

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)).
- In accordance with NC General Statutes Chapter 89C and 89E and NC Solid Waste Management Rules 15A NCAC 13B, be sure to affix a seal to the bottom of this page, when applicable.
- 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):

S&ME, Inc. (Consultant)

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

Name: John Whitehead Phone: 864.574.2360

E-mail: jwhitehead@smeinc.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Belews Creek Pine Hall Road Creek Ash Landfill	Duke Energy Belews Creek Steam Station 3195 Pine Hall Rd Belews Creek, NC 27009	85-03	.0500	April 5-6, 2010

**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  Methane gas monitoring data  
 Groundwater monitoring data from private water supply wells  Corrective action data (specify) \_\_\_\_\_  
 Leachate monitoring data  Other(specify) \_\_\_\_\_  
 Surface water monitoring 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.

Stanford J. Lummus

Senior Engineer

864.574.2360

Facility Representative Name (Print)

Title

(Area Code) Telephone Number

Signature

July 20, 2010

Date

Affix NC Licensed/ Professional Geologist/Engineer Seal here:



SEMI-ANNUAL  
GROUNDWATER MONITORING REPORT  
APRIL 2010 SAMPLING EVENT  
DUKE ENERGY BELEWS CREEK STEAM STATION  
PINE HALL ROAD ASH LANDFILL  
PERMIT #85-03  
S&ME Project No. 1411-09-047

Prepared For:



Prepared By:



S&ME, Inc.  
301 Zima Park Drive  
Spartanburg, South Carolina 29301

July 2010



July 20, 2010

Ms. Jackie Drummond  
North Carolina Department of Environment and Natural Resources  
Division of Waste Management  
Solid Waste Section  
1646 Mail Service Center  
Raleigh, N.C. 27699-1646

**Reference: Semi-Annual Groundwater Monitoring Report  
April 2010 Sampling Event**  
Duke Energy Belews Creek Steam Station  
Pine Hall Road Ash Landfill, Permit # 85-03  
S&ME Project 1411-09-047

Dear Ms. Drummond:

This report presents the semi-annual groundwater monitoring for the Pine Hall Road Ash Landfill (Permit #85-03). The landfill is located at Duke Energy's Belews Creek Steam Station in Stokes County. Groundwater sampling for the landfill was performed on April 5 and 6, 2010. S&ME is submitting this report on the behalf of Duke Energy.

This report includes a brief discussion of the landfill and groundwater monitoring activities, a figure showing groundwater contours at the site, a summary of the analytical results, and preliminary evaluation of values in excess of the NCAC 2L groundwater standards. Also attached is the Environmental Monitoring Reporting Form. An EXCEL file containing the laboratory results in the Electronic Data Deliverable format will be sent to you by e-mail.

If you have questions or require additional information, please contact us at 828-687-9080.

Sincerely,

**S&ME, Inc.**

  
John Whitehead  
Project Geologist

  
Stanford Lummus, P.E.  
Senior Project Engineer



North Carolina Professional Engineering Firm License No. F-0176

S:\ENVIRON\2009\1411 Projects\1411-09-047 Duke Landfill GW Reports\Pine Hall Rd\April 2010 Sampling Event\Draft Report\Pine Hall Rd Semi-Annual Sampling April 2010 Report -Final.doc

cc:

Duke Energy  
Post Office Box 1006  
Charlotte, North Carolina 28201-1006  
Attention: Mr. Ed Sullivan, P.E.  
Mail Code: EC13K

Duke Energy  
Belews Creek Steam Station  
3195 Pine Hall Road  
Walnut Cove, North Carolina 27052  
Attention: Melanie Martin, Environmental Coordinator

## TABLE OF CONTENTS

	<u>Page</u>
<b>1.0 BACKGROUND</b> .....	<b>1</b>
<b>2.0 SCOPE OF WORK</b> .....	<b>3</b>
<b>3.0 RESULTS</b> .....	<b>4</b>
3.1 Site Groundwater Flow .....	4
3.2 Analytical Results .....	4

## TABLES

Table 1:	Field Data Parameters
Table 2:	Summary of Field and Analytical Results
Table 3:	Groundwater Analytical Results Appendix I – 40 CFR Part 258 Compounds

## FIGURES

Figure 1:	Groundwater Contours April 2010
-----------	---------------------------------

## APPENDIX I

Chain of Custody

## 1.0 BACKGROUND

The Pine Hall Road ash landfill is located at the Duke Energy Belews Creek Steam Station, in Stokes County, North Carolina. The ash landfill was permitted to accept (only) fly ash from Belews Creek Steam Station operations. Belews Creek Steam Station is owned and operated by Duke Energy Carolinas (Duke). The landfill is permitted under NCDENR Solid Waste Permit #85-03 and was closed in December 2008.

The landfill was originally permitted in 1983. The original landfill was unlined and was permitted with a soil cap one foot thick on the side slopes and two feet thick on flatter areas. A subsequent expansion (Phase I Expansion) was permitted in 2003. This phase was also unlined, but was permitted with a synthetic cap system to be applied at closure.

After groundwater exceedences were observed in wells installed near the landfill, the placement of additional ash in the Phase I Expansion was halted. The closure design was changed to utilize an engineered, synthetic cover system for the entire landfill, both the original landfill and the Phase 1 Expansion. The construction of the synthetic cover system was completed in December 2008.

The ash landfill and nearby surrounding area are portrayed on Figure 1. The ash landfill is located to the north of the surface water divide that runs along Pine Hall Road and to the east of a surface water divide that runs along Middleton Loop Road. These surface water divides appear to serve as the groundwater divides for the area near the landfill. Two surface water features are located in the area of the landfill. One is an ephemeral stream along a surface water drainage feature originating along the eastern side of the landfill. The second is a small stream located in a surface water drainage feature beginning north of Pine Hall Road that roughly parallels the western side of the landfill. Both these features drain to the north and into the Ash Basin. Groundwater flow beneath the landfill is from Pine Hall Road, generally northward, toward the Ash Basin. The Ash Basin is operated as a water treatment facility and is permitted by the NPDES program (NPDES Permit #NC0024406).

The groundwater monitoring system for the landfill consists of the following groundwater monitoring wells:

MW-1	MW2-7
MW-2	MW2-9
MW-3	OB-4
MW-4	OB-5
MW-5	OB-9
MW-6	MW-1D
MW-7	

Two surface water sample locations are also included in the monitoring system: location SW-1A from the ephemeral stream east of the landfill and location SW-2 from the stream west of the landfill.

Monitoring well MW-3 is considered to represent “background” groundwater quality. MW-1D extends into fractured bedrock.

Thirteen (13) monitoring wells and two surface water locations were sampled at the Pine Hall Road Ash Landfill on April 5 and 6, 2010 as the semi-annual sampling for the landfill. Groundwater elevations were measured at the sampled monitoring wells on the day that the groundwater samples were collected. Field parameters from the sampling are presented in **Table 1**.

The sampling was conducted by Duke Energy according to North Carolina Solid Waste Management Guidelines. The parameters and compounds sampled and analyzed for were selected by Duke and NCDENR Division of Solid Waste. The samples were analyzed by a North Carolina certified laboratory.

The preliminary analysis of the cause and significance of these values is provided in Section 3.2. A summary of the laboratory analytical results is provided in **Table 2** for the compounds sampled on a semi-annual basis.

In addition to the semi-annual compounds, the groundwater samples were also analyzed for Appendix I compounds. Appendix I sampling and analysis was performed as part of the requirements contained in the Closure Plan Approval letter dated December 7, 2007, Document ID RC03425. Condition 11 of that document states:

*Ground-water and surface water samples should be analyzed for Appendix I constituents in addition to currently analyzed constituents semi-annually. Appendix I analytical data will be evaluated, and based on results, the compliance Branch of the SWS may not require continued Appendix I analysis.*

**Table 3** contains the summary of the laboratory results for the Appendix I compounds.

## 2.0 SCOPE OF WORK

To complete the scope of work, S&ME completed the following tasks:

- Received field sampling information provided by Duke (performed by Duke) for monitoring wells MW-1, MW-1D, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW2-7, MW2-9, OB-4, OB-5, OB-9 and surface water sample locations SW-1A and SW-2. This sampling was conducted on April 5 and 6, 2010.
- Reviewed the laboratory analytical results for samples. These results were provided in both in paper format and in an EXCEL file. The EXCEL file was converted to the format requirements of the NCDENR Electronic Data Deliverable template.
- Developed a groundwater flow contour map using map data and groundwater elevation data supplied by Duke.
- Provided a preliminary evaluation of the cause and significance of values exceeding NC 2L groundwater standards.
- Prepared and submitted this Semi-Annual Groundwater Monitoring Report to Duke and to NCDENR.

## 3.0 RESULTS

### 3.1 Site Groundwater Flow

Groundwater flow contours for the site are shown on **Figure 1**. These contours were developed using the measured groundwater elevations in the wells from the April 5 and 6, 2010 sampling and from using the approximate surface water elevation for the Belews Creek Ash Basin.

Middleton Loop Road and Pine Hall Road are located along topographic highs and also appear to be groundwater divides. Groundwater flow at the site is from areas of higher topography along Middleton Loop Road and Pine Hall Road towards the Ash Basin. As shown by the groundwater elevations observed at MW-2 and MW-6, there also appears to be component of groundwater flow from along Pine Hall road towards the south.

### 3.2 Analytical Results

#### Monitoring Wells

A summary of the field data is presented in **Table 1**. As discussed in Section 1.0, groundwater samples were analyzed for the required semi-annual compounds. The results of the laboratory analyses for the groundwater monitoring well samples for the semi-annual samples are summarized in **Table 2**.

#### Semi-Annual Compounds – Monitoring Wells

Analyte concentrations from the monitoring wells were below the corresponding NCAC 2L groundwater quality standards with the exceptions noted below:

- Lab pH – Lab pH values equal to or below 6.5 were measured in wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW2-7, MW2-9, OB-5, and OB-9. The detected pH values equal to and below 6.5 ranged from 4.5 in MW-1 to 6.2 in MW2-9.
- Field pH – Field pH values equal to and below 6.5 were also measured in wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW2-7, MW2-9, OB-5, and OB-9. Field pH values ranged from 4.9 at MW-1 to 6.3 at MW2-9.

Monitoring well MW-3 is considered to be a background well and should not be impacted by the landfill. The pH values measured in MW-3 was 5.2. The pH values measured in the other wells are similar in magnitude to those measured in MW-3 and are consistent with historic readings at the site.

- Arsenic – Arsenic was detected above the 10 µg/L NCAC 2L groundwater quality standard at monitoring wells MW2-7, OB-4 and OB-9. Monitoring wells MW2-7 and OB-4 are located inside the review boundary.
- Boron - Concentrations in excess of the NCAC 2L groundwater quality standard for boron of 700 µg/L were measured in wells MW2-7, MW2-9, OB-4, and OB-9. Wells MW-2-7, OB-4, and OB-9 are within the Review Boundary. Well MW2-9 is approximately 65 feet outside of the landfill Review Boundary and is located

approximately 10 feet outside of the Ash Basin Review Boundary. Groundwater flow in this region is towards the Ash Basin. It not anticipated that significant boron concentrations are flowing in any direction other than towards the Ash Basin.

- Chromium – A concentration in excess of the NCAC 2L groundwater quality standard for chromium of 10 µg/L was measured in wells MW-4 and OB-4. Well OB-4 is approximately 100 feet inside of the Review Boundary. MW-4 is near the review boundary.
- Iron – Concentrations in excess of the NCAC 2L groundwater quality standard for iron of 300 µg/L were measured in wells MW-1, MW-6, MW-7, MW2-9, and OB-5.

US EPA recommends that when sampling for contaminants that may be biased by the presence of turbidity, the turbidity reading is desired to stabilize at a value below 10 Nephelometric Turbidity Units (NTUs).<sup>1</sup> Turbidity values measured above 10 NTU were recorded at MW-1, MW-2, MW-7 and MW2-9 (Table 1).

- Lead – A concentration in excess of the NCAC 2L groundwater quality standard for lead of 15 µg/L was measured in well OB-4, which is within the review boundary.
- Manganese – Concentrations in excess of the NCAC 2L groundwater quality standard for manganese of 50 µg/L were measured in monitoring wells MW-1, MW-1D, MW-6, MW-7, MW2-7, MW2-9, OB-4, and OB-9.

The manganese concentration (55 µg/L) at MW-1 is slightly above 2L standard and be somewhat attributable to slightly elevated turbidity at this location. Well MW-1D is located within the Review Boundary. This well was sampled in December 2008, April 2009, and October 2009 with detected manganese concentrations of 15.7 µg/L, 483 µg/L, and 215 µg/L, respectively. The recent sampling result was 320 µg/L. No other parameters were observed in this well that clearly indicates influence from the landfill. The elevated sample turbidity in the groundwater sample from well MW-7 may contribute to the elevated manganese concentrations detected. Additional sampling events are needed to determine if the elevated manganese values are from the landfill. The manganese values measures in Well MW2-7 are consistent with historic readings at the well. This well is located inside of the review boundary. The elevated manganese concentration detected in well MW2-9 may be caused by groundwater flowing from the landfill. As noted above, the groundwater flow through MW2-9 is towards the Ash Basin. Wells OB-4 and OB-9 are located within the Review Boundary.

---

<sup>1</sup> Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers, Ground Water Forum Issue Paper, EPA 542-S-02-001, May 2002, Yeskis and Zavala.

- Selenium – Concentrations in excess of the NCAC 2L groundwater quality standard for selenium of 20 µg/L were measured in monitoring wells MW2-7, OB-4 and OB-9. The wells are located inside of the Review Boundary.
- Sulfate – Concentrations in excess of the NCAC 2L groundwater quality standard for sulfate of 250,000 µg/L were measured in monitoring wells MW2-7, OB-4, and OB-9. The wells are located inside of the Review Boundary.
- Total Dissolved Solids – Concentrations in excess of the NCAC 2L groundwater quality standard for total dissolved solids of 500,000 µg/L were measured in monitoring wells MW2-7, OB-4, and OB-9. All three wells are located inside of the Review Boundary.

### **Appendix I Compounds – Monitoring Wells**

In addition to sampling for the semi-annual compounds, the samples were analyzed for Appendix I compounds as a requirement of the Closure Plan Approval. Results from the monitoring wells were below the corresponding NCAC 2L groundwater quality standards for the Appendix I compounds with the exception of the previously discussed concentrations of: arsenic at MW2-7, OB-4 and OB-9; chromium concentrations at MW-4 and OB-4; the lead concentration at OB-4; and the selenium concentrations detected in wells MW2-7, OB-4, and OB-9. The laboratory analytical results for the Appendix I compounds are listed in **Table 3**.

### **Surface Water Analytical Results**

As discussed in Section 1.0, surface water samples were analyzed for the semi-annual compounds. In addition these samples were analyzed for Appendix I compounds as a requirement of the Closure Plan Approval. Both of these sample locations discharge to the Ash Basin.

A summary of the field data is presented in Table 1. The results of the laboratory analyses for the surface water samples are summarized in **Table 2**.

### **Semi-Annual Compounds – Surface Water Sample Locations**

Results from the surface water samples were below the corresponding NCAC 2L groundwater quality standards with the exceptions noted below:

- Field pH – Field pH values of 6.1 and 6.3 were measured for SW-1A and SW-2, respectively.
- Lab pH – Lab pH values below 6.5 were measured in both surface water samples SW-1A and SW-2, at values of 5.0 and 6.0, respectively.
- Arsenic – The arsenic concentration at SW-1A (13 µg/L) exceeded the NCAC 2L groundwater quality standard of 10 µg/L.
- Boron - Concentrations in excess of the NCAC 2L groundwater quality standard for boron of 700 µg/L were measured in surface water samples SW-1A and SW-2, at concentrations of 11,400 µg/L and 3,710 µg/L, respectively.
- Iron – A concentration in excess of the NCAC 2L groundwater quality standard for iron of 300 µg/L was measured at SW-2 (305 µg/L).
- Manganese – Concentrations in excess of the NCAC 2L groundwater quality standard for manganese of 50 µg/L were measured in surface water samples SW-1A and SW-2, at concentrations of 1,240 µg/L and 107 µg/L, respectively.
- Nitrate (as Nitrogen) – A concentration in excess of the NCAC 2L groundwater quality standard for nitrate (as nitrogen) 10,000 µg/L was measured in surface water sample SW-1A (16,600 µg/L).
- Selenium – A concentration in excess of the NCAC 2L groundwater quality standard for selenium of 20 µg/L was measured in surface water sample SW-1A (57.1 µg/L).
- Total Dissolved Solids – A concentration in excess of the NCAC 2L groundwater quality standard for total dissolved solids of 500,000 µg/L was measured in surface water sample location SW-1A (1,010,000 µg/L).

### **Appendix I Compounds – Surface Water Sample Locations**

The laboratory analytical results for the Appendix I compounds are listed in **Table 3**. The only compounds measured at concentrations at or above the NCAC 2L groundwater quality standard were the previously discussed arsenic and selenium concentrations measured in the surface water sample from location SW-1A.

### **Semi-Annual Compounds - Values Equal to or Above the SWSL's**

The groundwater analytical results for the compounds sampled on a semi-annual basis at the following wells and surface water sample locations were equal to or above the corresponding Solid Waste Section Limits (SWSL).<sup>2</sup> Compounds with concentrations also exceeding NCAC 2L standards are discussed above and have therefore been omitted from the following list.

- Barium – A concentration of barium equal to or in excess of the SWSL of 100 µg/l was measured in wells MW-7, MW2-9, and OB-5.
- Cadmium – A concentration in excess of the 1 µg/l SWSL was detected at OB-9.
- Copper – A concentration in excess of the SWSL of 10 µg/l was measured in well MW-5.
- Mercury – A concentration equal to the SWSL of 0.2 µg/l was detected at MW-7.
- Selenium – A concentrations of selenium in excess of the SWSL of 10 µg/L was measured at surface water sample location SW-2.
- Zinc – Concentrations of zinc in excess of the SWSL of 10 µg/l were measured in wells MW-5, MW-7, and OB-9.

---

<sup>2</sup> Note that the NCAC 2L standards are equal to or greater than the SWSL's; only locations that equal or exceed the SWSL's and that did not exceed the 2L standards are listed.

### **Appendix I Compounds - Values Equal to or Above the SWSL's**

The groundwater analytical results for the Appendix I compounds at the following wells and surface water sample locations were equal to or above the corresponding Solid Waste Section Limits (SWSL).<sup>3</sup>

- Antimony – A concentration in excess of the SWSL of 6 µg/l was measured in well OB-4.
- Barium – A concentration of barium equal to or in excess of the SWSL of 100 µg/l was measured in wells MW-7, MW2-9 and OB-5.
- Beryllium – Concentrations in excess of the SWSL of 1 µg/l were measured in well MW2-7, OB-4, OB-9, SW-1A, and SW-2.
- Cadmium – A concentration in excess of the 1 µg/l SWSL was detected at OB-9.
- Copper – A concentration in excess of the SWSL of 10 µg/l was measured in well MW-5.
- Selenium – A concentrations of selenium in excess of the SWSL of 10 µg/L was measured at surface water sample location SW-2.
- Thallium – A concentration in excess of the SWSL of 5.5 µg/l was measured in wells MW-2-7 and OB-4.
- Vanadium – A concentration in excess of the SWSL of 25 µg/l was measured in well OB-4.
- Zinc – Concentrations of zinc in excess of the SWSL of 10 µg/l were measured in wells MW-5, MW-7 and OB-9.

---

<sup>3</sup> Note that the NCAC 2L standards are equal to or greater than the SWSL's; only locations that equal or exceed the SWSL's and that did not exceed the 2L standards are listed.

# TABLES



**TABLE 1 - FIELD DATA PARAMETERS  
DUKE ENERGY PINE HALL ROAD  
FLY ASH LANDFILL - PERMIT #85-03  
GROUNDWATER MONITORING REPORT  
S&ME PROJECT 1411-09-047**

DATE	WELL NO.	WELL DEPTH (feet)	DEPTH TO WATER (feet)	WATER ELEV. (feet)	DEPTH TO WATER PRODUCT (feet)	ODOR	Purge Method	AVG * PMP RATE (ml/min)	WELL VOL (gal)	EVAC VOL (gal)	EVAC (yes/no)	TEMP (deg C)	SPECIFIC CONDUCTANCE (umho/cm)	Field pH (units)	TURBIDITY (NTU)	ORP (mV-NHE)	DO (mg/l)
4/6/2010	MW-1	47.20	33.42	819.60	N/A	NA	CP	N/A	2.25	6.50	YES	33.42	17	4.9	21.1	N/A	N/A
4/6/2010	MW-1D	90.53	40.20	814.13	N/A	NA	CP	N/A	8.21	18.15	NO	14.7	231	6.7	1.5	N/A	N/A
4/5/2010	MW-2	50.00	44.07	809.32	N/A	NA	CP	N/A	0.97	1.00	YES	15.3	43	5.8	10.6	N/A	N/A
4/5/2010	MW-3	49.50	38.73	804.46	N/A	NA	CP	N/A	1.76	5.25	NO	13.9	46	5.4	6.0	N/A	N/A
4/6/2010	MW-4	40.20	12.74	755.37	N/A	NA	CP	N/A	4.48	13.50	NO	14.9	162	5.9	5.3	N/A	N/A
4/5/2010	MW-5	60.20	24.62	762.55	N/A	NA	CP	N/A	5.80	18.00	NO	16.9	36	5.7	3.5	N/A	N/A
4/6/2010	MW-6	36.84	31.24	806.46	N/A	NA	CP	N/A	0.91	3.00	NO	14.8	54	5.2	3.3	N/A	N/A
4/5/2010	MW-7	14.26	5.13	810.44	N/A	NA	CP	N/A	1.49	7.50	NO	13.3	153	5.4	241.0	N/A	N/A
4/5/2010	MW2-7	30.62	13.81	764.98	N/A	NA	CP	N/A	2.74	13.75	NO	13.9	1891	5.2	5.1	N/A	N/A
4/6/2010	MW2-9	14.61	3.99	794.05	N/A	NA	CP	N/A	1.73	3.25	YES	10.6	509	6.3	15.8	N/A	N/A
4/5/2010	OB-4	30.03	22.80	754.80	N/A	NA	CP	N/A	1.18	3.75	NO	15.5	2779	7.9	6.9	N/A	N/A
4/5/2010	OB-5	36.60	25.07	755.86	N/A	NA	CP	N/A	1.88	6.00	NO	16.7	33	5.4	10.0	N/A	N/A
4/5/2010	OB-9	48.57	37.26	762.90	N/A	NA	CP	N/A	1.84	6.00	NO	15.2	1842	5.1	2.6	N/A	N/A
4/5/2010	SW-1A	N/A	N/A	N/A	N/A	NA	NP	NA	N/A	NA	NA	15.2	1287	6.1	3.1	NA	NA
4/5/2010	SW-2	N/A	N/A	N/A	N/A	NA	NP	NA	N/A	NA	NA	19.7	329	6.1	21.4	NA	NA

Sampling Performed by Duke Energy

Purge Methods

- LF = Low Flow
- CP = Conventional Purge (3 to 5 well vol)
- BP = No Purge (HydraSleeve)
- LO - Level Only

**TABLE 2 - FIELD AND ANALYTICAL RESULTS  
DUKE ENERGY PINE HALL ROAD  
FLY ASH LANDFILL - PERMIT #85-03  
GROUNDWATER MONITORING REPORT  
S&ME PROJECT 1411-09-047**

6/15/2010

Page 1 of 3

Facility: Belews Creek Steam Station Pine Hall Road Fly-Ash Landfill #85-03											
Sample Date: 4/5/2010 and 4/6/2010 (Field and Geochemistry Data)										Laboratory Certificate Codes:	
Field sampling performed by Duke Energy										Duke Power Field #5193 Pace Lab #40 Summit Lab #631	
Parameter	SWS ID	Units	Certificate Code	Monitoring Well Identification						SWSL	15A NCAC 2L*
				8503-MW-1	8503-MW-1D	8503-MW-2	8503-MW-3	8503-MW-4	8503-MW-5		
Field pH	320	Std. Units	5193	4.9	6.7	5.8	5.4	5.9	5.7		6.5-8.5
Field Spec. Conductance	323	umho/cm	5193	17	231	43	46	162	36		
Temperature	325	C	5193	17.60	14.7	15.3	13.9	14.9	16.9		
Top Casing	328	msl-feet		853.02	854.33	853.39	843.19	768.11	787.17		
Depth to Water	318	feet		33.42	40.20	44.07	38.73	12.74	24.62		
Water Elevation	319	msl-feet		819.60	814.13	809.32	804.46	755.37	762.55		
Well Depth	41	feet		47.20	90.53	50.00	49.50	40.20	60.20		
Arsenic	14	ug/l	40	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	10	10
Barium	15	ug/l	40	22.1 J	1.6 J	50.1 J	58 J	1.5 J	29.7 J	100	700
BOD	316	ug/l	40	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	NE	NE
Boron	NE	ug/l	40	4.7 U	15.3	46.2	39.9	229	34.2	NE	700
Cadmium	34	ug/l	40	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1	2
Chemical Oxygen Demand	317	ug/l	40	39000	25000 U	25000 U	25000 U	25000 U	25000 U	NE	NE
Chloride	301	ug/l	40	5000 U	9540	5790	9230	5000 U	5000 U	NE	250000
Chromium	51	ug/l	40	1.8 J	0.4 U	1.9 J	0.46 J	12.2	0.4 U	10	10
Copper	54	ug/l	40	1.8 J	0.3 U	1.7 J	0.3 U	0.3 U	76.6	10	1000
Fluoride	312	ug/l	40	100 U	170 J	100 U	100 U	100 U	100 U	2000	2000
Iron	340	ug/l	40	1550	73.2 J	103 J	286 J	129 J	205 J	300	300
Lab pH	321	Std. Units	40	4.5	6.6	5.6	5.2	5.9	5.6		6.5-8.5
Lead	131	ug/l	40	4.7 J	4 U	4 U	4 U	4 U	6.3 J	10	15
Manganese	342	ug/l	40	55	320	19.5 J	5.2 J	3 J	5.9 J	50	50
Mercury	132	ug/l	40	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.20	1
Nickel	152	ug/l	40	1.9 J	1.7 U	4.4 J	1.7 U	1.7 U	1.7 U	50	100
Nitrate (as Nitrogen)	303	ug-N/l	40	100 U	1200	476	100 U	590	878	10000	10000
Selenium	183	ug/l	40	3.8 U	3.8 U	3.8 U	3.8 U	6.2 J	3.8 U	10	20
Silver	184	ug/l	40	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	10	20
Sulfate	315	ug/l	40	5000 U	22600 J	5000 U	5000 U	34600 J	5000 U	250000	250000
Total Dissolved Solids	311	ug/l	40	20000 U	136000	46000	20000 U	108000	20000	NE	500000
Total Organic Carbon	357	ug/l	40	1070	2700	1260	1000 U	1380	1000 U	NE	NE
Total Organic Halogen	396	mg/l	631	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NE	NE
Zinc	213	ug/l	40	8.2 J	0.4 U	7.4 J	1.2 J	0.4 U	41.7	10	1000

\* Maximum Contaminant Level (MCL)

**Notes:**

15A NCAC 2L = 15A NCAC 2L .0200, Groundwater Quality Standards for Class GA groundwater

NC SWSL = North Carolina Solid Waste Section Limit

**BOLD VALUES** indicate a values that attain or exceed the 15A NCAC 2L MCL.

NE = Not established

Values in gray cells indicate values that equal or exceed the SWSL.

J = Parameters are values greater than Method Detection Limit (MDL) but less than the SWSL

U = Not detected above the method detection limit, for reporting purposes concentrations have been set equal to the method detection limit

Analytical results provided by Duke Energy and are found in Pace Lab Report 9266764, dated May 11, 2010.

**TABLE 2 - FIELD AND ANALYTICAL RESULTS  
DUKE ENERGY PINE HALL ROAD  
FLY ASH LANDFILL - PERMIT #85-03  
GROUNDWATER MONITORING REPORT  
S&ME PROJECT 1411-09-047**

6/15/2010

Page 2 of 3

Facility: Belews Creek Steam Station Pine Hall Road Fly-Ash Landfill #85-03												
Sample Date: 10/19/2009 and 10/20/2009 (Field and Geochemistry Data)											Laboratory Certificate Codes:	
Field sampling performed by Duke Energy											Duke Power Field #5193 Pace Lab #40 Summit Lab #631	
Parameter	SWS ID	Units	Certificate Code	Monitoring Well Identification						SWSL	15A NCAC 2L*	
				8503-MW-6	8503-MW-7	8503-MW2-7	8503-MW2-9	8503-OB-4	8503-OB-5			
Field pH	320	Std. Units	5193	5.2	5.4	5.2	6.3	7.9	5.4		6.5-8.5	
Field Spec. Conductance	323	umho/cm	5193	54	153	1891	509	2779	33			
Temperature	325	C	5193	14.8	13.3	13.9	10.6	15.5	16.7			
Top Casing	328	msl-feet		837.70	815.57	778.79	798.04	777.60	780.93			
Depth to Water	318	feet		31.24	5.13	13.81	3.99	22.80	25.07			
Water Elevation	319	msl-feet		806.46	810.44	764.98	794.05	754.80	755.86			
Well Depth	41	feet		36.84	14.26	30.62	14.61	30.03	36.60			
Arsenic	14	ug/l	40	2.7 U	2.7 U	17.4 J	4.3 J	91.8 J	2.7 U	10	10	
Barium	15	ug/l	40	54 J	100 J	34.8 J	101 J	28.3 J	149 J	100	700	
BOD	316	ug/l	40	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	NE	NE	
Boron	NE	ug/l	40	27.6 U	292 U	18100 U	1390 U	40300 U	16.9 U	NE	700	
Cadmium	34	ug/l	40	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1	2	
Chemical Oxygen Demand	317	ug/l	40	25000 U	25000 U	25000 U	686000 U	25000 U	25000 U	NE	NE	
Chloride	301	ug/l	40	5790 U	7740 U	17700 U	11700 U	5780 U	7010 U	NE	250000	
Chromium	51	ug/l	40	0.4 U	2.6 J	2 J	5.4 J	16.2 J	0.7 J	10	10	
Copper	54	ug/l	40	0.3 U	0.87 J	0.3 U	2.4 J	0.3 U	0.44 J	10	1000	
Fluoride	312	ug/l	40	100 U	100 U	100 U	130 J	720 J	100 U	2000	2000	
Iron	340	ug/l	40	752 U	3900 U	16.1 J	2090 U	14 U	409 U	300	300	
Lab pH	321	Std. Units	40	5.2	5.2	5.2	6.2	7.9	5.2		6.5-8.5	
Lead	131	ug/l	40	4 U	4 U	4 U	4 U	15.5 U	4 U	10	15	
Manganese	342	ug/l	40	73.8 U	103 U	228 U	5550 U	79.7 U	13.5 J	50	50	
Mercury	132	ug/l	40	0.07 U	0.2 J	0.19 J	0.07 U	0.07 U	0.07 U	0.20	1	
Nickel	152	ug/l	40	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	50	100	
Nitrate (as Nitrogen)	303	ug-N/l	40	100 U	4290 U	300 U	1200 U	6990 U	100 U	10000	10000	
Selenium	183	ug/l	40	3.8 U	3.8 U	134 U	5.3 J	231 U	3.8 U	10	20	
Silver	184	ug/l	40	0.1 U	0.1 U	0.1 U	0.1 U	5.1 J	0.1 U	10	20	
Sulfate	315	ug/l	40	5000 U	25300 J	1010000 U	55200 J	1680000 U	5000 U	250000	250000	
Total Dissolved Solids	311	ug/l	40	46000 U	98000 U	1610000 U	258000 U	2750000 U	20000 U	NE	500000	
Total Organic Carbon	357	ug/l	40	2360 U	3170 U	2950 U	11200 U	1390 U	1000 U	NE	NE	
Total Organic Halogen	396	ug/l	631	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NE	NE	
Zinc	213	ug/l	40	0.4 U	17.2 U	5 J	0.4 U	0.4 U	8.5 J	10	1000	

\* Maximum Contaminant Level (MCL)

**Notes:**

15A NCAC 2L = 15A NCAC 2L .0200, Groundwater Quality Standards for Class GA groundwater

NC SWSL = North Carolina Solid Waste Section Limit

**BOLD VALUES** indicate a values that attain or exceed the 15A NCAC 2L MCL.

NE = Not established

Values in gray cells indicate values that equal or exceed the SWSL.

J = Parameters are values greater than Method Detection Limit (MDL) but less than the SWSL

U = Not detected above the method detection limit, for reporting purposes concentrations have been set equal to the method detection limit

Analytical results provided by Duke Energy and are found in Pace Lab Report 9266764, dated May 11, 2010.

**TABLE 2 - FIELD AND ANALYTICAL RESULTS  
DUKE ENERGY PINE HALL ROAD  
FLY ASH LANDFILL - PERMIT #85-03  
GROUNDWATER MONITORING REPORT  
S&ME PROJECT 1411-09-047**

6/15/2010

Page 3 of 3

Parameter				Monitoring Well Identification				SWSL	15A NCAC 2L*
				8503-OB-9	8503-SW-1A	8503-SW-2	FIELD BLANK		
Field pH	320	Std. Units	5193	5.1	6.1	6.1			6.5-8.5
Field Spec. Conductance	323	umho/cm	5193	1842	1287	329			
Temperature	325	C	5193	15.2	15.2	19.7			
Top Casing	328	msl-feet		800.16					
Depth to Water	318	feet		37.26					
Water Elevation	319	msl-feet		762.90					
Well Depth	41	feet		48.57					
Arsenic	14	ug/l	40	16.6	13	3.9 J	2.7 U	10	10
Barium	15	ug/l	40	10.6 J	67.8 J	36.3 J	0.2 U	100	700
BOD	316	ug/l	40	2000 U	2000 U	2000 U		NE	NE
Boron	NE	ug/l	40	19700	11400	3710	39.1	NE	700
Cadmium	34	ug/l	40	1.7	0.5 U	0.5 U	0.5 U	1	2
Chemical Oxygen Demand	317	ug/l	40	25000 U	25000 U	25000 U	25000 U	NE	NE
Chloride	301	ug/l	40	10600	11800	6320	5000 U	NE	250000
Chromium	51	ug/l	40	2.4 J	1.7 J	0.41 J	0.4 U	10	10
Copper	54	ug/l	40	0.6 U	0.3 U	0.3 U	0.3 U	10	1000
Fluoride	312	ug/l	40	100 U	100 U	100 U	100 U	2000	2000
Iron	340	ug/l	40	28 U	82.7 J	305	14 U	300	300
Lab pH	321	Std. Units	40	5.0	5.0	6.0	4.3		6.5-8.5
Lead	131	ug/l	40	8 U	4 U	4 U	4 U	10	15
Manganese	342	ug/l	40	1010	1240	107	0.3 U	50	50
Mercury	132	ug/l	40	0.14 J	0.07 U	0.07 U	0.07 U	0.20	1
Nickel	152	ug/l	40	3.4 U	1.7 U	1.7 U	2 J	50	100
Nitrate (as Nitrogen)	303	ug-N/l	40	3610	16600	635	100 U	10000	10000
Selenium	183	ug/l	40	173	57.1	19.7	3.8 U	10	20
Silver	184	ug/l	40	0.2 U	0.1 U	0.1 U	0.1 U	10	20
Sulfate	315	ug/l	40	1050000	31600 J	108000 J	5000 U	250000	250000
Total Dissolved Solids	311	ug/l	40	1530000	1010000	148000		NE	500000
Total Organic Carbon	357	ug/l	40	2210	2800	1270	1320 U	NE	NE
Total Organic Halogen	396	ug/l	631	0.1 U	0.1 U	0.1 U	0.1 U	NE	NE
Zinc	213	ug/l	40	19.1	0.4 U	6.9 J	5.6 J	10	1000

\* Maximum Contaminant Level (MCL)

**Notes:**

15A NCAC 2L = 15A NCAC 2L .0200, Groundwater Quality Standards for Class GA groundwater

**BOLD VALUES** indicate a values that attain or exceed the 15A NCAC 2L MCL.

Values in gray cells indicate values that equal or exceed the SWSL.

J = Parameters are values greater than Method Detection Limit (MDL) but less than the SWSL

U = Not detected above the method detection limit, for reporting purposes concentrations have been set equal to the method detection limit

NC SWSL = North Carolina Solid Waste Section Limit

NE = Not established

**Table 3**  
**Groundwater Analytical Results**  
**Appendix I - 40 CFR Part 258 Compounds**  
**Belews Creek Steam Station Pine Hall Fly-Ash Landfill #85-03**  
**S&ME Project No. 1411-09-047**  
**Sample Date: April 5 and 6, 2010**

Sheet 1 of 3

Laboratory Certificate Codes:  
Pace Lab #12

	Compound	NCAC 2L	SWSL	8503-MW-1		8503-MW-ID		8503-MW-2		8503-MW-3		8503-MW-4		8503-MW-5	
		Stds. (ug/L)	(ug/L)												
(1)	Antimony	NE	6	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U
(2)	Arsenic	10	10	2.7	U	2.7	U	2.7	U	2.7	U	2.7	U	2.7	U
(3)	Barium	700	100	22.1	J	1.6	J	50.1	J	58	J	1.5	J	29.7	J
(4)	Beryllium	NE	1	0.22	J	0.1	U	0.32	J	0.25	J	0.1	U	0.18	J
(5)	Cadmium	2	1	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
(6)	Chromium	10	10	1.8	J	0.4	U	1.9	J	0.46	J	<b>12.2</b>		0.4	U
(7)	Cobalt	NE	10	0.93	J	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U
(8)	Copper	1000	10	1.8	J	0.3	U	1.7	J	0.3	U	0.3	U	<b>76.6</b>	
(9)	Lead	15	10	4.7	J	4	U	4	U	4	U	4	U	6.3	J
(10)	Nickel	100	50	1.9	J	1.7	U	4.4	J	1.7	U	1.7	U	1.7	U
(11)	Selenium	20	10	3.8	U	3.8	U	3.8	U	3.8	U	6.2	J	3.8	U
(12)	Silver	20	10	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
(13)	Thallium	NE	5.5	3	U	3	U	3	U	3	U	3	U	3	U
(14)	Vanadium	NE	25	1.4	J	0.51	J	0.26	J	1	J	2.3	J	0.63	J
(15)	Zinc	1000	10	8.2	J	0.4	U	7.4	J	1.2	J	0.4	U	<b>41.7</b>	
(16)	Acetone	6000	100	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U	2.2	U
(17)	Acrylonitrile	NE	200	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
(18)	Benzene	1	1	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
(19)	Bromochloromethane	NE	3	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
(20)	Bromodichloromethane	0.6	1	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
(21)	Bromoform	4	3	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
(22)	Carbon disulfide	700	100	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U
(23)	Carbon tetrachloride	0.3	1	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
(24)	Chlorobenzene	50	3	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U	0.23	U
(25)	Chloroethane	3000	10	0.54	U	0.54	U	0.54	U	0.54	U	0.54	U	0.54	U
(26)	Chloroform	70	5	0.14	U	0.14	U	0.14	U	0.36	J	0.14	U	0.14	U
(27)	Dibromochloromethane	0.4	3	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
(28)	1,2-Dibromo-3-chloropropane	0.04	13	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
(29)	1,2-Dibromoethane (EDB)	0.02	1	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U
(30)	1,2-Dichlorobenzene	20	5	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
(31)	1,4-Dichlorobenzene	6	1	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
(32)	trans-1,4-Dichloro-2-butene	NE	100	1	U	1	U	1	U	1	U	1	U	1	U
(33)	1,1-Dichloroethane	6	5	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U
(34)	1,2-Dichloroethane	0.4	1	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
(35)	1,1-Dichloroethene	7	5	0.56	U	0.56	U	0.56	U	0.56	U	0.56	U	0.56	U
(36)	cis-1,2-Dichloroethene	70	5	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
(37)	trans-1,2-Dichloroethene	100	5	0.49	U	0.49	U	0.49	U	0.49	U	0.49	U	0.49	U
(38)	1,2-Dichloropropane	0.6	1	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U
(39)	cis-1,3-Dichloropropene	0.4	1	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U	0.13	U
(40)	trans-1,3-Dichloropropene	0.4	1	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
(41)	Ethylbenzene	600	1	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U	0.3	U
(42)	2-Hexanone	280 (1)	50	0.46	U	0.46	U	0.46	U	0.46	U	0.46	U	0.46	U
(43)	Bromomethane	NE	10	0.29	U	0.29	U	0.29	U	0.29	U	0.29	U	0.29	U
(44)	Chloromethane	3	1	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U
(45)	Dibromomethane	NE	10	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
(46)	Methylene Chloride	5	1	0.97	U	0.97	U	0.97	U	0.97	U	0.97	U	0.97	U
(47)	2-Butanone (MEK)	4000	100	0.96	U	0.96	U	0.96	U	0.96	U	0.96	U	0.96	U
(48)	Iodomethane	NE	10	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U
(49)	4-Methyl-2-pentanone (MIBK)	NE	100	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
(50)	Styrene	70	1	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
(51)	1,1,1,2-Tetrachloroethane	NE	5	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
(52)	1,1,2,2-Tetrachloroethane	0.2	3	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
(53)	Tetrachloroethene	0.7	1	0.46	U	0.46	U	0.46	U	0.46	U	0.46	U	0.46	U
(54)	Toluene	600	1	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
(55)	1,1,1-Trichloroethane	200	1	0.48	U	0.48	U	0.48	U	0.48	U	0.48	U	0.48	U
(56)	1,1,2-Trichloroethane	NE	1	0.29	U	0.29	U	0.29	U	0.29	U	0.29	U	0.29	U
(57)	Trichloroethene	3	1	0.47	U	0.47	U	0.47	U	0.47	U	0.47	U	0.47	U
(58)	Trichlorofluoromethane	2000	1	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
(59)	1,2,3-Trichloropropane	0.005	1	0.41	U	0.41	U	0.41	U	0.41	U	0.41	U	0.41	U
(60)	Vinyl acetate	NE	50	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
(61)	Vinyl chloride	0.03	1	0.62	U	0.62	U	0.62	U	0.62	U	0.62	U	0.62	U
(62)	m,p,o-Xylenes	500	5	0.66	U	0.66	U	0.66	U	0.66	U	0.66	U	0.66	U

Notes:  
15A NCAC 2L = 15A NCAC 2L .0200, Groundwater Quality Standards for Class GA groundwater

(1) Interim Maximum Allowable Concentration

**BOLD VALUES** indicate a values that attain or exceed the 15A NCAC 2L MCL.

ND = Not detected by Lab at or above adjusted reporting limit.

J = Parameters are estimated values greater than Method Detection Limit (MDL) but less than the SWSL

U = Indicates compound was analyzed for, but not detected above the Laboratory Reporting Limit

NC SWSL = North Carolina Solid Waste Section Limit

NE = Not established

Values in gray cells indicate values that attain or exceed the SWSL.

Analyses performed by Pace Analytical Asheville, NC Wastewater Certification #40 and

Table 3

**Groundwater Analytical Results**  
**Appendix I - 40 CFR Part 258 Compounds**  
**Belews Creek Steam Station Pine Hall Fly-Ash Landfill #85-03**  
**S&ME Project No. 1411-09-047**  
**Sample Date: April 5 and 6, 2010**

Laboratory Certificate Codes:  
Pace Lab #12

	Compound	NCAC 2L Stds. (ug/L)	SWSL (ug/L)								
				8503-MW-6	8503-MW-7	8503-MW2-7	8503-MW2-9	8503-OB-4	8503-OB-5		
(1)	Antimony	NE	6	2.6 U	2.6 U	2.6 U	2.6 U	98.5	2.6 U		
(2)	Arsenic	10	10	2.7 U	2.7 U	17.4	4.3 J	91.8	2.7 U		
(3)	Barium	700	100	54 J	100 J	34.8 J	101	28.3 J	149		
(4)	Beryllium	NE	1	0.59 J	0.67 J	2.4	0.11 J	1.4	0.45 J		
(5)	Cadmium	2	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
(6)	Chromium	10	10	0.4 U	2.6 J	2 J	5.4 J	16.2	0.7 J		
(7)	Cobalt	NE	10	0.6 U	0.6 U	0.6 U	7.2 J	0.6 U	0.6 U		
(8)	Copper	1000	10	0.3 U	0.87 J	0.3 U	2.4 J	0.3 U	0.44 J		
(9)	Lead	15	10	4 U	4 U	4 U	4 U	15.5	4 U		
(10)	Nickel	100	50	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U		
(11)	Selenium	20	10	3.8 U	3.8 U	134	5.3 J	231	3.8 U		
(12)	Silver	20	10	0.1 U	0.1 U	0.1 U	0.1 U	5.1 J	0.1 U		
(13)	Thallium	NE	5.5	3 U	3 U	5.8	3 U	25.8	3 U		
(14)	Vanadium	NE	25	0.38 J	4.1 J	2.2 J	1.3 J	200	1.4 J		
(15)	Zinc	1000	10	0.4 U	17.2	5 J	0.4 U	0.4 U	8.5 J		
(16)	Acetone	6000	100	2.2 U	2.2 U	2.2 U	9.2 J	2.2 U	2.2 U		
(17)	Acrylonitrile	NE	200	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U		
(18)	Benzene	1	1	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
(19)	Bromochloromethane	NE	3	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U		
(20)	Bromodichloromethane	0.6	1	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U		
(21)	Bromoform	4	3	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U		
(22)	Carbon disulfide	700	100	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U		
(23)	Carbon tetrachloride	0.3	1	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
(24)	Chlorobenzene	50	3	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U		
(25)	Chloroethane	3000	10	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U		
(26)	Chloroform	70	5	1.2 J	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U		
(27)	Dibromochloromethane	0.4	3	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U		
(28)	1,2-Dibromo-3-chloropropane	0.04	13	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U		
(29)	1,2-Dibromoethane (EDB)	0.02	1	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U		
(30)	1,2-Dichlorobenzene	20	5	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		
(31)	1,4-Dichlorobenzene	6	1	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U		
(32)	trans-1,4-Dichloro-2-butene	NE	100	1 U	1 U	1 U	1 U	1 U	1 U		
(33)	1,1-Dichloroethane	6	5	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U		
(34)	1,2-Dichloroethane	0.4	1	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		
(35)	1,1-Dichloroethene	7	5	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U	0.56 U		
(36)	cis-1,2-Dichloroethene	70	5	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U		
(37)	trans-1,2-Dichloroethene	100	5	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U		
(38)	1,2-Dichloropropane	0.6	1	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U		
(39)	cis-1,3-Dichloropropene	0.4	1	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U		
(40)	trans-1,3-Dichloropropene	0.4	1	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U		
(41)	Ethylbenzene	600	50	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		
(42)	2-Hexanone	280 (1)	10	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U		
(43)	Bromomethane	NE	1	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U		
(44)	Chloromethane	3	1	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U		
(45)	Dibromomethane	NE	10	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U		
(46)	Methylene Chloride	5	1	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U		
(47)	2-Butanone (MEK)	4000	100	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U		
(48)	Iodomethane	NE	10	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U		
(49)	4-Methyl-2-pentanone (MIBK)	NE	100	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U		
(50)	Styrene	70	1	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U		
(51)	1,1,1,2-Tetrachloroethane	NE	5	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U		
(52)	1,1,2,2-Tetrachloroethane	0.2	3	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U		
(53)	Tetrachloroethene	0.7	1	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U		
(54)	Toluene	600	1	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U		
(55)	1,1,1-Trichloroethane	200	1	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U		
(56)	1,1,2-Trichloroethane	NE	1	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U		
(57)	Trichloroethene	3	1	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U		
(58)	Trichlorofluoromethane	2000	1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U		
(59)	1,2,3-Trichloropropane	0.005	1	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U		
(60)	Vinyl acetate	NE	50	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U		
(61)	Vinyl chloride	0.03	1	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U		
(62)	m,p,o-Xylenes	500	5	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U		

## Notes:

15A NCAC 2L = 15A NCAC 2L .0200, Groundwater Quality Standards for Class GA groundwater

(1) Interim Maximum Allowable Concentration

**BOLD VALUES** indicate a values that attain or exceed the 15A NCAC 2L MCL.

ND = Not detected by Lab at or above adjusted reporting limit.

J = Parameters are estimated values greater than Method Detection Limit (MDL) but less than the SWSL

U = Indicates compound was analyzed for, but not detected above the Laboratory Reporting Limit

NC SWSL = North Carolina Solid Waste Section Limit

NE = Not established

Values in gray cells indicate values that attain or exceed the SWSL.

Analyses performed by Pace Analytical Asheville, NC Wastewater Certification #40 and

by Pace Analytical Huntersville, NC Wastewater Certification #12

## Groundwater Analytical Results

## Appendix I - 40 CFR Part 258 Compounds

Belews Creek Steam Station Pine Hall Fly-Ash Landfill #85-03

Laboratory Certificate Codes:

Pace Lab #12

S&amp;ME Project No. 1411-09-047

Sample Date: April 5 and 6, 2010

Compound	NCAC 2L Stds. (ug/L)	SWSL (ug/L)	8503-OB-9	8503-SW-1A	8503-SW-2	FIELD BLANK
(1) Antimony	NE	6	5.2 U	2.6 U	2.6 U	2.6 U
(2) Arsenic	10	10	16.6 J	13	3.9 J	2.7 U
(3) Barium	700	100	10.6 J	67.8 J	36.3 J	0.2 U
(4) Beryllium	NE	1	3.2	1.2	1.3	0.1 U
(5) Cadmium	2	1	1.7	0.5 U	0.5 U	0.5 U
(6) Chromium	10	10	2.4 J	1.7 J	0.41 J	0.4 U
(7) Cobalt	NE	10	1.2 U	0.6 U	0.6 U	0.6 U
(8) Copper	1000	10	0.6 U	0.3 U	0.3 U	0.3 U
(9) Lead	15	10	8 U	4 U	4 U	4 U
(10) Nickel	100	50	3.4 U	1.7 U	1.7 U	2 J
(11) Selenium	20	10	173	57.1	19.7	3.8 U
(12) Silver	20	10	0.2 U	0.1 U	0.1 U	0.1 U
(13) Thallium	NE	5.5	6 U	4.1 J	3 U	3 U
(14) Vanadium	NE	25	2.4 J	1.6 J	0.84 J	0.22 J
(15) Zinc	1000	10	19.1	0.4 U	6.9 J	5.6 J
(16) Acetone	6000	100	2.2 U	2.4 J	4.1 J	42.9 J
(17) Acrylonitrile	NE	200	1.9 U	1.9 U	1.9 U	1.9 U
(18) Benzene	1	1	0.25 U	0.25 U	0.25 U	0.25 U
(19) Bromochloromethane	NE	3	0.17 U	0.17 U	0.17 U	0.17 U
(20) Bromodichloromethane	0.6	1	0.18 U	0.18 U	0.18 U	0.18 U
(21) Bromoform	4	3	0.26 U	0.26 U	0.26 U	0.26 U
(22) Carbon disulfide	700	100	1.2 U	1.2 U	1.2 U	1.2 U
(23) Carbon tetrachloride	0.3	1	0.25 U	0.25 U	0.25 U	0.25 U
(24) Chlorobenzene	50	3	0.23 U	0.23 U	0.23 U	0.23 U
(25) Chloroethane	3000	10	0.54 U	0.54 U	0.54 U	0.54 U
(26) Chloroform	70	5	0.14 U	0.14 U	0.14 U	0.14 U
(27) Dibromochloromethane	0.4	3	0.21 U	0.21 U	0.21 U	0.21 U
(28) 1,2-Dibromo-3-chloropropane	0.04	13	2.5 U	2.5 U	2.5 U	2.5 U
(29) 1,2-Dibromoethane (EDB)	0.02	1	0.27 U	0.27 U	0.27 U	0.27 U
(30) 1,2-Dichlorobenzene	20	5	0.3 U	0.3 U	0.3 U	0.3 U
(31) 1,4-Dichlorobenzene	6	1	0.33 U	0.33 U	0.33 U	0.33 U
(32) trans-1,4-Dichloro-2-butene	NE	100	1 U	1 U	1 U	1 U
(33) 1,1-Dichloroethane	6	5	0.32 U	0.32 U	0.32 U	0.32 U
(34) 1,2-Dichloroethane	0.4	1	0.12 U	0.12 U	0.12 U	0.12 U
(35) 1,1-Dichloroethene	7	5	0.56 U	0.56 U	0.56 U	0.56 U
(36) cis-1,2-Dichloroethene	70	5	0.19 U	0.19 U	0.19 U	0.19 U
(37) trans-1,2-Dichloroethene	100	5	0.49 U	0.49 U	0.49 U	0.49 U
(38) 1,2-Dichloropropane	0.6	1	0.27 U	0.27 U	0.27 U	0.27 U
(39) cis-1,3-Dichloropropene	0.4	1	0.13 U	0.13 U	0.13 U	0.13 U
(40) trans-1,3-Dichloropropene	0.4	1	0.26 U	0.26 U	0.26 U	0.26 U
(41) Ethylbenzene	600	50	0.3 U	0.3 U	0.3 U	0.3 U
(42) 2-Hexanone	280 (1)	10	0.46 U	0.46 U	0.46 U	2.9 J
(43) Bromomethane	NE	1	0.29 U	0.29 U	0.29 U	0.29 U
(44) Chloromethane	3	1	0.11 U	0.11 U	0.11 U	0.11 U
(45) Dibromomethane	NE	10	0.21 U	0.21 U	0.21 U	0.21 U
(46) Methylene Chloride	5	1	0.97 U	0.97 U	0.97 U	0.97 U
(47) 2-Butanone (MEK)	4000	100	0.96 U	0.96 U	1.2 J	19.4 J
(48) Iodomethane	NE	10	0.32 U	0.32 U	0.32 U	0.32 U
(49) 4-Methyl-2-pentanone (MIBK)	NE	100	0.33 U	0.33 U	0.33 U	0.33 U
(50) Styrene	70	1	0.26 U	0.26 U	0.26 U	0.26 U
(51) 1,1,1,2-Tetrachloroethane	NE	5	0.33 U	0.33 U	0.33 U	0.33 U
(52) 1,1,2,2-Tetrachloroethane	0.2	3	0.4 U	0.4 U	0.4 U	0.4 U
(53) Tetrachloroethene	0.7	1	0.46 U	0.46 U	0.46 U	0.46 U
(54) Toluene	600	1	0.26 U	0.26 U	0.26 U	0.26 U
(55) 1,1,1-Trichloroethane	200	1	0.48 U	0.48 U	0.48 U	0.48 U
(56) 1,1,2-Trichloroethane	NE	1	0.29 U	0.29 U	0.29 U	0.29 U
(57) Trichloroethene	3	1	0.47 U	0.47 U	0.47 U	0.47 U
(58) Trichlorofluoromethane	2000	1	0.2 U	0.2 U	0.2 U	0.2 U
(59) 1,2,3-Trichloropropane	0.005	1	0.41 U	0.41 U	0.41 U	0.41 U
(60) Vinyl acetate	NE	50	0.35 U	0.35 U	0.35 U	0.35 U
(61) Vinyl chloride	0.03	1	0.62 U	0.62 U	0.62 U	0.62 U
(62) m,p,o-Xylenes	500	5	0.66 U	0.66 U	0.66 U	0.66 U

## Notes:

15A NCAC 2L = 15A NCAC 2L .0200, Groundwater Quality Standards for Class GA groundwater

(1) Interim Maximum Allowable Concentration

**BOLD VALUES** indicate a values that attain or exceed the 15A NCAC 2L MCL.

ND = Not detected by Lab at or above adjusted reporting limit.

J = Parameters are estimated values greater than Method Detection Limit (MDL) but less than the SWSL.

U = Indicates compound was analyzed for, but not detected above the Laboratory Reporting Limit

NC SWSL = North Carolina Solid Waste Section Limit

NE = Not established

Values in gray cells indicate values that attain or exceed the SWSL.

Analyses performed by Pace Analytical Asheville, NC Wastewater Certification #40 and

by Pace Analytical Huntersville, NC Wastewater Certification #12

# FIGURES





# APPENDIX I







For Detailed Instructions, see:  
<http://dewwww/essenv/ocd>

Duke Energy Analytical Lab Services

Mail Code MGO3A2 (Building 7495)  
 13330 Hagers Ferry Rd  
 Hagerstown, M.C. 20678  
 (794) 87

1) Project Name: BELEWS CRK LANDFILL - PINE HALL  
 2) Client: C Campbell / T Hunsucker / Ed Sullivan  
 3) Business Unit: 2003  
 4) Project ID:  
 5) Process: BENVWS  
 6) Activity ID:  
 7) Resp. To: BC00  
 10) Mail Code: MGO3A3  
 2) Phone No: 875-5257  
 4) Fax No: 875-4348

# CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

1) Lab Use Only  
 1) Lab ID: 30004628  
 30004629  
 30004630  
 30004631  
 30004632  
 30004633

2) Analytical Laboratory Use Only  
 1) Sample Originating From: NC-1  
 2) Sample Program: GROUND WATER  
 3) Date & Time: 3/15/10 14:01  
 4) Vendor: PACE  
 5) Mail Number: 15W01-1942  
 6) Cooler Temp (C): 4  
 7) Preserv. Temp (C): 2-4, SO, 3-10, 4-10, 5-10

1) Page 2 of 2  
 DISTRIBUTION  
 ORIGINAL TO LAB,  
 COPY TO CLIENT

Analytical Laboratory  
 Page 109 of 109

9266704

12) Chem Desktop No.	13) Sample Description or ID	Date	14) Collection Information		15) Analytes "Comp." "Grab"	16) MET - (Ag, As, B, Ba, Be, Bi, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, Se, Sb, Tl, V, Zn)	17) TOC	18) TDS	19) BOD	20) TOX	21) COD	22) Hg	23) PCB (see attachment for compounds)	24) Chlorine (ppm)	25) Total # of Containers
			Time	Signature											
011	OB-4	4/5/10	0930	TD CUM	X		1	1	1	1	1	3	11	11	
012	OB-5	4/5/10	1330	TD CUM	X		1	1	1	1	1	3	11	11	
013	OB-9	4/5/10	1010	POC CUM	X		1	1	1	1	1	3	11	11	
014	SW-1A	4/5/10	1045	TD CUM	X		1	1	1	1	1	3	11	11	
015	SW-2	4/5/10	1120	TD CUM	X		1	1	1	1	1	3	11	11	
016	FIELD BLANK	4/6/10	1010	RD NR	X		1	1	1	1	1	3	n/a	9	

Customer to sign & date below

1) Requested By: TD CUM  
 2) Date/Time: 4/6/10 0740  
 3) Requested By: TD CUM  
 4) Date/Time: 4/6/10 1325  
 5) Requested By: Ed Cadin  
 6) Date/Time: 4-6-10 1450  
 7) Requested By: Ed Cadin  
 8) Date/Time: 4-6-10 1330

Customer, Important please indicate desired turnaround

12) Requested Turnaround  
 14 Days   
 7 Days   
 48 Hr   
 \*Other  Add. Cost Will Apply

SEE ATTACHMENT FOR LIST OF REQUIRED 8280 COMPOUNDS NEEDED  
 SEE packet 46-10 1513