220		5,000
6	19-Mar-09	MW-8	B flagged	B	5,000
7	22-Apr-09	MW-8	B flagged	B	5,000
8	14-May-09	MW-8	B flagged	B	5,000
9	08-Oct-09	MW-8	B flagged	B	5,000
10	19-Mar-09	MW-10S	B flagged	B	5,000
11	22-Apr-09	MW-10S	B flagged	B	5,000
12	14-May-09	MW-10S	B flagged	B	5,000
13	08-Oct-09	MW-10S	B flagged	B	5,000
14	19-Mar-09	P-19S	B flagged	B	5,000
15	22-Apr-09	P-19S	B flagged	B	5,000
16	14-May-09	P-19S	B flagged	B	5,000
17	08-Oct-09	P-19S	B flagged	B	5,000
		mean =	9.493		
		STD =	0.234		

Note: All concentrations are micrograms per liter

Using the data listed above, form the statisitc Tn:

Tn = (Xn - mean) / STD

where:
Xn = largest observed sample value
mean = mean of the background values
STD = standard deviation of the background values

For
Xn = 9.781
mean = 9.493
STD = 0.234

Tn = 1.228

From Table 8 included in the Staistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Interim Final Guidance, the critical value for the given sample group is

Number of samples = 4
Tc = 1.463

Since Tc>Tn, the sample result is not considered to be an outlier

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Shapiro Wilk Test Statistic (W) for normality of total **Alkalinity**

Complete the following table where

i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
X(n-i+1) = sample values arranged from largest to smallest
A(n-i+1) = coefficient from table A-1, Statistical Analysis of Ground-Water Data at RCRA Facilities
B(i) = summation of (X(n-i+1)-X(i))A(n-i+1)

i	X(i)	X(n-i+1)	X(n-i+1) - X(i)	A(n-i+1)	B(i)
1	10100	17700	7600	0.6872	5222.72
2	12400	14000	1600	0.1677	268.32
3	14000	12400	-1600		
4	17700	10100	-7600		

The test statistic W can be found using:

W = SQR[B/(SD x SQRT(n-1))]

where:

B = summation of (X(n-i+1)-X(i))A(n-i+1) = 5491.04
SD = standard deviation of the data group = 3196.35
n = number of samples = 4

W = 0.984

Compare this value to the critical value in Table A-2 of Statistical Analysisof Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (Draft) July, 1992, to determine if the data is normally distributed.

From Table A-2 with (n) samples and a 95% confidence level, the critical value is

W(crit) = 0.748
and the calculated W = 0.984

Therefore the data set is Normal

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Parametric Prediction Interval for normally distributed data

Analyte: **Alkalinity**

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	B-Flagged	B	5000
2	12-Oct-10	MW-6	12400.0		5000
3	14-Apr-11	MW-6	14000.0		5000
4	13-Oct-11	MW-6	17700.0		5000
5	17-Apr-12	MW-6	10100.0		5000
6	19-Mar-09	MW-8	B-Flagged	B	5000
7	22-Apr-09	MW-8	B-Flagged	B	5000
8	14-May-09	MW-8	B-Flagged	B	5000
9	08-Oct-09	MW-8	B-Flagged	B	5000
10	19-Mar-09	MW-10S	B-Flagged	B	5000
11	22-Apr-09	MW-10S	B-Flagged	B	5000
12	14-May-09	MW-10S	B-Flagged	B	5000
13	08-Oct-09	MW-10S	B-Flagged	B	5000
14	19-Mar-09	P-19S	B-Flagged	B	5000
15	22-Apr-09	P-19S	B-Flagged	B	5000
16	14-May-09	P-19S	B-Flagged	B	5000
17	08-Oct-09	P-19S	B-Flagged	B	5000

Note: All sample concentrations are micrograms per liter

Using the background data, the upper Prediction Limit can be determined using:

Upper Prediction Limit = (Mean Conc) + t(n-1,k,.95) x (Std Dev) x SQRT(1/m+1/n)

where:
Mean Conc = mean concentration background samples
t(n-1k,.95) = Bonferroni t-statistic with
n-1 = degrees of freedom (number of samples - 1)
k = number of downgradient samples per event
.95 = confidence interval
Std Dev = standard deviation of background samples
m = number independent samples from each sampling point
n = number of background samples

For:
Mean Conc = 13550
Std Dev = 3196
sqrt(1/m+1/n) = 1.118
t(n-1,k,.95) = 6.96
k = 5
m = 1
n = 4

UPL = 38,439 ug/L

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Parametric Tolerance Interval for normally distributed data

Analyte: **Alkalinity**

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	B-Flagged	B	5,000
2	12-Oct-10	MW-6	12,400		5,000
3	14-Apr-11	MW-6	14,000		5,000
4	13-Oct-11	MW-6	17,700		5,000
5	17-Apr-12	MW-6	10,100		5,000
6	19-Mar-09	MW-8	B-Flagged	B	5,000
7	22-Apr-09	MW-8	B-Flagged	B	5,000
8	14-May-09	MW-8	B-Flagged	B	5,000
9	08-Oct-09	MW-8	B-Flagged	B	5,000
10	19-Mar-09	MW-10S	B-Flagged	B	5,000
11	22-Apr-09	MW-10S	B-Flagged	B	5,000
12	14-May-09	MW-10S	B-Flagged	B	5,000
13	08-Oct-09	MW-10S	B-Flagged	B	5,000
14	19-Mar-09	P-19S	B-Flagged	B	5,000
15	22-Apr-09	P-19S	B-Flagged	B	5,000
16	14-May-09	P-19S	B-Flagged	B	5,000
17	08-Oct-09	P-19S	B-Flagged	B	5,000

Note: All sample concentrations are micrograms per liter

Using the background data, the upper Tolerance Limit can be determined using:

Upper Tolerance Limit = (Mean Concentration) + K x (Standard Deviation Samples)

where: Mean Conc = mean concentration background samples
K = factor for constructing one sided normal tolerance limit taken from table 4-2, page 87, Statistical Methods for Groundwater Monitoring, Gibbons, 1994
n = number of background samples
STDS = Standard Deviation Samples

For:
n = 4
K = 5.145
Mean Conc = 13,550
STDS = 3,196

UTL = 29,995 µg/L

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Analyte: **Barium**

Sample No.	Sample Date	Location	Concentration		Quantitation Limit	Sorted Concentration	
1	Apr-00	MW-3	340		8	37.8	357
2	Nov-00	MW-3	ND		500	37.9	340
3	Apr-01	MW-3	ND		500	41.3	120
4	Dec-01	MW-3	ND		500	42.8	113
5	Apr-02	MW-3	ND		500	48.8	101
6	Nov-02	MW-3	ND		500	58.8	95.0
7	Apr-03	MW-3	ND		500	59.0	85.5
8	Nov-03	MW-6	ND		500	62.4	74.1
9	Apr-04	MW-6	ND		500	74.1	62.4
10	Oct-04	MW-6	ND		500	85.5	59.0
11	Apr-05	MW-6	ND		500	95.0	58.8
12	Oct-05	MW-6	ND		500	101	48.8
13	28-Apr-06	MW-6	ND		500	113	42.8
14	11-Oct-06	MW-6	ND		500	120	41.3
15	19-Apr-07	MW-6	58.8	J	100	340	37.9
16	11-Oct-07	MW-6	38.2	B	100	357	37.8
17	15-Apr-08	MW-6	37.8	J	100		
18	15-Oct-08	MW-6	41.3	J	100		
19	22-Apr-09	MW-6	46.4	B	100		
20	08-Oct-09	MW-6	39.7	B	100		
21	27-Apr-10	MW-6	42.1	B	100		
22	12-Oct-10	MW-6	48.8	J	100		
23	14-Apr-11	MW-6	46.5	B	100		
24	13-Oct-11	MW-6	37.9	J	100		
25	17-Apr-12	MW-6	42.8	J	100		
26	19-Mar-09	MW-8	357		100		
27	22-Apr-09	MW-8	95.0	J	100		
28	14-May-09	MW-8	101		100		
29	08-Oct-09	MW-8	120		100		
30	19-Mar-09	MW-10S	59.0	J	100		
31	22-Apr-09	MW-10S	56.5	B	100		
32	14-May-09	MW-10S	49.1	B	100		
33	08-Oct-09	MW-10S	85.5	J	100		
34	19-Mar-09	P-19S	62.4	J	100		
35	22-Apr-09	P-19S	63.2	B	100		
36	14-May-09	P-19S	74.1		100		
37	08-Oct-09	P-19S	113		100		

Number of Data: 29
Number of Truncated Data: 13
Percentage of Truncated Data: 45%

Non-Parametric Prediction Interval 357 µg/L

- All concentrations in micrograms per liter (µg/L).
- J = Estimated value below quantitation linit..
- B = Blank qualified data not used in statistical calculations.
- Background data included from MW-3, MW-8, MW-10S, and P-19S.
- Background well MW-6.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **Barium**

Complete the following table where

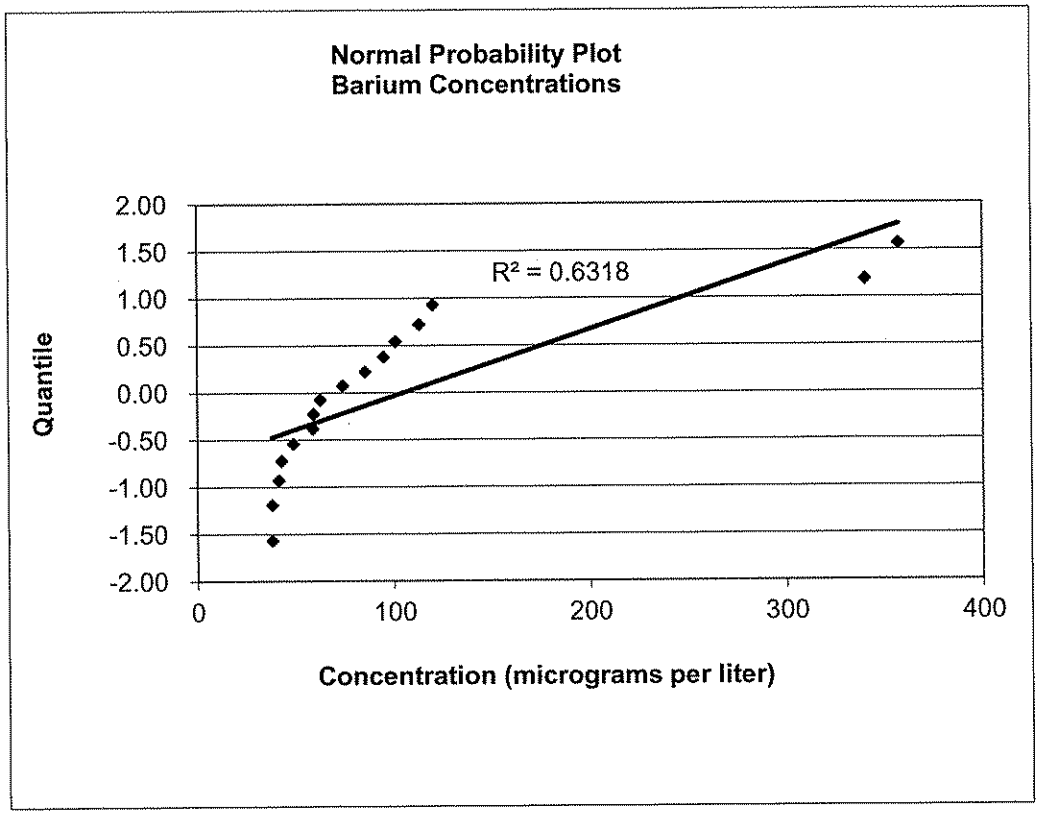
i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
LN[X(i)] = Natural Log Value of sample concentrations arranged from smallest to largest
[i/(n+1)] = Cumulative probability
n = number of samples = 16

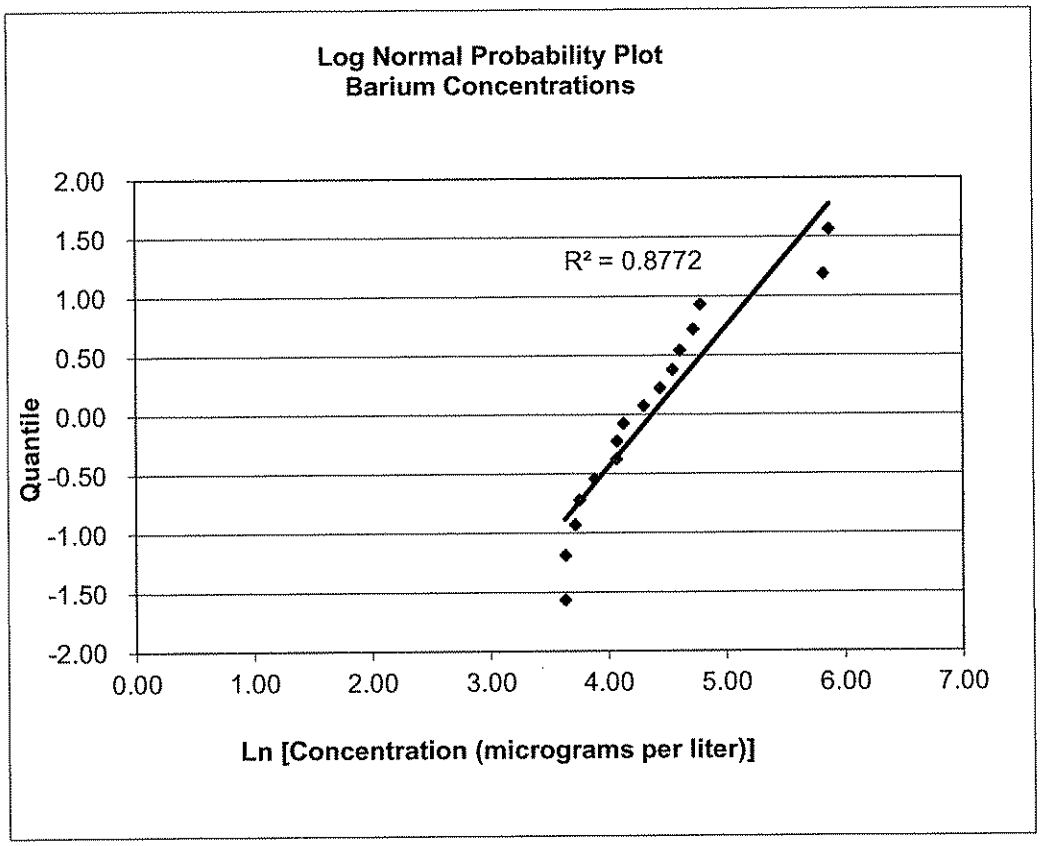
X(i)	LN[X(i)]	i	Rank	[Rank/(n+1)]	Quantiles
37.8	3.63	1	1	0.059	-1.56
37.9	3.63	2	2	0.118	-1.19
41.3	3.72	3	3	0.176	-0.93
42.8	3.76	4	4	0.235	-0.72
48.8	3.89	5	5	0.294	-0.54
58.8	4.07	6	6	0.353	-0.38
59	4.08	7	7	0.412	-0.22
62.4	4.13	8	8	0.471	-0.07
74.1	4.31	9	9	0.529	0.07
85.5	4.45	10	10	0.588	0.22
95	4.55	11	11	0.647	0.38
101	4.62	12	12	0.706	0.54
113	4.73	13	13	0.765	0.72
120	4.79	14	14	0.824	0.93
340	5.83	15	15	0.882	1.19
357	5.88	16	16	0.941	1.56

Plot analysis indicates that the data more closely follow a normal distribution in the log-transformed format.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **Barium**





JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Determination of reported background value as an outlier

Analyte: **Barium**

Background Data

Sample No.	Sample Date	Location	ln(Concentration) (ug/l)		Quantitation Limit (ug/l)
1	Apr-00	MW-3	5.829		8
2	Nov-00	MW-3	ND		500
3	Apr-01	MW-3	ND		500
4	Dec-01	MW-3	ND		500
5	Apr-02	MW-3	ND		500
6	Nov-02	MW-3	ND		500
7	Apr-03	MW-3	ND		500
8	Nov-03	MW-6	ND		500
9	Apr-04	MW-6	ND		500
10	Oct-04	MW-6	ND		500
11	Apr-05	MW-6	ND		500
12	Oct-05	MW-6	ND		500
13	28-Apr-06	MW-6	ND		500
14	11-Oct-06	MW-6	ND		500
15	19-Apr-07	MW-6	4.074	J	100
16	11-Oct-07	MW-6	B flagged	B	100
17	15-Apr-08	MW-6	3.632	J	100
18	15-Oct-08	MW-6	3.721	J	100
19	22-Apr-09	MW-6	B flagged	B	100
20	08-Oct-09	MW-6	B flagged	B	100
21	27-Apr-10	MW-6	B flagged	B	100
22	12-Oct-10	MW-6	3.888	J	100
23	14-Apr-11	MW-6	B flagged	B	100
24	13-Oct-11	MW-6	3.635	J	100
25	17-Apr-12	MW-6	3.757	J	100
26	19-Mar-09	MW-8	5.878		100
27	22-Apr-09	MW-8	4.554	J	100
28	14-May-09	MW-8	4.615		100
29	08-Oct-09	MW-8	4.787		100
30	19-Mar-09	MW-10S	4.078	J	100
31	22-Apr-09	MW-10S	B flagged	B	100
32	14-May-09	MW-10S	B flagged	B	100
33	08-Oct-09	MW-10S	4.449	J	100
34	19-Mar-09	P-19S	4.134	J	100
35	22-Apr-09	P-19S	B flagged	B	100
36	14-May-09	P-19S	4.305		100
37	08-Oct-09	P-19S	4.727		100
		mean =	4.379		
		STD =	0.690		

Note: All concentrations are micrograms per liter

Using the data listed above, form the statisitc Tn:

Tn = (Xn - mean) / STD

where:
Xn = largest observed sample value
mean = mean of the background values
STD = standard deviation of the background values

For
Xn = 5.878
mean = 4.379
STD = 0.690

Tn = 2.171

From Table 8 included in the Staistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Interim Final Guidance, the critical value for the given sample group is

Number of samples = 16
Tc = 2.443

Since Tc>Tn, the sample result is not considered to be an outlier

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Shapiro Wilk Test Statistic (W) for normality of total **Barium**

Complete the following table where

i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
X(n-i+1) = sample values arranged from largest to smallest
A(n-i+1) = coefficient from table A-1, Statistical Analysis of Ground-Water Data at RCRA Facilities
B(i) = summation of (X(n-i+1)-X(i))A(n-i+1)

i	X(i)	X(n-i+1)	X(n-i+1) - X(i)	A(n-i+1)	B(i)
1	37.8	357.0	319	0.5056	161.39
2	37.9	340.0	302	0.3290	99.39
3	41.3	120.0	79	0.2521	19.84
4	42.8	113.0	70	0.1939	13.61
5	48.8	101.0	52	0.1447	7.55
6	58.8	95.0	36	0.1005	3.64
7	59.0	85.5	27	0.0593	1.57
8	62.4	74.1	12	0.0196	0.23
9	74.1	62.4	-12		
10	85.5	59.0	-27		
11	95.0	58.8	-36		
12	101.0	48.8	-52		
13	113.0	42.8	-70		
14	120.0	41.3	-79		
15	340.0	37.9	-302		
16	357.0	37.8	-319		

The test statistic W can be found using:

W = SQR[B/(SD x SQRT(n-1))]

where:

B = summation of (X(n-i+1)-X(i))A(n-i+1) = 307.22
SD = standard deviation of the data group = 98.87
n = number of samples = 16

W = 0.644

Compare this value to the critical value in Table A-2 of Statistical Analysisof Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (Draft) July, 1992, to determine if the data is normally distributed.

From Table A-2 with (n) samples and a 95% confidence level, the critical value is

W(crit) = 0.887
and the calculated W = 0.644

Therefore the data is Non-Normal

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Shapiro Wilk Test Statistic (W) for log normality of total **Barium**

Complete the following table where

i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
X(n-i+1) = sample values arranged from largest to smallest
A(n-i+1) = coefficient from table A-1, Statistical Analysis of Ground-Water Data at RCRA Facilities
B(i) = summation of (X(n-i+1)-X(i))A(n-i+1)

i	X(i)	X(n-i+1)	X(n-i+1) - X(i)	A(n-i+1)	B(i)
1	3.63	5.88	2.2454267	0.5056	1.14
2	3.63	5.83	2.1939945	0.3290	0.72
3	3.72	4.79	1.0666292	0.2521	0.27
4	3.76	4.73	0.9708497	0.1939	0.19
5	3.89	4.62	0.7273902	0.1447	0.11
6	4.07	4.55	0.4797350	0.1005	0.05
7	4.08	4.45	0.3709789	0.0593	0.02
8	4.13	4.31	0.1718503	0.0196	0.00
9	4.31	4.13	-0.1718503		
10	4.45	4.08	-0.3709789		
11	4.55	4.07	-0.4797350		
12	4.62	3.89	-0.7273902		
13	4.73	3.76	-0.9708497		
14	4.79	3.72	-1.0666292		
15	5.83	3.63	-2.1939945		
16	5.88	3.63	-2.2454267		

The test statistic W can be found using:

W = SQR[B/(SD x SQRT(n-1))]

where:

B = summation of (X(n-i+1)-X(i))A(n-i+1) = 2.49
SD = standard deviation of the data group = 0.69
n = number of samples = 16

W = 0.869

Compare this value to the critical value in Table A-2 of Statistical Analysisof Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (Draft) July, 1992, to determine if the data is normally distributed.

From Table A-2 with (n) samples and a 95% confidence level, the critical value is

W(crit) = 0.887
and the calculated W = 0.869

Therefore the data is Non-Normal

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Analyte: **Chloride**

Sample No.	Sample Date	Location	Concentration		Quantitation Limit	Sorted Concentration	
1	27-Apr-10	MW-6	7,900	B	5,000	9,050	9,900
2	12-Oct-10	MW-6	9,900		5,000	9,410	9,840
3	14-Apr-11	MW-6	9,410		5,000	9,840	9,410
4	13-Oct-11	MW-6	9,050		5,000	9,900	9,050
5	17-Apr-12	MW-6	9,840		5,000		
6	19-Mar-09	MW-8	6,700	B	5,000		
7	22-Apr-09	MW-8	6,900	B	5,000		
8	14-May-09	MW-8	7,800	B	5,000		
9	08-Oct-09	MW-8	5,500	B	5,000		
10	19-Mar-09	MW-10S	13,100	B	5,000		
11	22-Apr-09	MW-10S	13,700	B	5,000		
12	14-May-09	MW-10S	16,400	B	5,000		
13	08-Oct-09	MW-10S	17,200	B	5,000		
14	19-Mar-09	P-19S	10,900	B	5,000		
15	22-Apr-09	P-19S	9,500	B	5,000		
16	14-May-09	P-19S	11,200	B	5,000		
17	08-Oct-09	P-19S	13,100	B	5,000		

Number of Data: 4
Number of Truncated Data: 0
Percentage of Truncated Data: 0%

Parametric Prediction Interval (UPL): 12,652 µg/L

- All concentrations in micrograms per liter (µg/L).
- B = Blank qualified data not used in statistical calculations.
- Background data included from MW-8, MW-10S, and P-19S.
- Background well MW-6.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **Chloride**

Complete the following table where

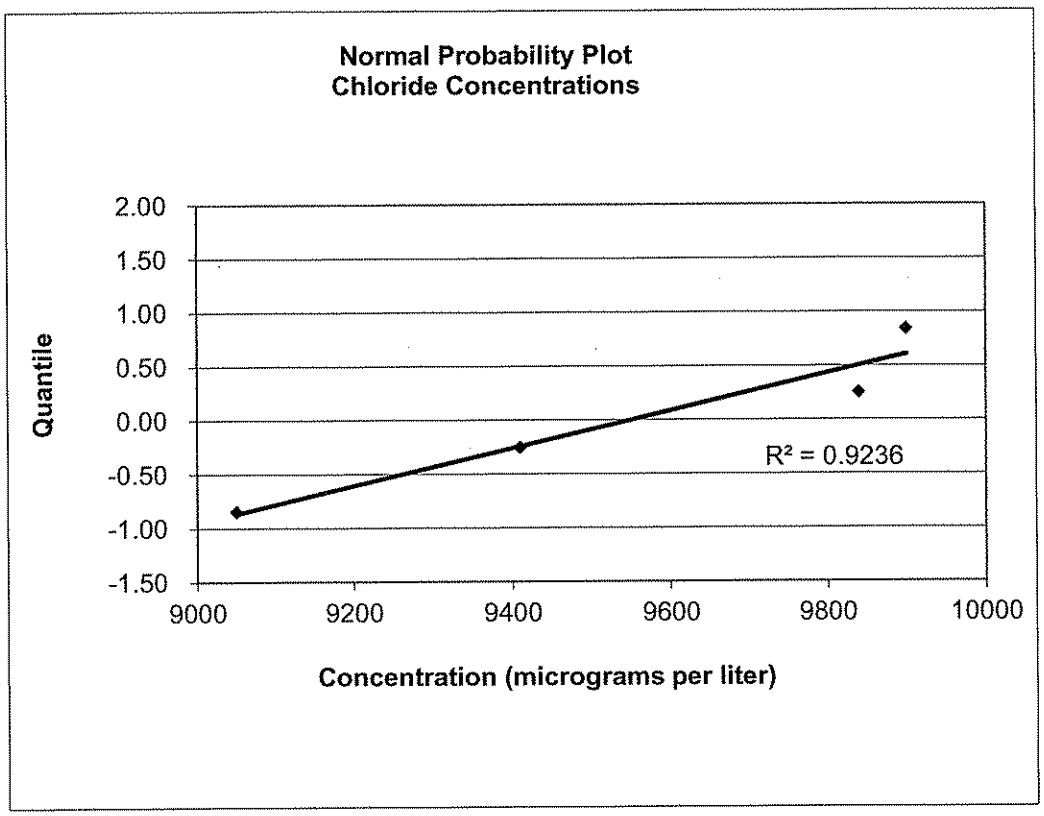
i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
LN[X(i)] = Natural Log Value of sample concentrations arranged from smallest to largest
[i/(n+1)] = Cumulative probability
n = number of samples = 4

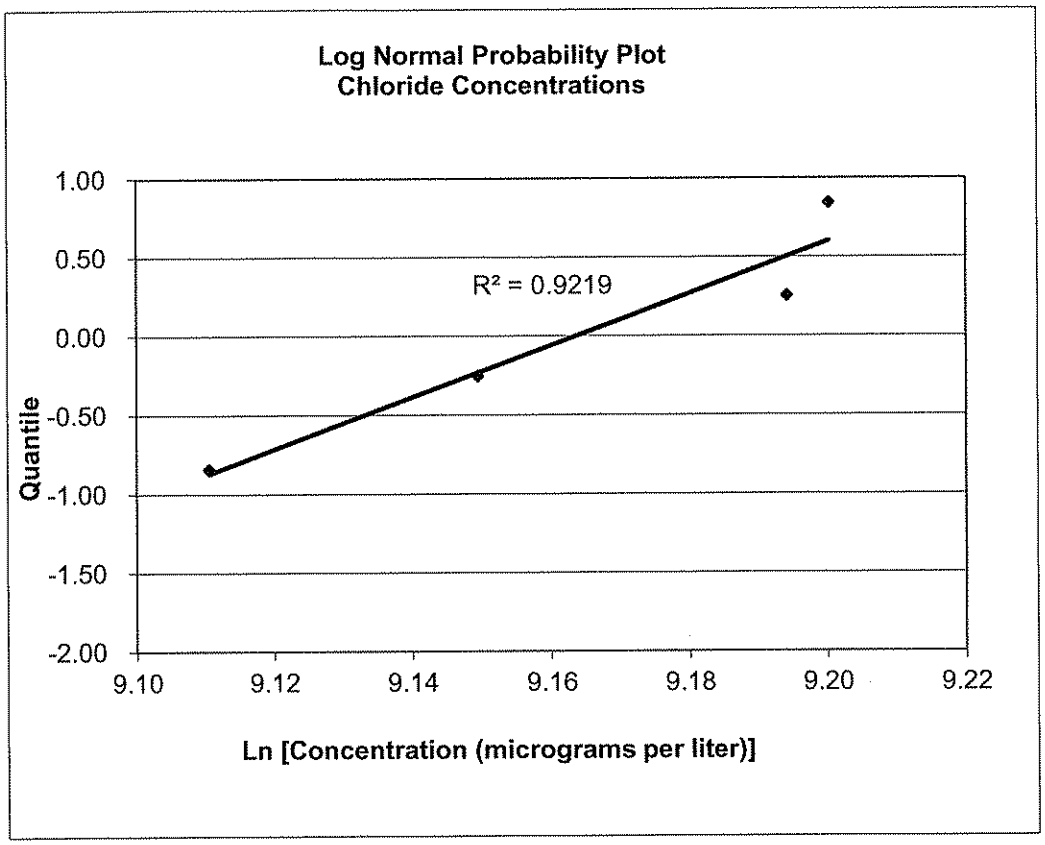
X(i)	LN[X(i)]	i	Rank	[Rank/(n+1)]	Quantiles
9050	9.11	1	1	0.200	-0.84
9410	9.15	2	2	0.400	-0.25
9840	9.19	3	3	0.600	0.25
9900	9.20	4	4	0.800	0.84

Plot analysis indicates that the data more closely follow a normal distribution in the log-transformed format.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **Chloride**





JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **04/17/12**

Determination of reported background value as an outlier

Analyte: **Chloride**

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	B flagged	B	5,000
2	12-Oct-10	MW-6	9,900		5,000
3	14-Apr-11	MW-6	9,410		5,000
4	13-Oct-11	MW-6	9,050		5,000
5	17-Apr-12	MW-6	9,840		5,000
6	19-Mar-09	MW-8	B flagged	B	5,000
7	22-Apr-09	MW-8	B flagged	B	5,000
8	14-May-09	MW-8	B flagged	B	5,000
9	08-Oct-09	MW-8	B flagged	B	5,000
10	19-Mar-09	MW-10S	B flagged	B	5,000
11	22-Apr-09	MW-10S	B flagged	B	5,000
12	14-May-09	MW-10S	B flagged	B	5,000
13	08-Oct-09	MW-10S	B flagged	B	5,000
14	19-Mar-09	P-19S	B flagged	B	5,000
15	22-Apr-09	P-19S	B flagged	B	5,000
16	14-May-09	P-19S	B flagged	B	5,000
17	08-Oct-09	P-19S	B flagged	B	5,000

mean = 9,550
STD = 398

Note: All concentrations are micrograms per liter

Using the data listed above, form the statisitc Tn:

Tn = (Xn - mean) / STD

where:
Xn = largest observed sample value
mean = mean of the background values
STD = standard deviation of the background values

For
Xn = 9,900
mean = 9,550
STD = 398

Tn = 0.878

From Table 8 included in the Staistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Interim Final Guidance, the critical value for the given sample group is

Number of samples = 4
Tc = 1.463

Since Tc>Tn, the sample result is not considered to be an outlier

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Shapiro Wilk Test Statistic (W) for normality of total **Chloride**

Complete the following table where

i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
X(n-i+1) = sample values arranged from largest to smallest
A(n-i+1) = coefficient from table A-1, Statistical Analysis of Ground-Water Data at RCRA Facilities
B(i) = summation of (X(n-i+1)-X(i))A(n-i+1)

i	X(i)	X(n-i+1)	X(n-i+1) - X(i)	A(n-i+1)	B(i)
1	9050	9900	850	0.6872	584.12
2	9410	9840	430	0.1677	72.11
3	9840	9410	-430		
4	9900	9050	-850		

The test statistic W can be found using:

W = SQR[B/(SD x SQRT(n-1))]

where:

B = summation of (X(n-i+1)-X(i))A(n-i+1) = 656.23
SD = standard deviation of the data group = 398.41
n = number of samples = 4

W = 0.904

Compare this value to the critical value in Table A-2 of Statistical Analysisof Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (Draft) July, 1992, to determine if the data is normally distributed.

From Table A-2 with (n) samples and a 95% confidence level, the critical value is

W(crit) = 0.748
and the calculated W = 0.904

Therefore the data set is Normal

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Parametric Prediction Interval for normally distributed data

Analyte: **Chloride**

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	B-Flagged	B	5000
2	12-Oct-10	MW-6	9900.0		5000
3	14-Apr-11	MW-6	9410.0		5000
4	13-Oct-11	MW-6	9050.0		5000
5	17-Apr-12	MW-6	9840.0		5000
6	19-Mar-09	MW-8	B-Flagged	B	5000
7	22-Apr-09	MW-8	B-Flagged	B	5000
8	14-May-09	MW-8	B-Flagged	B	5000
9	08-Oct-09	MW-8	B-Flagged	B	5000
10	19-Mar-09	MW-10S	B-Flagged	B	5000
11	22-Apr-09	MW-10S	B-Flagged	B	5000
12	14-May-09	MW-10S	B-Flagged	B	5000
13	08-Oct-09	MW-10S	B-Flagged	B	5000
14	19-Mar-09	P-19S	B-Flagged	B	5000
15	22-Apr-09	P-19S	B-Flagged	B	5000
16	14-May-09	P-19S	B-Flagged	B	5000
17	08-Oct-09	P-19S	B-Flagged	B	5000

Note: All sample concentrations are micrograms per liter

Using the background data, the upper Prediction Limit can be determined using:

Upper Prediction Limit = (Mean Conc) + t(n-1,k,.95) x (Std Dev) x SQRT(1/m+1/n)

where:
Mean Conc = mean concentration background samples
t(n-1k,.95) = Bonferroni t-statistic with
n-1 = degrees of freedom (number of samples - 1)
k = number of downgradient samples per event
.95 = confidence interval
Std Dev = standard deviation of background samples
m = number independent samples from each sampling point
n = number of background samples

For:
Mean Conc = 9550
Std Dev = 398
sqrt(1/m+1/n) = 1.118
t(n-1,k,.95) = 6.96
k = 5
m = 1
n = 4

UPL = 12,652 ug/L

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Parametric Tolerance Interval for normally distributed data

Analyte: **Chloride**

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	B-Flagged	B	5,000
2	12-Oct-10	MW-6	9,900		5,000
3	14-Apr-11	MW-6	9,410		5,000
4	13-Oct-11	MW-6	9,050		5,000
5	17-Apr-12	MW-6	9,840		5,000
6	19-Mar-09	MW-8	B-Flagged	B	5,000
7	22-Apr-09	MW-8	B-Flagged	B	5,000
8	14-May-09	MW-8	B-Flagged	B	5,000
9	08-Oct-09	MW-8	B-Flagged	B	5,000
10	19-Mar-09	MW-10S	B-Flagged	B	5,000
11	22-Apr-09	MW-10S	B-Flagged	B	5,000
12	14-May-09	MW-10S	B-Flagged	B	5,000
13	08-Oct-09	MW-10S	B-Flagged	B	5,000
14	19-Mar-09	P-19S	B-Flagged	B	5,000
15	22-Apr-09	P-19S	B-Flagged	B	5,000
16	14-May-09	P-19S	B-Flagged	B	5,000
17	08-Oct-09	P-19S	B-Flagged	B	5,000

Note: All sample concentrations are micrograms per liter

Using the background data, the upper Tolerance Limit can be determined using:

Upper Tolerance Limit = (Mean Concentration) + K x (Standard Deviation Samples)

where: Mean Conc = mean concentration background samples
K = factor for constructing one sided normal tolerance limit taken from table 4-2, page 87, Statistical Methods for Groundwater Monitoring, Gibbons, 1994
n = number of background samples
STDS = Standard Deviation Samples

For:

n =	4
K =	5.145
Mean Conc =	9,550
STDS =	398

UTL = 11,600 µg/L

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1200.12**
Task No: **01**
Date: **17-Apr-12**

Analyte: **Cobalt**

Sample No.	Sample Date	Location	Concentration		Quantitation Limit	Sorted Concentration	
1	27-Apr-10	MW-6	ND		10.0	5.9	6.8
2	12-Oct-10	MW-6	ND		10.0	6.1	6.1
3	14-Apr-11	MW-6	2.7	B	10.0	6.8	5.9
4	13-Oct-11	MW-6	ND		10.0		
5	17-Apr-12	MW-6	ND		10.0		
6	19-Mar-09	MW-8	32.8	Outlier	10.0		
7	22-Apr-09	MW-8	9.7	B	10.0		
8	14-May-09	MW-8	11.1	B	10.0		
9	08-Oct-09	MW-8	6.1	J	10.0		
10	19-Mar-09	MW-10S	4.5	B	10.0		
11	22-Apr-09	MW-10S	1.8	B	10.0		
12	14-May-09	MW-10S	4.8	B	10.0		
13	08-Oct-09	MW-10S	6.8	J	10.0		
14	19-Mar-09	P-19S	9.9	B	10.0		
15	22-Apr-09	P-19S	10.4	B	10.0		
16	14-May-09	P-19S	10.3	B	10.0		
17	08-Oct-09	P-19S	5.9	J	10.0		

Number of Data: 7
Number of Truncated Data: 4
Percentage of Truncated Data: 57%

Non Parametric Prediction: 6.80 µg/L

- All concentrations in micrograms per liter (µg/L).
- J = Estimated value below quantitation linit..
- B = Blank qualified data not used in statistical calculations.
- Background data included from MW-8, MW-10S, and P-19S.
- Background well MW-6.
- O = Outlier removed from calculations.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Analyte: **Iron**

Sample No.	Sample Date	Location	Concentration		Quantitation Limit	Sorted Concentration	
1	27-Apr-10	MW-6	242	J	300	78.6	54,500
2	12-Oct-10	MW-6	206	J	300	142	19,400
3	14-Apr-11	MW-6	918		300	206	15,600
4	13-Oct-11	MW-6	78.6	J	300	242	14,600
5	17-Apr-12	MW-6	142	J	300	918	9,670
6	19-Mar-09	MW-8	54,500		300	2,020	8,060
7	22-Apr-09	MW-8	14,600		300	2,680	4,810
8	14-May-09	MW-8	15,600		300	3,150	4,130
9	08-Oct-09	MW-8	19,400		300	3,470	3,470
10	19-Mar-09	MW-10S	4,810		300	4,130	3,150
11	22-Apr-09	MW-10S	3,470		300	4,810	2,680
12	14-May-09	MW-10S	2,680		300	8,060	2,020
13	08-Oct-09	MW-10S	9,670		300	9,670	918
14	19-Mar-09	P-19S	3,150		300	14,600	242
15	22-Apr-09	P-19S	4,130		300	15,600	206
16	14-May-09	P-19S	2,020		300	19,400	142
17	08-Oct-09	P-19S	8,060		300	54,500	78.6

Number of Data: 17
Number of Truncated Data: 0
Percentage of Truncated Data: 0%

Upper Prediction Limit: 475,958 µg/L

- All concentrations in micrograms per liter (µg/L).
- J = Estimated value below quantitation linit..
- Background data included from MW-8, MW-10S, and P-19S.
- Background well MW-6.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **Iron**

Complete the following table where

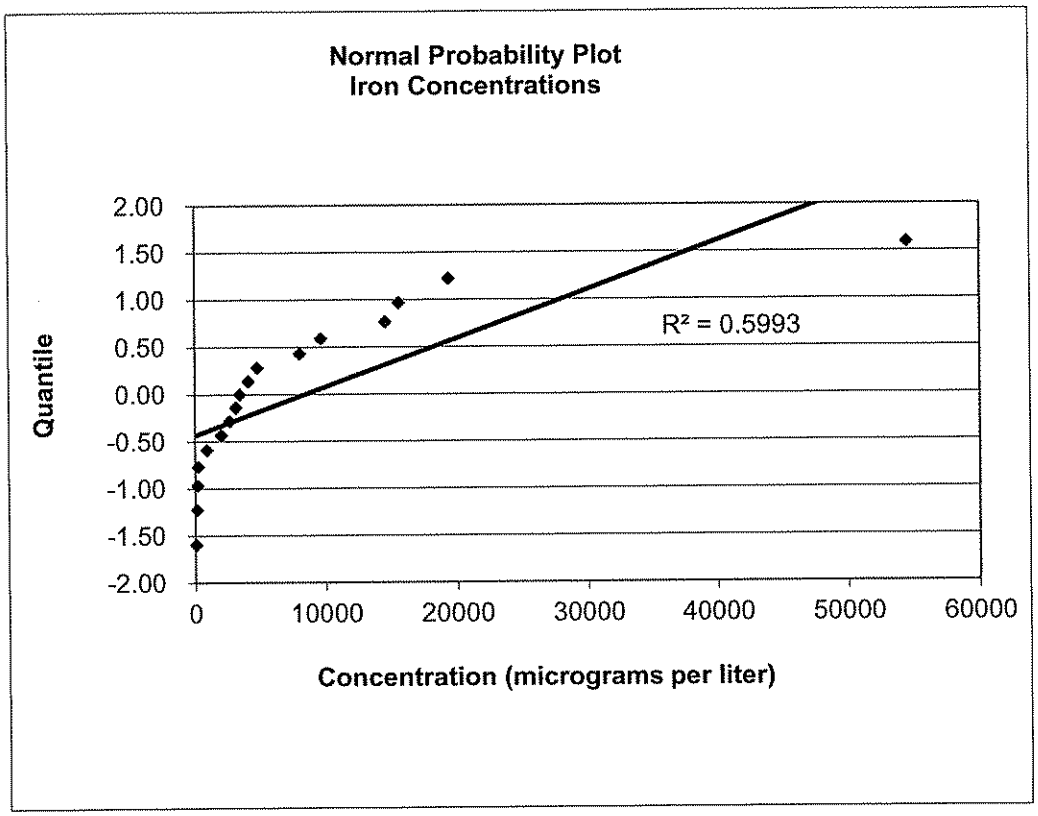
i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
LN[X(i)] = Natural Log Value of sample concentrations arranged from smallest to largest
[i/(n+1)] = Cumulative probability
n = number of samples = 17

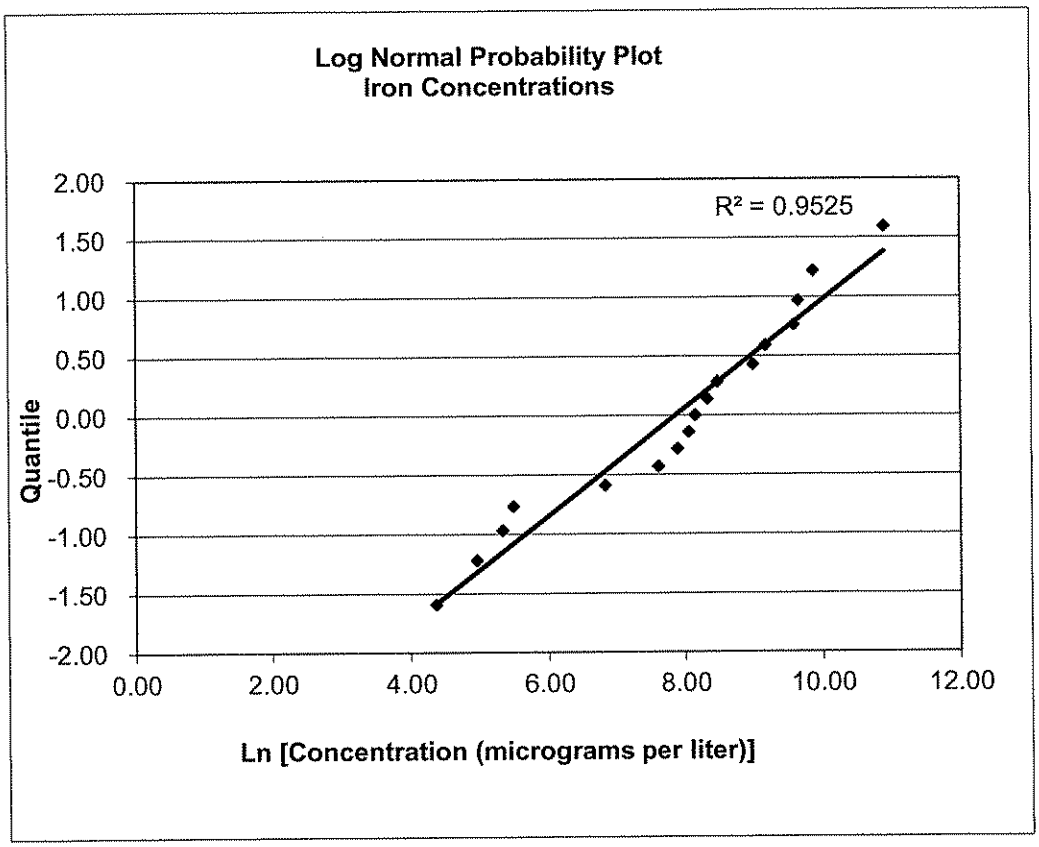
X(i)	LN[X(i)]	i	Rank	[Rank/(n+1)]	Quantiles
78.6	4.36	1	1	0.056	-1.59
142	4.96	2	2	0.111	-1.22
206	5.33	3	3	0.167	-0.97
242	5.49	4	4	0.222	-0.76
918	6.82	5	5	0.278	-0.59
2020	7.61	6	6	0.333	-0.43
2680	7.89	7	7	0.389	-0.28
3150	8.06	8	8	0.444	-0.14
3470	8.15	9	9	0.500	0.00
4130	8.33	10	10	0.556	0.14
4810	8.48	11	11	0.611	0.28
8060	8.99	12	12	0.667	0.43
9670	9.18	13	13	0.722	0.59
14600	9.59	14	14	0.778	0.76
15600	9.66	15	15	0.833	0.97
19400	9.87	16	16	0.889	1.22
54500	10.91	17	17	0.944	1.59

Plot analysis indicates that the data more closely follow a normal distribution in the log-transformed format.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **Iron**





JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Determination of reported background value as an outlier

Analyte: **Iron**

Background Data

Sample No.	Sample Date	Location	ln(Concentration) (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	5.489	J	300
2	12-Oct-10	MW-6	5.328	J	300
3	14-Apr-11	MW-6	6.822		300
4	13-Oct-11	MW-6	4.364		300
5	17-Apr-12	MW-6	4.956		300
6	19-Mar-09	MW-8	10.906		300
7	22-Apr-09	MW-8	9.589		300
8	14-May-09	MW-8	9.655		300
9	08-Oct-09	MW-8	9.873		300
10	19-Mar-09	MW-10S	8.478		300
11	22-Apr-09	MW-10S	8.152		300
12	14-May-09	MW-10S	7.894		300
13	08-Oct-09	MW-10S	9.177		300
14	19-Mar-09	P-19S	8.055		300
15	22-Apr-09	P-19S	8.326		300
16	14-May-09	P-19S	7.611		300
17	08-Oct-09	P-19S	8.995		300
		mean =	7.863		
		STD =	1.889		

Note: All concentrations are micrograms per liter

Using the data listed above, form the statisitc Tn:

Tn = (Xn - mean) / STD

where:
Xn = largest observed sample value
mean = mean of the background values
STD = standard deviation of the background values

For
Xn = 10.906
mean = 7.863
STD = 1.889

Tn = 1.611

From Table 8 included in the Staistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Interim Final Guidance, the critical value for the given sample group is

Number of samples = 17
Tc = 2.475

Since Tc>Tn, the sample result is not considered to be an outlier

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Shapiro Wilk Test Statistic (W) for normality of total **Iron**

Complete the following table where

i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
X(n-i+1) = sample values arranged from largest to smallest
A(n-i+1) = coefficient from table A-1, Statistical Analysis of Ground-Water Data at RCRA Facilities
B(i) = summation of (X(n-i+1)-X(i))A(n-i+1)

i	X(i)	X(n-i+1)	X(n-i+1) - X(i)	A(n-i+1)	B(i)
1	79	54,500	54,421	0.4968	27,036.55
2	142	19,400	19,258	0.3273	6,303.14
3	206	15,600	15,394	0.254	3,910.08
4	242	14,600	14,358	0.1988	2,854.37
5	918	9,670	8,752	0.1524	1,333.80
6	2,020	8,060	6,040	0.1109	669.84
7	2,680	4,810	2,130	0.0725	154.43
8	3,150	4,130	980	0.0359	35.18
9	3,470	3,470	0	0.0000	0.00
10	4,130	3,150	-980		
11	4,810	2,680	-2,130		
12	8,060	2,020	-6,040		
13	9,670	918	-8,752		
14	14,600	242	-14,358		
15	15,600	206	-15,394		
16	19,400	142	-19,258		
17	54,500	79	-54,421		

The test statistic W can be found using:

W = SQR[B/(SD x SQRT(n-1))]

where:

B =	summation of (X(n-i+1)-X(i))A(n-i+1)	=	42,297.39
SD =	standard deviation of the data group	=	13,279.92
n =	number of samples	=	17

W = 0.634

Compare this value to the critical value in Table A-2 of Statistical Analysisof Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (Draft) July, 1992, to determine if the data is normally distributed.

From Table A-2 with (n) samples and a 95% confidence level, the critical value is

W(crit) = 0.892
and the calculated W = 0.634

Therefore the data is Non-Normal

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Shapiro Wilk Test Statistic (W) for log normality of total **Iron**

Complete the following table where

i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
X(n-i+1) = sample values arranged from largest to smallest
A(n-i+1) = coefficient from table A-1, Statistical Analysis of Ground-Water Data at RCRA Facilities
B(i) = summation of (X(n-i+1)-X(i))A(n-i+1)

i	X(i)	X(n-i+1)	X(n-i+1) - X(i)	A(n-i+1)	B(i)
1	4.36	10.91	6.54	0.4968	3.25
2	4.96	9.87	4.92	0.3273	1.61
3	5.33	9.66	4.33	0.254	1.10
4	5.49	9.59	4.10	0.1988	0.82
5	6.82	9.18	2.35	0.1524	0.36
6	7.61	8.99	1.38	0.1109	0.15
7	7.89	8.48	0.58	0.0725	0.04
8	8.06	8.33	0.27	0.0359	0.01
9	8.15	8.15	0.00	0.0000	0.00
10	8.33	8.06	-0.27		
11	8.48	7.89	-0.58		
12	8.99	7.61	-1.38		
13	9.18	6.82	-2.35		
14	9.59	5.49	-4.10		
15	9.66	5.33	-4.33		
16	9.87	4.96	-4.92		
17	10.91	4.36	-6.54		

The test statistic W can be found using:

W = SQR[B/(SD x SQRT(n-1))]

where:

B = summation of (X(n-i+1)-X(i))A(n-i+1) = 7.34
SD = standard deviation of the data group = 1.89
n = number of samples = 17

W = 0.943

Compare this value to the critical value in Table A-2 of Statistical Analysisof Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (Draft) July, 1992, to determine if the data is normally distributed.

From Table A-2 with (n) samples and a 95% confidence level, the critical value is

W(crit) = 0.892
and the calculated W = 0.943

Therefore the data set is Log-Normal

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task: **01**
Date: **4/17/12**

Parametric Prediction Interval for log normally distributed data

Analyte: **Iron**

Background Data: Note use of log(concentration)

Sample No.	Sample Date	Location	Concentration (ug/l)	Natural Log Concentration
1	04/27/10	MW-6	242	5.489
2	10/12/10	MW-6	206	5.328
3	04/14/11	MW-6	918	6.822
4	10/13/11	MW-6	79	4.364
5	04/17/12	MW-6	142	4.956
6	03/19/09	MW-8	54,500	10.906
7	04/22/09	MW-8	14,600	9.589
8	05/14/09	MW-8	15,600	9.655
9	10/08/09	MW-8	19,400	9.873
10	03/19/09	MW-10S	4,810	8.478
11	04/22/09	MW-10S	3,470	8.152
12	05/14/09	MW-10S	2,680	7.894
13	10/08/09	MW-10S	9,670	9.177
14	03/19/09	P-19S	3,150	8.055
15	04/22/09	P-19S	4,130	8.326
16	05/14/09	P-19S	2,020	7.611
17	10/08/09	P-19S	8,060	8.995

Note: All sample concentrations are micrograms per liter

Using the background data, the upper Prediction Limit can be determined using:

Upper Prediction Limit = antilog((Mean Conc) + t(n-1,k,.95) x (Std Dev) x SQRT(1/m+1/n))

where:
Mean Conc = mean concentration background samples
t(n-1k,.95) = Bonferroni t-statistic with
n-1 = degrees of freedom (number of samples - 1)
k = number of downgradient samples per event
.95 = confidence interval
Std Dev = standard deviation of background samples
m = number independent samples from each sampling point
n = number of background samples

For:
Mean Conc = 7.863
Std Dev = 1.889
t(n-1,k,.95)*sqrt(1/m+1/n) = 2.758
k = 5
m = 1
n = 17

Antilog UPL = 475,958.20 ug/L

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Parametric Tolerance Interval for log normally distributed data

Analyte: **Iron**

Background Data: Note use of log(concentration)

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)	Natural Log Concentration
1	27-Apr-10	MW-6	242	J	300	5.489
2	12-Oct-10	MW-6	206	J	300	5.328
3	14-Apr-11	MW-6	918		300	6.822
4	13-Oct-11	MW-6	79		300	4.364
5	17-Apr-12	MW-6	142		300	4.956
6	19-Mar-09	MW-8	54,500		300	10.906
7	22-Apr-09	MW-8	14,600		300	9.589
8	14-May-09	MW-8	15,600		300	9.655
9	08-Oct-09	MW-8	19,400		300	9.873
10	19-Mar-09	MW-10S	4,810		300	8.478
11	22-Apr-09	MW-10S	3,470		300	8.152
12	14-May-09	MW-10S	2,680		300	7.894
13	08-Oct-09	MW-10S	9,670		300	9.177
14	19-Mar-09	P-19S	3,150		300	8.055
15	22-Apr-09	P-19S	4,130		300	8.326
16	14-May-09	P-19S	2,020		300	7.611
17	08-Oct-09	P-19S	8,060		300	8.995

Note: All sample concentrations are micrograms per liter

Using the background data, the upper Tolerance Limit can be determined using:

Upper Tolerance Limit = antilog((Mean Concentration)+K x (Standard Deviation Samples))

where: Mean Conc = mean concentration background samples
K = factor for constructing one sided normal tolerance limit taken from table 4-2, page 87, Statistical Methods for Groundwater Monitoring, Gibbons, 1994
STDS = Standard Deviation Samples
n = number of background samples

For:
n = 17
K = 2.486
Mean Conc = 7.863
STDS = 1.889

UTL = 284,862 µg/L

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Analyte: **Manganese**

Sample No.	Sample Date	Location	Concentration		Quantitation Limit	Sorted Concentration	
1	27-Apr-10	MW-6	9.4	B	50.0	6.0	1,280
2	12-Oct-10	MW-6	9.2	J	50.0	9.2	1,050
3	14-Apr-11	MW-6	25.6	J	50.0	25.0	850
4	13-Oct-11	MW-6	25.0	1/2 QL	50.0	25.6	830
5	17-Apr-12	MW-7	6.0	J	50.0	188	819
6	19-Mar-09	MW-8	830		50.0	196	640
7	22-Apr-09	MW-8	188		50.0	236	553
8	14-May-09	MW-8	196		50.0	359	359
9	08-Oct-09	MW-8	236		50.0	553	236
10	19-Mar-09	MW-10S	359		50.0	640	196
11	22-Apr-09	MW-10S	553		50.0	819	188
12	14-May-09	MW-10S	640		50.0	830	25.0
13	08-Oct-09	MW-10S	1,050		50.0	850	25.6
14	19-Mar-09	P-19S	1,280		50.0	1,050	9.2
15	22-Apr-09	P-19S	850		50.0	1,280	6.0
16	14-May-09	P-19S	819		50.0		
17	08-Oct-09	P-19S	1,890	Outlier	50.0		

Number of Data: 15
Number of Truncated Data: 1
Percentage of Truncated Data: 7%

Parametric Prediction Interval: 1,659 µg/L

- All concentrations in micrograms per liter (µg/L).
- B = Blank qualified data not used in statistical calculations.
- J = Estimated value below quantitation linit..
- Background data included from MW-8, MW-10S, and P-19S.
- Background well MW-6.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **Manganese**

Complete the following table where

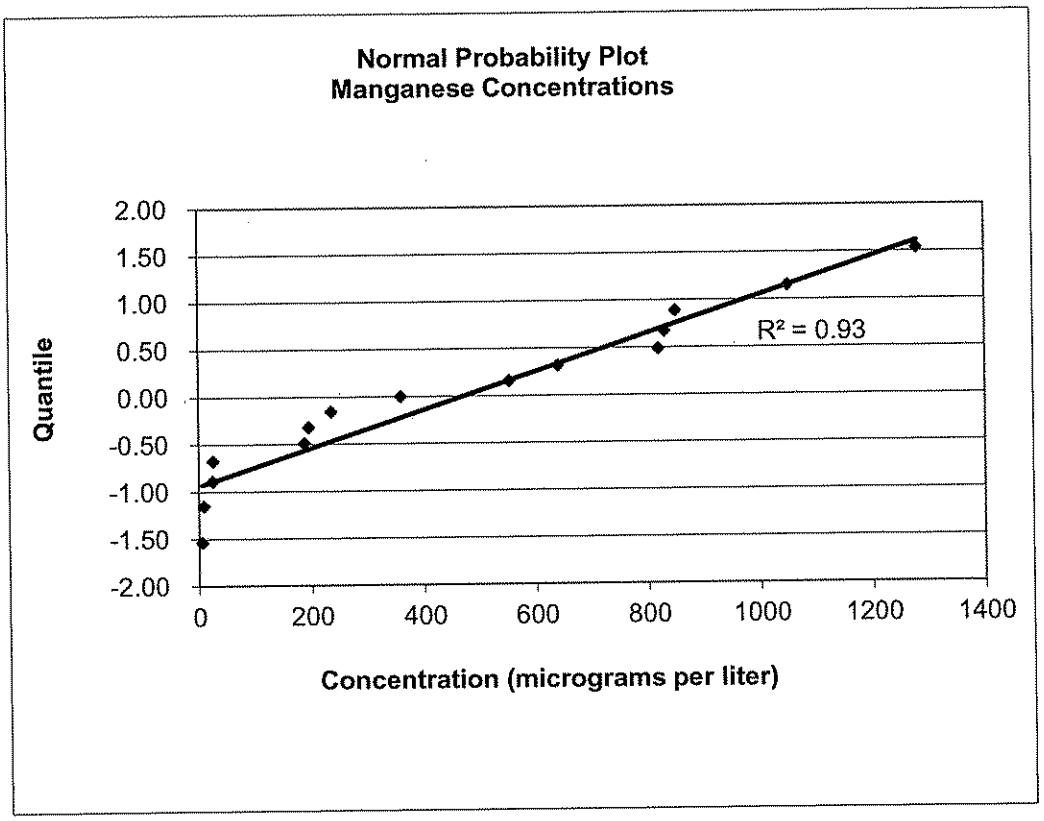
i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
LN[X(i)] = Natural Log Value of sample concentrations arranged from smallest to largest
[i/(n+1)] = Cumulative probability
n = number of samples = 15

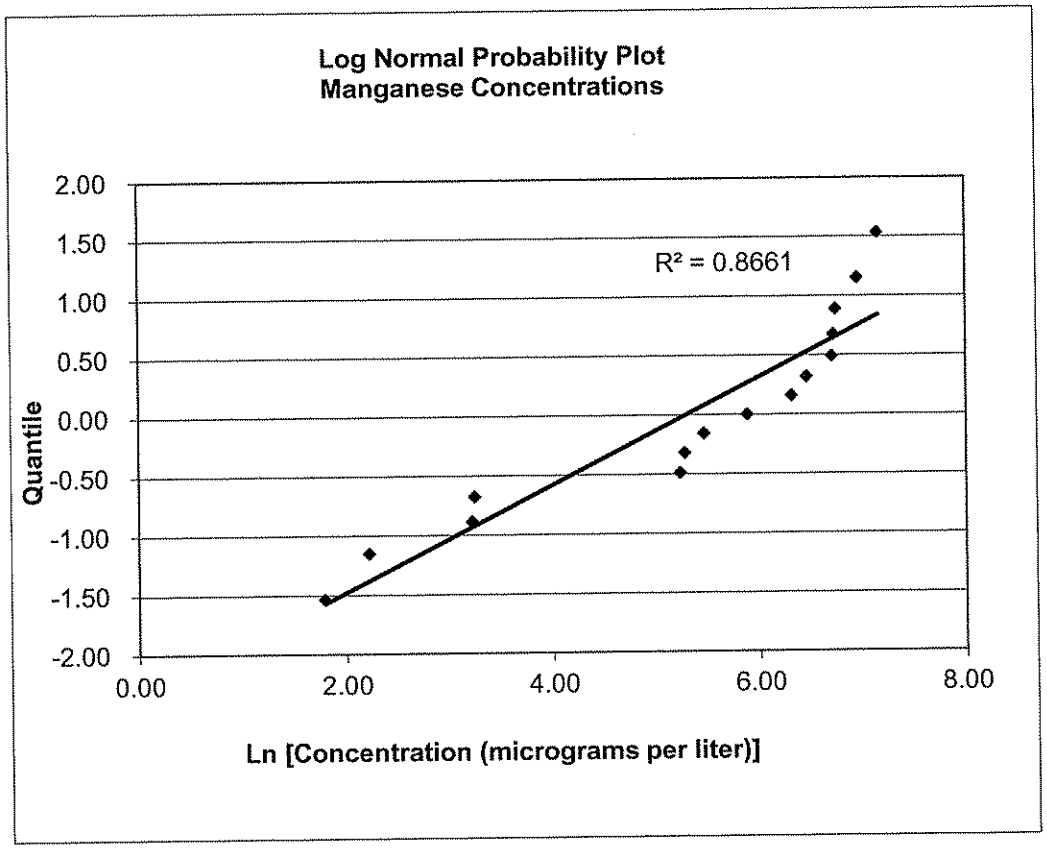
X(i)	LN[X(i)]	i	Rank	[Rank/(n+1)]	Quantiles
6	1.79	1	1	0.063	-1.53
9.2	2.22	2	2	0.125	-1.15
25	3.22	3	3	0.188	-0.89
25.6	3.24	4	4	0.250	-0.67
188	5.24	5	5	0.313	-0.49
196	5.28	6	6	0.375	-0.32
236	5.46	7	7	0.438	-0.16
359	5.88	8	8	0.500	0.00
553	6.32	9	9	0.563	0.16
640	6.46	10	10	0.625	0.32
819	6.71	11	11	0.688	0.49
830	6.72	12	12	0.750	0.67
850	6.75	13	13	0.813	0.89
1050	6.96	14	14	0.875	1.15
1280	7.15	15	15	0.938	1.53

Plot analysis indicates that the data more closely follow a normal distribution in the log-transformed format.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **Manganese**





JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task: **01**
Date: **17-Apr-12**

Determination of reported background value as an outlier

Analyte: **Manganese**

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)
1	12-Oct-10	MW-6	9.2	J	50
2	14-Apr-11	MW-6	25.6	J	50
3	13-Oct-11	MW-6	25.0	1/2 QL	50
4	17-Apr-12	MW-7	6.0	J	50
5	19-Mar-09	MW-8	830.0		50
6	22-Apr-09	MW-8	188.0		50
7	14-May-09	MW-8	196.0		50
8	08-Oct-09	MW-8	236.0		50
9	19-Mar-09	MW-10S	359.0		50
10	22-Apr-09	MW-10S	553.0		50
11	14-May-09	MW-10S	640.0		50
12	08-Oct-09	MW-10S	1050.0		50
13	19-Mar-09	P-19S	1280.0		50
14	22-Apr-09	P-19S	850.0		50
15	14-May-09	P-19S	819.0		50
16	08-Oct-09	P-19S	1890.0	Outlier	50

mean = 471.120
STD = 419.940

Note: All concentrations are micrograms per liter

Using the data listed above, form the statisitc Tn:

Tn = (Xn - mean) / STD

where:
Xn = largest observed sample value
mean = mean of the background values
STD = standard deviation of the background values

For
Xn = 1280
mean = 471.120
STD = 419.940

Tn = 1.926

From Table 8 included in the Staistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Interim Final Guidance, the critical value for the given sample group is

Number of samples = 15
Tc = 2.409

Since Tc>Tn, the sample result is not considered to be an outlier

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Shapiro Wilk Test Statistic (W) for normality of total **Manganese**

Complete the following table where

i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
X(n-i+1) = sample values arranged from largest to smallest
A(n-i+1) = coefficient from table A-1, Statistical Analysis of Ground-Water Data at RCRA Facilities
B(i) = summation of (X(n-i+1)-X(i))A(n-i+1)

i	X(i)	X(n-i+1)	X(n-i+1) - X(i)	A(n-i+1)	B(i)
1	6.0	1280	1274	0.5150	656.11
2	9.2	1050	1041	0.3306	344.09
3	25.0	850	825	0.2495	205.84
4	25.6	830	804	0.1878	151.07
5	188.0	819	631	0.1353	85.37
6	196.0	640	444	0.0880	39.07
7	236.0	553	317	0.0433	13.73
8	359.0	359	0		
9	553.0	236	-317		
10	640.0	196	-444		
11	819.0	188	-631		
12	830.0	25	-805		
13	850.0	26	-824		
14	1050.0	9	-1041		
15	1280.0	6	-1274		

The test statistic W can be found using:

W = SQR[B/(SD x SQRT(n-1))]

where:

B = summation of (X(n-i+1)-X(i))A(n-i+1) = 1495.27
SD = standard deviation of the data group = 419.94
n = number of samples = 15

W = 0.906

Compare this value to the critical value in Table A-2 of Statistical Analysisof Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (Draft) July, 1992, to determine if the data is normally distributed.

From Table A-2 with (n) samples and a 95% confidence level, the critical value is

W(crit) = 0.881
and the calculated W = 0.906

Therefore the data set is Normal

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Parametric Prediction Interval for normally distributed data

Analyte: **Manganese**

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	B flagged	B	50
2	12-Oct-10	MW-6	9	J	50
3	14-Apr-11	MW-6	26	J	50
4	13-Oct-11	MW-6	25	1/2 QL	50
5	17-Apr-12	MW-7	6	J	50
6	19-Mar-09	MW-8	830		50
7	22-Apr-09	MW-8	188		50
8	14-May-09	MW-8	196		50
9	08-Oct-09	MW-8	236		50
10	19-Mar-09	MW-10S	359		50
11	22-Apr-09	MW-10S	553		50
12	14-May-09	MW-10S	640		50
13	08-Oct-09	MW-10S	1050		50
14	19-Mar-09	P-19S	1280		50
15	22-Apr-09	P-19S	850		50
16	14-May-09	P-19S	819		50
17	08-Oct-09	P-19S	1890	Outlier	50

Note: All sample concentrations are micrograms per liter

Using the background data, the upper Prediction Limit can be determined using:

Upper Prediction Limit = (Mean Conc) + t(n-1,k,.95) x (Std Dev) x SQRT(1/m+1/n)

where:
Mean Conc = mean concentration background samples
t(n-1k,.95) = Bonferroni t-statistic with
n-1 = degrees of freedom (number of samples - 1)
k = number of downgradient samples per event
.95 = confidence interval
Std Dev = standard deviation of background samples
m = number independent samples from each sampling point
n = number of background samples

For:
Mean Conc = 471
Std Dev = 420
sqrt(1/m+1/n) = 1.033
t(n-1,k,.95) = 2.74
k = 5
m = 1
n = 15

UPL = 1659 ug/L

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Parametric Tolerance Interval for normally distributed data

Analyte: **Manganese**

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	B flagged	B	50.0
2	12-Oct-10	MW-6	9.2	J	50.0
3	14-Apr-11	MW-6	25.6	J	50.0
4	13-Oct-11	MW-6	25.0	1/2 QL	50.0
5	17-Apr-12	MW-7	6.0	J	50.0
6	19-Mar-09	MW-8	830.0		50.0
7	22-Apr-09	MW-8	188.0		50.0
8	14-May-09	MW-8	196.0		50.0
9	08-Oct-09	MW-8	236.0		50.0
10	19-Mar-09	MW-10S	359.0		50.0
11	22-Apr-09	MW-10S	553.0		50.0
12	14-May-09	MW-10S	640.0		50.0
13	08-Oct-09	MW-10S	1050.0		50.0
14	19-Mar-09	P-19S	1280.0		50.0
15	22-Apr-09	P-19S	850.0		50.0
16	14-May-09	P-19S	819.0		50.0
17	08-Oct-09	P-19S	1890.0	Outlier	50.0

Note: All sample concentrations are micrograms per liter

Using the background data, the upper Tolerance Limit can be determined using:

Upper Tolerance Limit = (Mean Concentration) + K x (Standard Deviation Samples)

where: Mean Conc = mean concentration background samples
K = factor for constructing one sided normal tolerance limit taken from table 4-2, page 87, Statistical Methods for Groundwater Monitoring, Gibbons, 1994
n = number of background samples
STDS = Standard Deviation Samples

For:
n = 15
K = 2.566
Mean Conc = 471.12
STDS = 419.94

UTL = 1,549 µg/L

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Analyte: **Sulfate**

Sample No.	Sample Date	Location	Concentration		Quantitation Limit	Sorted Concentration	
1	27-Apr-10	MW-6	ND		5,000	5,600	5,600
2	12-Oct-10	MW-6	5,600		5,000		
3	14-Apr-11	MW-6	ND		5,000		
4	13-Oct-11	MW-6	ND		5,000		
5	17-Apr-12	MW-6	ND		5,000		
6	19-Mar-09	MW-8	8,100	B	5,000		
7	22-Apr-09	MW-8	5,800	B	5,000		
8	14-May-09	MW-8	11,200	B	5,000		
9	08-Oct-09	MW-8	ND		5,000		
10	19-Mar-09	MW-10S	31,400	B	5,000		
11	22-Apr-09	MW-10S	23,300	B	5,000		
12	14-May-09	MW-10S	30,400	B	5,000		
13	08-Oct-09	MW-10S	38,500	B	5,000		
14	19-Mar-09	P-19S	16,500	B	5,000		
15	22-Apr-09	P-19S	16,600	B	5,000		
16	14-May-09	P-19S	15,900	B	5,000		
17	08-Oct-09	P-19S	6,300	B	5,000		

Number of Data: 6
Number of Truncated Data: 5
Percentage of Truncated Data: 83%

Nonparametric Prediction Interval: 5,600 µg/L

- All concentrations in micrograms per liter (µg/L).
- B = Blank qualified data not used in statistical calculations.
- Background data included from MW-8, MW-10S, and P-19S.
- Background well MW-6.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Analyte: **TDS**

Sample No.	Sample Date	Location	Concentration		Quantitation Limit	Sorted Concentration	
1	27-Apr-10	MW-6	114,000	B	100,000	94,000	270,000
2	12-Oct-10	MW-6	141,000		25,000	100,000	170,000
3	14-Apr-11	MW-6	132,000		25,000	104,000	132,000
4	13-Oct-11	MW-6	170,000		25,000	127,000	127,000
5	17-Apr-12	MW-6	127,000		25,000	132,000	104,000
6	19-Mar-09	MW-8	104,000		40,000	141,000	100,000
7	22-Apr-09	MW-8	104,000	B	20,000	170,000	100,000
8	14-May-09	MW-8	94,000		20,000	270,000	94,000
9	08-Oct-09	MW-8	164,000	B	20,000		
10	19-Mar-09	MW-10S	270,000		40,000		
11	22-Apr-09	MW-10S	204,000	B	20,000		
12	14-May-09	MW-10S	210,000	B	20,000		
13	08-Oct-09	MW-10S	288,000	B	20,000		
14	19-Mar-09	P-19S	100,000		40,000		
15	22-Apr-09	P-19S	84,000	B	20,000		
16	14-May-09	P-19S	110,000	B	20,000		
17	08-Oct-09	P-19S	152,000	B	20,000		

Number of Data: 8
Number of Truncated Data: 0
Percentage of Truncated Data: 0%

Upper Predication Limit: 457,854 µg/L

- All concentrations in micrograms per liter (µg/L).
- B = Blank qualified data not used in statistical calculations.
- Background data included from MW-8, MW-10S, and P-19S.
- Background well MW-6.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **TDS**

Complete the following table where

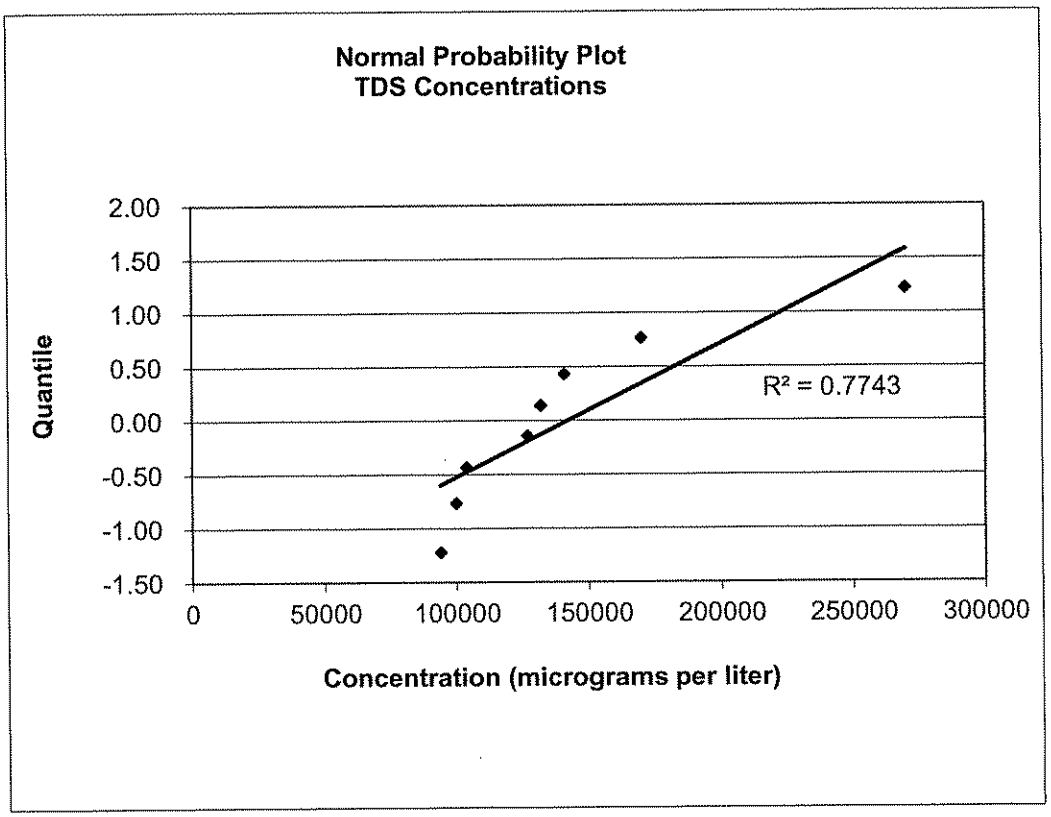
i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
LN[X(i)] = Natural Log Value of sample concentrations arranged from smallest to largest
[i/(n+1)] = Cumulative probability
n = number of samples = 8

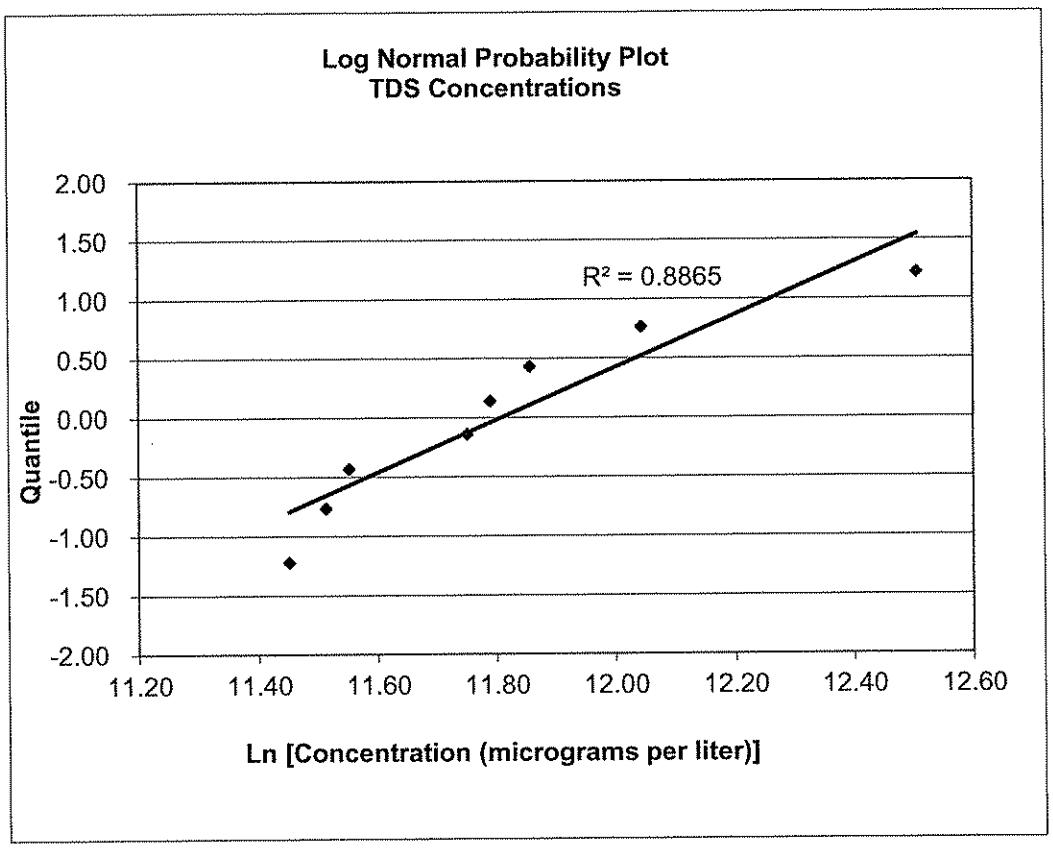
X(i)	LN[X(i)]	i	Rank	[Rank/(n+1)]	Quantiles
94000	11.45	1	1	0.111	-1.22
100000	11.51	2	2	0.222	-0.76
104000	11.55	3	3	0.333	-0.43
127000	11.75	4	4	0.444	-0.14
132000	11.79	5	5	0.556	0.14
141000	11.86	6	6	0.667	0.43
170000	12.04	7	7	0.778	0.76
270000	12.51	8	8	0.889	1.22

Plot analysis indicates that the data more closely follow a normal distribution in the log-transformed format.

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Probability Plots to determine the distribution of **TDS**





JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Determination of reported background value as an outlier

Analyte: **TDS**

Background Data

Sample No.	Sample Date	Location	ln(Concentration) (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	B flagged	B	100,000
2	12-Oct-10	MW-6	11.857		25,000
3	14-Apr-11	MW-6	11.791		25,000
4	13-Oct-11	MW-6	12.044		25,000
5	17-Apr-12	MW-6	11.752		25,000
6	19-Mar-09	MW-8	11.552		40,000
7	22-Apr-09	MW-8	B flagged	B	20,000
8	14-May-09	MW-8	11.451		20,000
9	08-Oct-09	MW-8	B flagged	B	20,000
10	19-Mar-09	MW-10S	12.506		40,000
11	22-Apr-09	MW-10S	B flagged	B	20,000
12	14-May-09	MW-10S	B flagged	B	20,000
13	08-Oct-09	MW-10S	B flagged	B	20,000
14	19-Mar-09	P-19S	11.513		40,000
15	22-Apr-09	P-19S	B flagged	B	20,000
16	14-May-09	P-19S	B flagged	B	20,000
17	08-Oct-09	P-19S	B flagged	B	20,000
		mean =	11.808		
		STD =	0.344		

Note: All concentrations are micrograms per liter

Using the data listed above, form the statisitc Tn:

Tn = (Xn - mean) / STD

where:
Xn = largest observed sample value
mean = mean of the background values
STD = standard deviation of the background values

For
Xn = 12.506
mean = 11.808
STD = 0.344

Tn = 2.029

From Table 8 included in the Staistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Interim Final Guidance, the critical value for the given sample group is

Number of samples = 8
Tc = 2.032

Since Tc>Tn, the sample result is not considered to be an outlier

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Shapiro Wilk Test Statistic (W) for normality of total **TDS**

Complete the following table where

i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
X(n-i+1) = sample values arranged from largest to smallest
A(n-i+1) = coefficient from table A-1, Statistical Analysis of Ground-Water Data at RCRA Facilities
B(i) = summation of (X(n-i+1)-X(i))A(n-i+1)

i	X(i)	X(n-i+1)	X(n-i+1) - X(i)	A(n-i+1)	B(i)
1	94000	270000	176000	0.6052	106515.20
2	100000	170000	70000	0.3164	22148.00
3	104000	132000	28000	0.1743	4880.40
4	127000	127000	0	0.0561	0.00
5	132000	104000	-28000		
6	141000	100000	-41000		
7	170000	100000	-70000		
8	270000	94000	-176000		

The test statistic W can be found using:

W = SQR[B/(SD x SQRT(n-1))]

where:

B = summation of (X(n-i+1)-X(i))A(n-i+1) = 133543.60
SD = standard deviation of the data group = 57328.00
n = number of samples = 8

W = 0.775

Compare this value to the critical value in Table A-2 of Statistical Analysisof Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (Draft) July, 1992, to determine if the data is normally distributed.

From Table A-2 with (n) samples and a 95% confidence level, the critical value is

W(crit) = 0.818
and the calculated W = 0.775

Therefore the data is Non-Normal

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Shapiro Wilk Test Statistic (W) for log normality of total **TDS**

Complete the following table where

i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
X(n-i+1) = sample values arranged from largest to smallest
A(n-i+1) = coefficient from table A-1, Statistical Analysis of Ground-Water Data at RCRA Facilities
B(i) = summation of (X(n-i+1)-X(i))A(n-i+1)

i	X(i)	X(n-i+1)	X(n-i+1) - X(i)	A(n-i+1)	B(i)
1	11.45	12.51	1.06	0.6052	0.64
2	11.51	12.04	0.53	0.3164	0.17
3	11.55	11.79	0.24	0.1743	0.04
4	11.75	11.75	0.00	0.0561	0.00
5	11.79	11.55	-0.24		
6	11.86	11.51	-0.34		
7	12.04	11.51	-0.53		
8	12.51	11.45	-1.06		

The test statistic W can be found using:

W = SQR[B/(SD x SQRT(n-1))]

where:

B =	summation of (X(n-i+1)-X(i))A(n-i+1)	=	0.85
SD =	standard deviation of the data group	=	0.34
n =	number of samples	=	8

W = 0.868

Compare this value to the critical value in Table A-2 of Statistical Analysisof Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (Draft) July, 1992, to determine if the data is normally distributed.

From Table A-2 with (n) samples and a 95% confidence level, the critical value is

W(crit) = 0.818
and the calculated W = 0.868

Therefore the data set is Log-Normal

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task: **01**
Date: **17-Apr-12**

Parametric Prediction Interval for log normally distributed data

Analyte: **TDS**

Background Data: Note use of log(concentration)

Sample No.	Sample Date	Location	Concentration (ug/l)		Natural Log Concentration
1	27-Apr-10	MW-6	B flagged	B	-
2	12-Oct-10	MW-6	141,000		11.857
3	14-Apr-11	MW-6	132,000		11.791
4	13-Oct-11	MW-6	170,000		12.044
5	17-Apr-12	MW-6	127,000		11.752
6	19-Mar-09	MW-8	104,000		11.552
7	22-Apr-09	MW-8	B flagged	B	-
8	14-May-09	MW-8	94,000		11.451
9	8-Oct-09	MW-8	B flagged	B	-
10	19-Mar-09	MW-10S	270,000		12.506
11	22-Apr-09	MW-10S	B flagged	B	-
12	14-May-09	MW-10S	B flagged	B	-
13	8-Oct-09	MW-10S	B flagged	B	-
14	19-Mar-09	P-19S	100,000		11.513
15	22-Apr-09	P-19S	B flagged	B	-
16	14-May-09	P-19S	B flagged	B	-
17	8-Oct-09	P-19S	B flagged	B	-

Note: All sample concentrations are micrograms per liter

Using the background data, the upper Prediction Limit can be determined using:

Upper Prediction Limit = antilog((Mean Conc) + t(n-1,k,.95) x (Std Dev) x SQRT(1/m+1/n))

where:
Mean Conc = mean concentration background samples
t(n-1k,.95) = Bonferroni t-statistic with
n-1 = degrees of freedom (number of samples - 1)
k = number of downgradient samples per event
.95 = confidence interval
Std Dev = standard deviation of background samples
m = number independent samples from each sampling point
n = number of background samples

For:
Mean Conc = 11.808
Std Dev = 0.344
t(n-1,k,.95)*sqrt(1/m+1/n) = 3.564
k = 5
m = 1
n = 8

Antilog UPL = 457,853.77 ug/L

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Parametric Tolerance Interval for normally distributed data

Analyte: **TDS**

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)
1	27-Apr-10	MW-6	B-Flagged	B	100,000
2	12-Oct-10	MW-6	141,000		25,000
3	14-Apr-11	MW-6	132,000		25,000
4	13-Oct-11	MW-6	170,000		25,000
5	17-Apr-12	MW-6	127,000		25,000
6	19-Mar-09	MW-8	104,000		40,000
7	22-Apr-09	MW-8	B-Flagged	B	20,000
8	14-May-09	MW-8	94,000		20,000
9	08-Oct-09	MW-8	B-Flagged	B	20,000
10	19-Mar-09	MW-10S	270,000		40,000
11	22-Apr-09	MW-10S	B-Flagged	B	20,000
12	14-May-09	MW-10S	B-Flagged	B	20,000
13	08-Oct-09	MW-10S	B-Flagged	B	20,000
14	19-Mar-09	P-19S	100,000		40,000
15	22-Apr-09	P-19S	B-Flagged	B	20,000
16	14-May-09	P-19S	B-Flagged	B	20,000

Note: All sample concentrations are micrograms per liter

Using the background data, the upper Tolerance Limit can be determined using:

Upper Tolerance Limit = (Mean Concentration) + K x (Standard Deviation Samples)

where: Mean Conc = mean concentration background samples
K = factor for constructing one sided normal tolerance limit taken from table 4-2, page 87, Statistical Methods for Groundwater Monitoring, Gibbons, 1994
n = number of background samples
STDS = Standard Deviation Samples

For:
n = 8
K = 3.188
Mean Conc = 142,250
STDS = 57,328

UTL = 325,012 µg/L

JOYCE Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1201.12**
Task No: **01**
Date: **17-Apr-12**

Analyte: **Zinc**

Sample No.	Sample Date	Location	Concentration		Quantitation Limit
1	27-Apr-10	MW-6	ND		10.0
2	12-Oct-10	MW-6	ND		10.0
3	14-Apr-11	MW-6	12.8	B	10.0
4	13-Oct-11	MW-6	ND		10.0
5	17-Apr-12	MW-6	ND		10.0
6	19-Mar-09	MW-8	161	Outlier	10.0
7	22-Apr-09	MW-8	34.9		10.0
8	14-May-09	MW-8	32.3		10.0
9	08-Oct-09	MW-8	39.2		10.0
10	19-Mar-09	MW-10S	11.0	B	10.0
11	22-Apr-09	MW-10S	5.9	B	10.0
12	14-May-09	MW-10S	4.0	B	10.0
13	08-Oct-09	MW-10S	14.0	B	10.0
14	19-Mar-09	P-19S	4.1	B	10.0
15	22-Apr-09	P-19S	3.8	B	10.0
16	14-May-09	P-19S	1.2	B	10.0
17	08-Oct-09	P-19S	1.9	B	10.0

Sorted Concentration	
32.3	161
34.9	39.2
39.2	34.9
161	32.3

Number of Data: 7
Number of Truncated Data: 4
Percentage of Truncated Data: 57%

Nonparametric Prediction Interval: 39.2 µg/L

- All concentrations in micrograms per liter (µg/L).
- B = Blank qualified data not used in statistical calculations.
- Background data included from MW-8, MW-10S, and P-19S.
- Background well MW-6.
- Outlier removed from calculations.