Prepared for:

Coble's Sandrock, Inc.
5833 Foster Store Road
Liberty, North Carolina 27298

JEI Project No. 00419.1000.12, Task No. 02

ALTERNATE SOURCE DEMONSTRATION – COBALT

COBLE'S SANDROCK CONSTRUCTION & DEMOLITION DEBRIS LANDFILL
ALAMANCE COUNTY, NORTH CAROLINA
PERMIT NO. 01-05

March 2011

Prepared by:

JOYCE ENGINEERING, INC.

2211 West Meadowview Road, Suite 101
Greensboro, North Carolina 27407
Phone: (336) 323-0092
Fax: (336) 323-0093

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: Jeremey J. Kerly Phone: (336) 323-0092

E-mail: jkerly@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	October 11-12, 2010 December 13-14, 2010. January 24 and 26, 2011

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) Soil/Sediment Data

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.

Jeremey J. Kerly — Senior Project Consultant — (336) 323-0092

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

Signature — 3-24-11 Date

Affix NC Licensed/ Professional Geologist Seal

NORTH CAROLINA LICENSED SEAL 2097 GEOLOGIST JEREMEY JOHN KERLY

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

ENGINEERING, INC.

Waste Industry Experts

Joyce Engineering, Inc
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Suite 101
Greensboro, NC 27407

tel: 336/323-0092
fax: 336/323-0093

www.JoyceEngineering.com

March 24, 2011

Mr. Ervin Lane
Compliance Hydrogeologist
Division of Waste Management/Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

RE: Alternate Source Demonstration – Cobalt
Coble's Sandrock Construction & Demolitions Debris Landfill, Permit No. 88-07
Alamance County, North Carolina
JEI Project No. 00419.1000.12, Task No. 02

Dear Ervin:

On behalf of Coble's Sandrock, Joyce Engineering, Inc. (JEI) is presenting this Alternate Source Demonstration (ASD) pursuant to the requirements of Title 15A, Chapter 13, Subchapter 13B, Section .0545, (b) (8) of the North Carolina Division of Solid Waste Management Regulations. This ASD addresses a Groundwater Protection Standard (GWPS) exceedence for cobalt that was detected during the October 2010 sampling and December 2010 resampling events in monitoring well MW-7 at the C&D Debris Landfill.

The Coble's Sandrock C&D Debris Landfill monitoring well compliance network was sampled by JEI on October 12 2010. This sampling event represented the 2nd semiannual groundwater monitoring event of 2010. The groundwater samples were submitted to Pace Analytical Services, Inc., of Huntersville, NC and the final report was received October 27, 2010. Upon review of laboratory analytical data, it was determined that the cobalt concentration reported in the groundwater sample collected from monitoring well MW-7 exceeded the GWPS and calculated background concentration. The current GWPS for cobalt is 1 micrograms per liter (µg/L) while the calculated background concentration is 30.2 µg/L. Cobalt was detected in MW-7 at a concentration of 30.5 µg/L.

A resampling event was performed by JEI on December 14, 2010 for cobalt in MW-7. The groundwater samples were submitted to Pace Analytical Services, Inc. of Huntersville, NC, for analysis. The final laboratory report from the resampling event was received January 7, 2011. Cobalt was detected at a concentration of 18.8 µg/L in the groundwater sample collected from MW-7, confirming the October 2010 detection above the GWPS. The resample results did <u>not</u> confirm statistically significant increase (SSI) above the calculated background.

Based on the ASD investigation completed January 24 and 26, 2011, JEI has concluded that the source of cobalt in MW-7 is not from landfill leachate impact. This conclusion is based on the following observations:

- The concentration of cobalt detected in MW-7 is not considered to be a SSI over background levels. JEI statistically compared the December 2010 resampling result (18.8 µg/L) and January 2011 investigation result (24.2 µg/L) to the background concentration shown in Appendix 1, and the reported cobalt concentrations do not represent an SSI above the statistically-determined background concentration of 30.2 µg/L. Historical cobalt concentrations can be found in the Table and laboratory analytical certificates can be found in Appendix 2.

- Cobalt was detected in MW-8 at a concentration of 32.8 µg/L during the first background monitoring event for the Phase 3 expansion area. This reported concentration is higher than the October 2010 concentration of cobalt in MW-7.

- On January 24, 2011, JEI completed an ASD investigation of MW-7 and facility soils. MW-7 was redeveloped to collect fine sediments collected within the well casing and surrounding sand pack and soil samples were collected upgradient of the landfill and in the immediate area of MW-7. Soil Sample-1 (SS-1) was collected from soils approximately 5 feet in depth near MW-7. No cobalt was detected in SS-1. SS-2 was collected from soil approximately 5 feet in depth upgradient of the landfill. Cobalt was detected in SS-2 at a concentration of 67.0 mg/kg. SS-3 was collected from the sediment inside the well casing. Cobalt was detected in SS-3 at a concentration of 64.7 mg/kg. Based on this information, cobalt is naturally occurring both upgradient of the landfill and in the vicinity of MW-7 at depth. Laboratory analytical certificates can be found in Appendix 2.

- During the December 2010 resampling event the groundwater sample from MW-7 was also analyzed for dissolved cobalt. After laboratory filtering, dissolved cobalt was detected at an estimated concentration of 3.1 J µg/L (although based on method blank data, this concentration could be blank qualified). The January 2011 sample was also analyzed for dissolved cobalt and was reported at a quantified concentration of 12.2 µg/L. Turbidity during the December 2010 resampling was 57.8 ntu in MW-7 while turbidity during the January 2011 investigation was 25.5 ntu. Based on this information, fine sediment in the well is known to contain cobalt and is influencing both the total and dissolved cobalt concentrations in groundwater.

In conclusion, JEI finds no evidence that the GWPS exceedence of cobalt in MW-7 is a result of leachate impact from the landfill. JEI believes that cobalt is naturally occurring in parent soils and rock at the site based on the ASD investigation. JEI recommends that the site remain in Detection Monitoring for C&D Landfills. Coble's Sandrock requests that future GWPS exceedences of cobalt will not require the facility to proceed with an ASD as defined by Title 15A, Chapter 13, Subchapter 13B, Section .0545, (b) (8).

Based on the finding of this ASD, Coble's Sandrock will continue with Detection Monitoring for C&D Landfills during the first semiannual sampling event in 2011, which is tentatively scheduled for April 2011. We appreciate your consideration of this ASD and look forward to your response. If you have any questions regarding this ASD, please contact me at (336) 323-0092.

Sincerely,
JOYCE ENGINEERING, INC.

Jeremey J. Kerly, P.G.
Senior Project Consultant

ATTACHMENTS

Table

Summary of Historical Cobalt Concentrations in Groundwater

Appendices

Appendix 1 Statistical Analyses for Cobalt
Appendix 2 Laboratory Analytical Certificate and Field Data Logs

C: Kent Coble – Coble's Sandrock
File

Table

Summary of Historical Cobalt Concentrations in Groundwater

SUMMARY OF HISTORICAL COBALT CONCENTRATIONS IN GROUNDWATER

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				
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
Dissolved	14-Dec-10	0.60	10.0	NS	AB	NS	AB	NS	NS	3.1 B	NS	NS		NS		3.2	J
Investigation	24-Jan-11	0.60	10.0	NS	AB	NS	AB	NS	NS	24.2	NS	NS		NS		2.4	J
Dissolved	24-Jan-11	0.60	10.0	NS	AB	NS	AB	NS	NS	12.2	NS	NS		NS		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}).
4. DL = Laboratory detection limit.
5. ND = Not detected above laboratory detection limit .
6. J = Estimated value between the DL and the NC SWSL (or lower).
7. B = Blank qualified data.
8. GWPS = Groundwater Protection Standards (specific concentration established by date).
9. Shaded values are above the NC 2L or GWP Standards.
10. AB = Monitoring well has been abandoned.
11. NS = Not sampled and/or water levels not measured.
12. NC SWSL = North Carolina Solid Waste Section limits.

Appendices

Appendix 1 Statistical Analysis for Cobalt
Appendix 2 Laboratory Analytical Certificate and Field Data Logs

Appendix 1 Statistical Analysis for Cobalt

JEI Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1000.12**
Task No: **01**
Date: **12-Oct-10**

Analyte: **Cobalt**

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

Number of Data: 5
Number of Truncated Data: 2
Percentage of Truncated Data: 40%

Upper Tollerance Limit (UTL): 30.2 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.

JEI Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1000.12**
Task No: **01**
Date: **12-Oct-10**

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

Complete the following table where

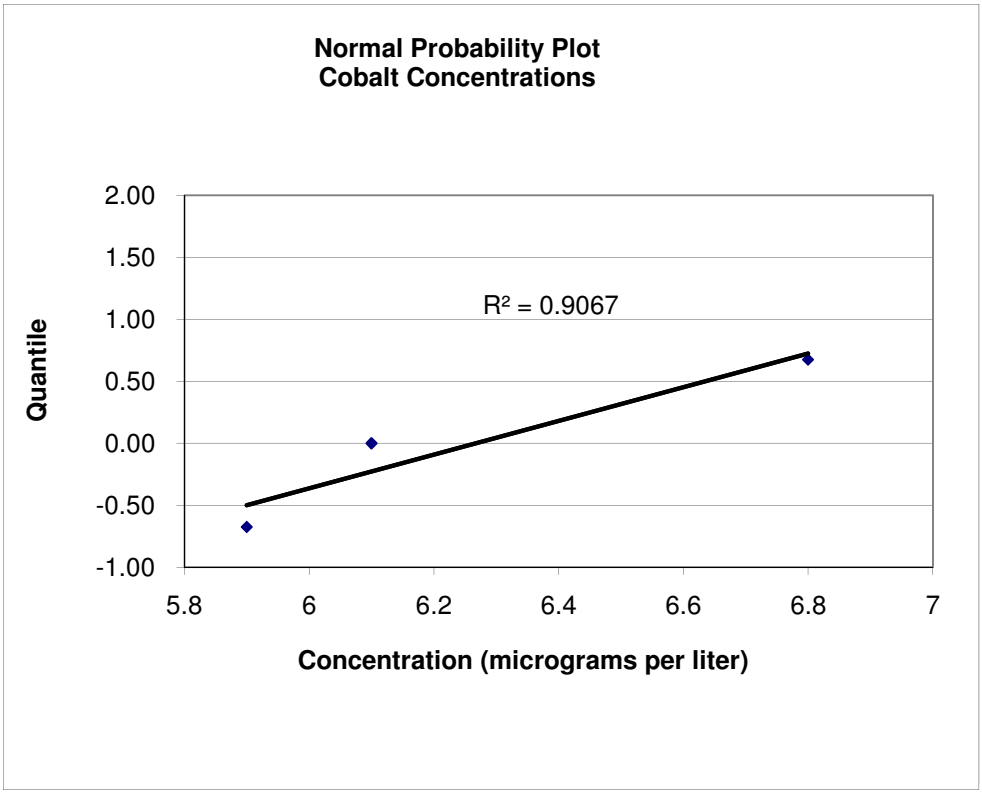
i = ordered value of sample, arranged from smallest to largest
X(i) = sample values arranged from smallest to largest
LN[X(i)] = Natural Log Value of sample concentrations arranged from smallest to largest
[i/(n+1)] = Cumulative probability
n = number of samples = 3

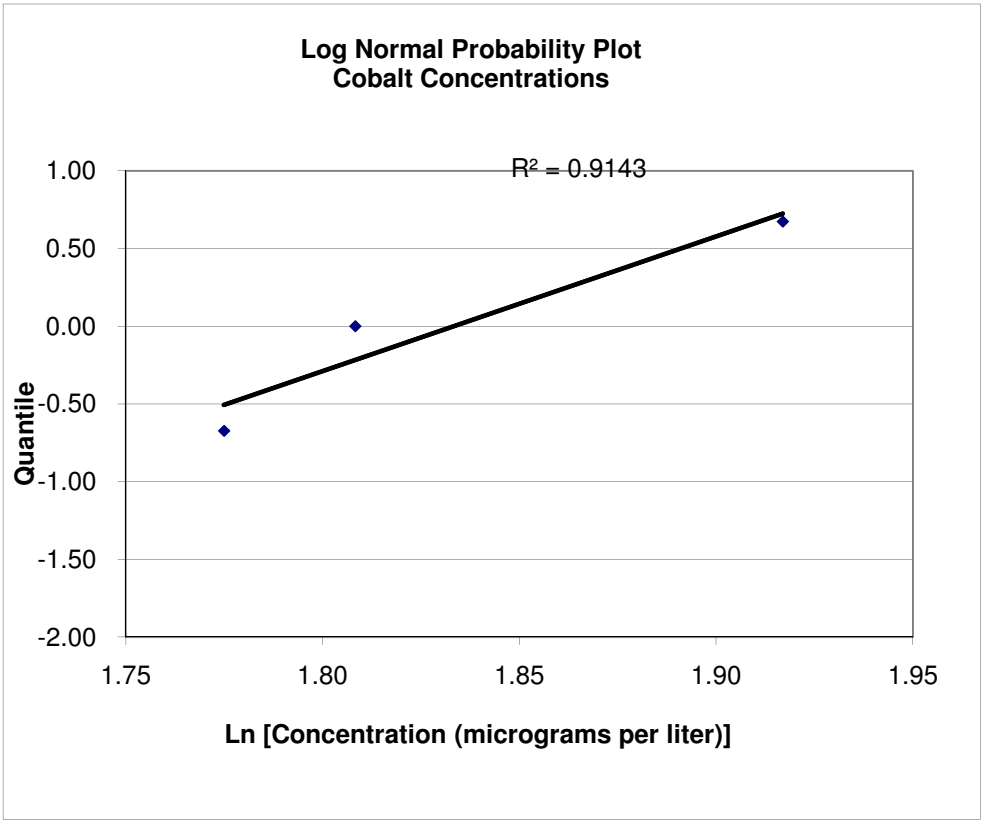
X(i)	LN[X(i)]	i	Rank	[Rank/(n+1)]	Quantiles
5.9	1.77	1	1	0.250	-0.67
6.1	1.81	2	2	0.500	0.00
6.8	1.92	3	3	0.750	0.67

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

JEI Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1000.12**
Task No: **01**
Date: **12-Oct-10**

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





JEI Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1000.12**
Task No: **01**
Date: **12-Oct-10**

Determination of reported background value as an outlier

Analyte: **Cobalt**

Background Data

Sample No.	Sample Date	Location	ln(Concentration) (ug/l)		Quantitation Limit (ug/l)	
1	27-Apr-10	MW-6	ND		10.0	
2	12-Oct-10	MW-6	ND		10.0	
3	19-Mar-09	MW-8	3.490		10.0	Outlier!
4	22-Apr-09	MW-8	B Flagged	B	10.0	
5	14-May-09	MW-8	B Flagged	B	10.0	
6	08-Oct-09	MW-8	1.808	J	10.0	
7	19-Mar-09	MW-10S	B Flagged	B	10.0	
8	22-Apr-09	MW-10S	B Flagged	B	10.0	
9	14-May-09	MW-10S	B Flagged	B	10.0	
10	08-Oct-09	MW-10S	1.917	J	10.0	
11	19-Mar-09	P-19S	B Flagged	B	10.0	
12	22-Apr-09	P-19S	B Flagged	B	10.0	
13	14-May-09	P-19S	B Flagged	B	10.0	
14	08-Oct-09	P-19S	1.775	J	10.0	
		mean =	1.833			
		STD =	0.074			

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 = 1.917
mean = 1.833
STD = 0.074

Tn = 1.125

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 = 3
Tc = 1.153

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

JEI Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1000.12**
Task No: **01**
Date: **12-Oct-10**

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

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	5.90	6.80	0.9	0.7071	0.64
2	6.10	6.10	0	0	0.00
3	6.80	5.90	-0.9		

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) = 0.64
SD = standard deviation of the data group = 0.47
n = number of samples = 3

W = 0.907

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) = 0.767
and the calculated W = 0.907

Therefore the data set is Normal

JEI Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1000.12**
Task No: **01**
Date: **12-Oct-10**

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

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	1.77	1.92	0.14	0.7071	0.10
2	1.81	1.81	0.00	0	0.00
3	1.92	1.77	-0.14		

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) = 0.10
SD = standard deviation of the data group = 0.07
n = number of samples = 3

W = 0.914

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) = 0.767
and the calculated W = 0.914

Therefore the data set is Log-Normal

JEI Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1000.12**
Date: **10/12/10**

Aitchison's Adjustment for **Cobalt**

Background Values (positive detects only)

Sample No.	Sample Date	Location	Concentration (ug/l)	
1	04/27/10	MW-6	ND	
2	10/12/10	MW-6	ND	
3	03/19/09	MW-8	32.8	O
4	04/22/09	MW-8	9.7	B
5	05/14/09	MW-8	11.1	B
6	10/08/09	MW-8	6.1	J
7	03/19/09	MW-10S	4.5	B
8	04/22/09	MW-10S	1.8	B
9	05/14/09	MW-10S	4.8	B
10	10/08/09	MW-10S	6.8	J
11	03/19/09	P-19S	9.9	B
12	04/22/09	P-19S	10.4	B
13	05/14/09	P-19S	10.3	B
14	10/08/09	P-19S	5.9	J

Mean of detected values = 6.27
Standard Deviation of detected values = 0.47

The adjusted mean can be found using

$$M(a) = (1-d/n) \times M$$

where:	d =	number non- detected values	=	2
	n =	total number samples	=	5
	M =	mean detected values	=	6.27
		M(a)	**=**	**3.76**

The adjusted standard deviation squared may be found using

$$STD(a) = [(n-(d+1))/(n-1)]\ S + d/n((n-d)/(n-1))MM$$

where:	n =	total number samples	=	5
	d =	number non-detected values	=	2
	S =	std deviation of detected values squared	=	0.22
	MM =	mean of detected values squared	=	39.27
		STD(a)	=	11.89

and the adjusted standard deviation is then

S(a) = SQRT(STD(a)) = 3.45

JEI Project: **Coble's Sandrock - C&D Landfill**
Project No: **419.1000.12**
Date: **10/12/10**

Parametric Tolerance Interval for Aitchison's adjusted data

Analyte: **Cobalt**

Background Data

Sample No.	Sample Date	Location	Concentration (ug/l)		Quantitation Limit (ug/l)
1	04/27/10	MW-6	ND		10.0
2	10/12/10	MW-6	ND		10.0
3	03/19/09	MW-8	32.8	O	10.0
4	04/22/09	MW-8	9.7	B	10.0
5	05/14/09	MW-8	11.1	B	10.0
6	10/08/09	MW-8	6.1	J	10.0
7	03/19/09	MW-10S	4.5	B	10.0
8	04/22/09	MW-10S	1.8	B	10.0
9	05/14/09	MW-10S	4.8	B	10.0
10	10/08/09	MW-10S	6.8	J	10.0
11	03/19/09	P-19S	9.9	B	10.0
12	04/22/09	P-19S	10.4	B	10.0
13	05/14/09	P-19S	10.3	B	10.0
14	10/08/09	P-19S	5.9	J	10.0

Note: All sample concentrations are micrograms per liter

The background mean and standard deviation were modified using Aitchison's Adjustment.
The adjusted mean and standard deviation are as follows:

The adjusted mean and standard deviation are

adjusted mean = 3.76
adjusted standard deviation = 3.45

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

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

where: 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

For: K = 7.655
n = 3

UTL = 30.16 µg/L

Appendix 2 Laboratory Analytical Certificate and Field Data Logs

Pace Analytical Services, Inc.
205 East Meadow Road - Suite A
Eden, NC 27288
(336)623-8921

Pace Analytical Services, Inc.
2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

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

February 21, 2011

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

RE: Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

Dear Mr. Kerly:
Enclosed are the analytical results for sample(s) received by the laboratory on January 27, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated 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

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

Pace Analytical Services, Inc.
205 East Meadow Road - Suite A
Eden, NC 27288
(336)623-8921

Pace Analytical Services, Inc.
2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

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

CERTIFICATIONS

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Idaho Certification #: MN00064
Illinois Certification #: 200011
Iowa Certification #: 368
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Mexico Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
North Dakota Certification #: R-036A
Ohio VAP Certification #: CL101
Oklahoma Certification #: D9921
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Washington Certification #: C754
Wisconsin Certification #: 999407970
A2LA cert#

Charlotte Certification IDs
9800 Kincey Ave. Ste 100, Huntersville, NC 28078
Louisiana/LELAP Certification #: 04034
New Jersey Certification #: NC012
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
Pennsylvania Certification #: 68-00784
South Carolina Certification #: 99006001
South Carolina Drinking Water Cert. #: 99006003
Virginia Certification #: 00213
Connecticut Certification #: PH-0104
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Louisiana DHH Drinking Water # LA 100031
West Virginia Certification #: 357

Asheville Certification IDs
2225 Riverside Dr., Asheville, NC 28804
Connecticut Certification #: PH-0106
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
New Jersey Certification #: NC011
North Carolina Bioassay Certification #: 9
North Carolina Drinking Water Certification #: 37712
North Carolina Wastewater Certification #: 40
Pennsylvania Certification #: 68-03578
South Carolina Bioassay Certification #: 99030002
South Carolina Certification #: 99030001
Virginia Certification #: 00072
West Virginia Certification #: 356

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

SAMPLE SUMMARY

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

Lab ID	Sample ID	Matrix	Date Collected	Date Received
9286621001	**SS-1**	Solid	01/24/11 12:15	01/27/11 14:00
9286621002	**SS-2**	Solid	01/24/11 16:20	01/27/11 14:00
9286621003	**SS-3**	Solid	01/26/11 15:00	01/27/11 14:00
9286621004	**MW-7**	Water	01/24/11 15:05	01/27/11 14:00
9286621005	**FIELD BLANK**	Water	01/24/11 15:20	01/27/11 14:00

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SAMPLE ANALYTE COUNT

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
9286621001	**SS-1**	EPA 6010	JMW	1	PASI-A
		ASTM D2974-87	KDF	1	PASI-C
9286621002	**SS-2**	EPA 6010	JMW	1	PASI-A
		ASTM D2974-87	KDF	1	PASI-C
9286621003	**SS-3**	EPA 6010	JMW	1	PASI-A
9286621004	**MW-7**	EPA 6010	JMW	1	PASI-A
		EPA 6020	TL1	1	PASI-M
		SM 2540C	JKS	1	PASI-A
9286621005	**FIELD BLANK**	EPA 6010	JMW	1	PASI-A

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ANALYTICAL RESULTS

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

Sample: SS-1 **Lab ID: 9286621001** Collected: 01/24/11 12:15 Received: 01/27/11 14:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Cobalt	ND	mg/kg	0.44	0.12	1	02/03/11 12:30	02/04/11 16:59	7440-48-4	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**19.2**	%	0.10	0.10	1		01/31/11 14:47		

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ANALYTICAL RESULTS

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

Sample: SS-2 **Lab ID: 9286621002** Collected: 01/24/11 16:20 Received: 01/27/11 14:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Cobalt	**67.0**	mg/kg	1.2	0.32	2	02/03/11 12:30	02/07/11 11:25	7440-48-4	
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**19.8**	%	0.10	0.10	1		01/31/11 14:47		

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ANALYTICAL RESULTS

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

Sample: SS-3 **Lab ID: 9286621003** Collected: 01/26/11 15:00 Received: 01/27/11 14:00 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3050								
Cobalt	**64.7**	mg/kg	0.32	0.089	1	02/03/11 12:30	02/04/11 17:07	7440-48-4	

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ANALYTICAL RESULTS

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

Sample: MW-7 **Lab ID: 9286621004** Collected: 01/24/11 15:05 Received: 01/27/11 14:00 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								
Cobalt	**24.2**	ug/L	10.0	0.60	1	02/02/11 11:50	02/03/11 00:56	7440-48-4	
6020 MET ICPMS, Dissolved	Analytical Method: EPA 6020								
Cobalt, Dissolved	**12.2**	ug/L	0.50	0.22	1	02/17/11 11:04	02/17/11 18:43	7440-48-4	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1560**	mg/L	25.0	25.0	1		02/01/11 16:36		H1

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ANALYTICAL RESULTS

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

Sample: FIELD BLANK **Lab ID: 9286621005** Collected: 01/24/11 15:20 Received: 01/27/11 14:00 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								
Cobalt	**2.4J**	ug/L	10.0	0.60	1	02/02/11 11:50	02/03/11 01:00	7440-48-4	

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QUALITY CONTROL DATA

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

QC Batch: MPRP/7814
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: 6010 MET NC Groundwater
Associated Lab Samples: 9286621004, 9286621005

METHOD BLANK: 558337
Matrix: Water
Associated Lab Samples: 9286621004, 9286621005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cobalt	ug/L	2.8J	10.0	02/03/11 00:23	

LABORATORY CONTROL SAMPLE: 558338

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cobalt	ug/L	500	500	100	80-120	

MATRIX SPIKE SAMPLE: 558339

Parameter	Units	9286103018 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cobalt	ug/L	ND	500	495	99	75-125	

SAMPLE DUPLICATE: 558340

Parameter	Units	9286606001 Result	Dup Result	RPD	Max RPD	Qualifiers
Cobalt	ug/L	13.3	9.9J	29	25	R1

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QUALITY CONTROL DATA

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

QC Batch: MPRP/7831 Analysis Method: EPA 6010
QC Batch Method: EPA 3050 Analysis Description: 6010 MET
Associated Lab Samples: 9286621001, 9286621002, 9286621003

METHOD BLANK: 559312 Matrix: Solid
Associated Lab Samples: 9286621001, 9286621002, 9286621003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cobalt	mg/kg	0.14J	0.50	02/04/11 12:45	

LABORATORY CONTROL SAMPLE: 559313

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cobalt	mg/kg	50	51.6	103	80-120	

MATRIX SPIKE SAMPLE: 559314

Parameter	Units	9283941001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cobalt	mg/kg	59.7	51.5	104	85	75-125	

SAMPLE DUPLICATE: 559315

Parameter	Units	9286788006 Result	Dup Result	RPD	Max RPD	Qualifiers
Cobalt	mg/kg	ND	0.32J		20	

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QUALITY CONTROL DATA

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

QC Batch: ICPM/24756
QC Batch Method: EPA 6020
Analysis Method: EPA 6020
Analysis Description: 6020 MET Dissolved
Associated Lab Samples: 9286621004

METHOD BLANK: 931874
Matrix: Water
Associated Lab Samples: 9286621004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cobalt, Dissolved	ug/L	ND	0.50	02/17/11 18:33	

LABORATORY CONTROL SAMPLE: 931875

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cobalt, Dissolved	ug/L	80	78.4	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 931876 931877

Parameter	Units	9286621004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cobalt, Dissolved	ug/L	12.2	80	80	90.6	88.0	98	95	70-130	3	20	

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QUALITY CONTROL DATA

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

QC Batch: PMST/3707
Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 9286621001, 9286621002

SAMPLE DUPLICATE: 557635

Parameter	Units	9286461004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	11.7	10.4	12	25	

SAMPLE DUPLICATE: 557636

Parameter	Units	9286727003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%		12.0			

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QUALITY CONTROL DATA

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

QC Batch: WET/15194
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 9286621004

METHOD BLANK: 556919
Matrix: Water
Associated Lab Samples: 9286621004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	02/01/11 16:35	

LABORATORY CONTROL SAMPLE: 556920

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	288	115	80-120	

SAMPLE DUPLICATE: 556921

Parameter	Units	9286621004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1560	1580	1	10	

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QUALIFIERS

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

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.

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

LABORATORIES

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

ANALYTE QUALIFIERS

H1	Analysis conducted outside the EPA method holding time.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: COBLE'S SANDROCK ASD
Pace Project No.: 9286621

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
9286621004	**MW-7**	EPA 3010	MPRP/7814	EPA 6010	ICP/7215
9286621005	**FIELD BLANK**	EPA 3010	MPRP/7814	EPA 6010	ICP/7215
9286621001	**SS-1**	EPA 3050	MPRP/7831	EPA 6010	ICP/7226
9286621002	**SS-2**	EPA 3050	MPRP/7831	EPA 6010	ICP/7226
9286621003	**SS-3**	EPA 3050	MPRP/7831	EPA 6010	ICP/7226
9286621004	**MW-7**	EPA 6020	ICPM/24756	EPA 6020	ICPM/10083
9286621001	**SS-1**	ASTM D2974-87	PMST/3707		
9286621002	**SS-2**	ASTM D2974-87	PMST/3707		
9286621004	**MW-7**	SM 2540C	WET/15194		

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

1434023

Section A Required Client Information:

Company: Joyce Engineering, Inc.
Address: 2211 W. Meadowview Rd., St. 101, Greensboro, NC 27407
Email To: rwinfield@joyceengineering.com
Phone: 336-323-0092 Fax: 336-323-0093
Requested Due Date/TAT: 10 days

Section B Required Project Information:

Report To: jkerly@joyceengineering.com
Copy To:
Purchase Order No.:
Project Name: Coble's Sandrock ASP
Project Number: 419.1000.12.02

Section C Invoice Information:

Attention: Lecia Jones
Company Name: Joyce Engineering Inc.
Address: 1607 Ownby Ln. Richmond, VA 23220
Pace Quote Reference:
Pace Project Manager: Kevin Godwin
Pace Profile #: 2186-13, 18

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: NC

Section D Required Client Information

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

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start Date	COLLECTED Composite Start Time	COLLECTED Composite End/Grab Date	COLLECTED Composite End/Grab Time	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: Cobalt	~~Barium~~	TDS	Dissolved Cobalt	~~Dissolved Barium~~	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	SS-1	SL	G			1/24/11	12:15		1	X								X	X					001
2	SS-2	SL	G			↓	16:20		1	X								X	X					002
3	SS-3	SL	G			1/26/11	15:00		1	X								X	X					003
4	MW-7	WT	G			1/24/11	15:05		3	X		X						X	X	X	X	X		004
5	Field Blank	WT	G			↓	15:20		1			X						X	X					005
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
* Hold Dissolved Metals	[signature] / JEI	1/27/11	11:01	[signature] / pace alt	1/27/11	11:01				
until notified to analyze	[signature] / pace alt	1/27/11	14:00	[signature] / PAL	01/27/11	1400	3.2	Y	N	Y

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Robert L. Winfield

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 1/26/11

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Sample Condition Upon Receipt

Pace Analytical

Client Name: Joyce Project # 9286621

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 : T904 **Type of Ice:** (Wet) Blue None ☒ Samples on ice, cooling process has begun

Temp Correction Factor: Add / Subtract _____0_____C

Corrected Cooler Temp.: 3.2 C **Biological Tissue is Frozen:** Yes (No)

Temp should be above freezing to 6°C

Date and Initials of person examining contents: JGM 01/27/11

		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. Did not Recive Enough sample For metals
Correct Containers Used:	☑Yes ☐No ☐N/A	9. For SS-3
-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: SL/WS		
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: _____

CURF Review: J. Gook **Date:** 1/27/11 **SRF Review:** J. Gook **Date:** 1/27/11

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: 1/24/11

JOYCE ENGINEERING, INC.

SOIL SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project/Task No.:** 419.1000.12.02

Surface Point ID: SS-1 **Sampler(s):** R. Winfield

Location: Beside well MW-7

Field Parameters:

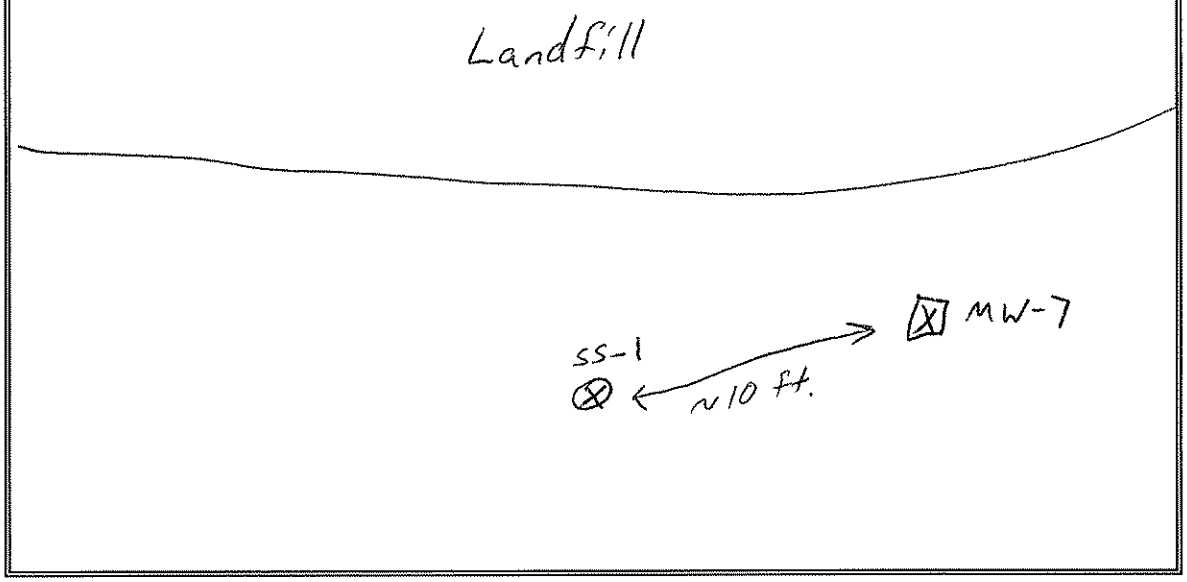
Time of Sampling:	12:15	
pH:	-	
Temperature :	-	(°C)
Conductivity :	-	(µS)
Turbidity :	-	(ntu)

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

Soil sample was taken @ 5ft deep, approximately 10ft away from MW-7

P. Cloudy, low 40's

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



Signature: [signature] **Date:** 1/24/11

QA/QC Sign Off: [signature] **Date:** 3-24-11

DATE: 1/24/11

JOYCE ENGINEERING, INC.

SOIL SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project/Task No.:** 419.1000.12.02

Surface Point ID: SS-2 **Sampler(s):** R. Winfield

Location: Upgradient of landfill between MW-6 and GP-1

Field Parameters:

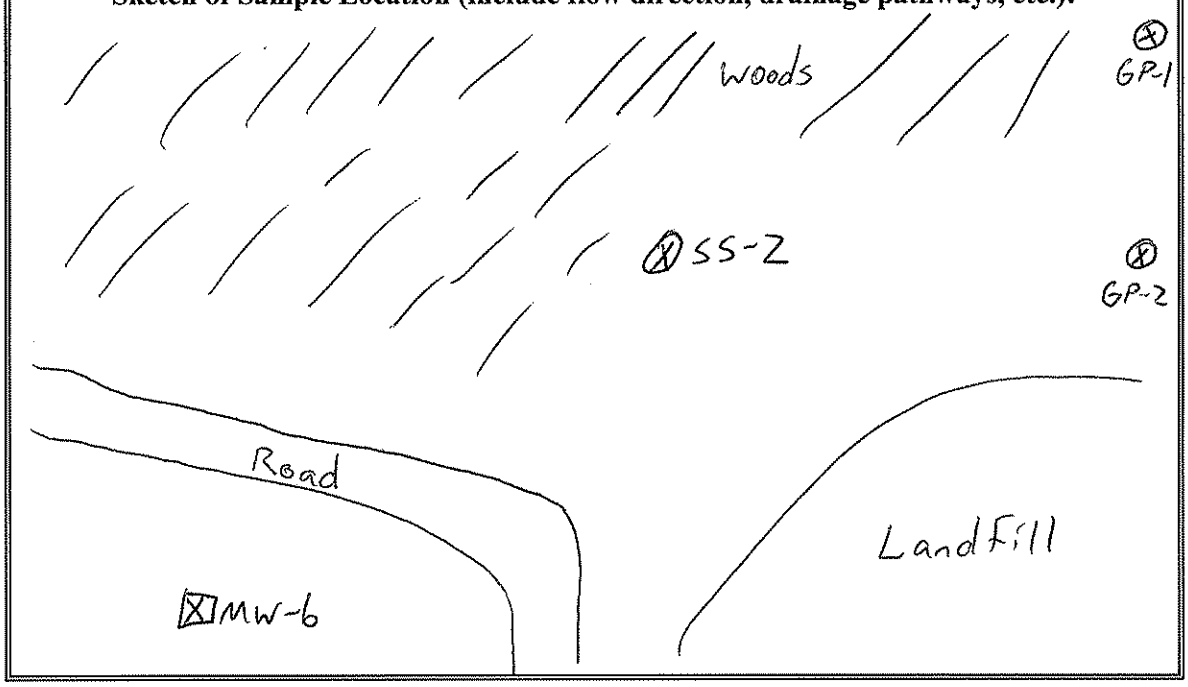
Time of Sampling:	16:20	
pH:	-	
Temperature :	-	(°C)
Conductivity :	-	(µS)
Turbidity :	-	(ntu)

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

Soil sample was taken @ 5ft deep along tree line of field between MW-6 and GP-1

P. Cloudy, low 40's

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



Signature: [signature] **Date:** 1/24/11

QA/QC Sign Off: [signature] **Date:** 3-24-11

DATE: 1/24-26/11

JOYCE ENGINEERING, INC.

SOIL SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project/Task No.:** 419.1000.12.02

Surface Point ID: SS-3 **Sampler(s):** R. Winfield

Location: Inside MW-7

Field Parameters:

Time of Sampling: 15:00

pH: -

Temperature : - (°C)

Conductivity : - (µS)

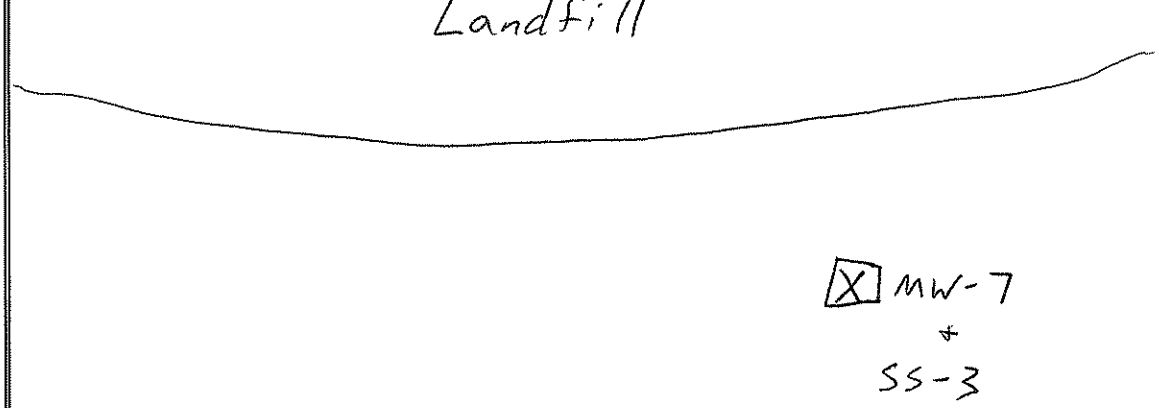
Turbidity : - (ntu)

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

Soil sample was taken from collected sediment from inside MW-7 during well development

P. Cloudy, low 40's

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



Signature: [signature] **Date:** 1/26/11

QA/QC Sign Off: [signature] **Date:** 1-24-11

DATE: 1/24/11

JOYCE ENGINEERING, INC.

GROUND WATER SAMPLING LOG

Project Name: COBLE'S SANDROCK & LF **Project No./Task No.:** 419.1000.12.02

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

Well Location: Westside of the landfill near MW5

Well Diameter: 2 inches

Initial Depth to Water (DTW): 11.46 feet

Depth to Bottom (DTB): 16.00 feet

Water Column Thickness (WCT): 4.54 feet [DTB-DTW]

Calculation for One Well Volume (WV):

For 2" Well: WCT X 0.163 = 0.74 gallons

For 4" Well: WCT X 0.653 = _____ gallons

For THREE Well Volumes: WV X 3 = 2.22 gallons

Actual Amount Purged/Bailed : 18.75 gallons

Purged with: disposable bailer

Sampled with: disposable bailer

Depth to Water before Sampling: - feet

Gallons	Time	Temp(°C)	pH	Cond. (MS)	Turb.(ntu)	Initials
	1/24/10					
Before Sampling	15:05	15.7	6.54	2480	25.5	RW

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

See well development form for purging parameters and information

P. Cloudy, low 40's

Signature: [signature] **Date:** 1/24/11

QA/QC Sign Off: [signature] **Date:** 2-24-11

ENGINEERING, INC.

MONITORING WELL DEVELOPMENT DATA SHEET

Project: Coble's Sandrock CDDLF - ASD
Date: 01/24/11
Casing Type: PVC
Well/Boring Number MW-7
Casing Diameter in inches (Dr): 2"
Screened Interval: 3.5' - 13.5'
Riser Elevation: 2.5'
Total Well Depth (Lw) in feet: 16.00
Depth to Water (Lf) in feet: 11.46
Time of Measurement: 11:40

Volume of water in well, using $V=0.041\ (Dr)^2\ (Lw - Lf) =$ 0.74 Gallons

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

	Temp (°C)	pH	Conductivity (µS/cm)	Clarity Color Turbidity	Water Level (ft)	Time	Sampler Initials
Before Development	14.3	6.65	2850	627	11.46	11:44	RW
After Purging 2.50 Gallons	14.9	6.57	2540	231	-	11:51	RW
3.50 Gallons	15.4	6.56	2530	352	-	11:57	RW
4.50 Gallons	15.8	6.63	2530	72.6	-	12:11	RW
6.00 Gallons	16.4	6.62	2510	392	-	12:30	RW
7.00 Gallons	16.1	6.66	2510	78.1	-	12:50	RW
8.50 Gallons	16.6	6.67	2460	42.8	-	13:10	RW
9.75 Gallons	16.4	6.65	2480	127	-	13:30	RW
11.00 Gallons	15.4	6.63	2490	158	-	13:45	RW
12.00 Gallons	16.3	6.67	2500	127	-	14:00	RW
13.00 Gallons	15.2	6.65	2490	96.1	-	14:15	RW

(Fill in one or more of the above columns depending on available equipment)

Method of purging (bailer or pump) : 12V Pump If pumped, pumping rate: 3.00 gal/min
Well Purged Dry: Yes Continuous Recharge: Yes
Notes concerning condition of well, odors, color, etc.: Odor, Foam
Partly cloudy, low 40's °F
Well purged dry each pumping cycle. Parameters taken each time at beginning of the following cycle.
Developer's Signature:

ENGINEERING, INC.

MONITORING WELL DEVELOPMENT DATA SHEET

Project: Coble's Sandrock CDDLF - ASD
Date: 01/24/11
Casing Type: PVC
Well/Boring Number MW-7
Casing Diameter in inches (Dr): 2"
Screened Interval: 3.5' - 13.5'
Riser Elevation: 2.5'
Total Well Depth (Lw) in feet: 16.00
Depth to Water (Lf) in feet: 11.46
Time of Measurement: 11:40
Volume of water in well, using $V=0.041\ (Dr)^2\ (Lw - Lf) =$ 0.74 Gallons

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

	Temp (°C)	pH	Conductivity (µS/cm)	Clarity Color Turbidity	Water Level (ft)	Time	Sampler Initials
After Purging 14.25 Gallons	15.1	6.65	2490	119	-	14:25	RW
15.25 Gallons	16.8	6.62	2500	32.5	-	14:35	RW
16.25 Gallons	16.7	6.61	2470	16.00	-	14:45	RW
17.50 Gallons	15.5	6.63	2470	33.9	-	14:55	RW
18.75 Gallons	15.7	6.54	2480	25.5	-	15:05	RW

Sampled at 15:05 for TDS, Metals, and Dissolved Metals

Field Blank sampled at 15:20 for Metals

(Fill in one or more of the above columns depending on available equipment)

Method of purging (bailer or pump) : 12V Pump
If pumped, pumping rate: 3.00 gal/min
Well Purged Dry: Yes
Continuous Recharge: Yes
Notes concerning condition of well, odors, color, etc.: Odor, Foam
Partly cloudy, low 40's °F
Well purged dry each pumping cycle. Parameters taken each time at beginning of the following cycle.
Developer's Signature: