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):

Altamont Environmental, Inc. (Consultant)

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

Name: Andrew Moore Phone: (828) 281-3350

E-mail: amoore@altamontenvironmental.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Duke Energy Carolinas, LLC Marshall Steam Station FGD Residue Landfill Phase 1, Cell 1	8320 East NC Highway 150 Terrell, NC 28682	1809	.0500	March 13, 2012

Environmental Status: (Check all that apply)

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

Type of data submitted: (Check all that apply)

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

Notification attached?

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

Certification

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

Stuart A. Ryman P.G. (828) 281-3350

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

Signature 6.6.12 Date

Affix NC Licensed/ Professional Geologist Seal

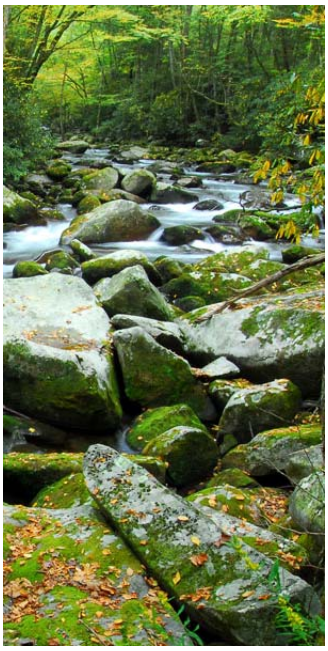
NORTH CAROLINA LICENSED SEAL 1654 GEOLOGIST STUART A. RYMAN

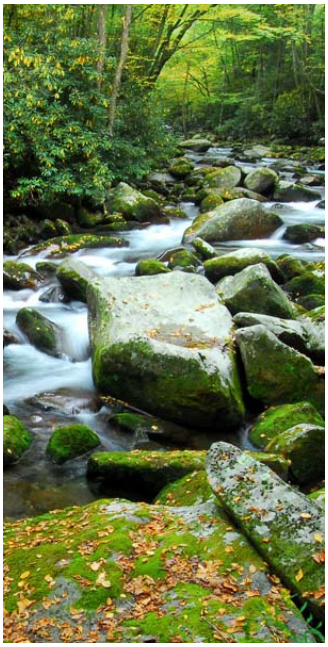
231 Haywood Street Asheville, NC 28801

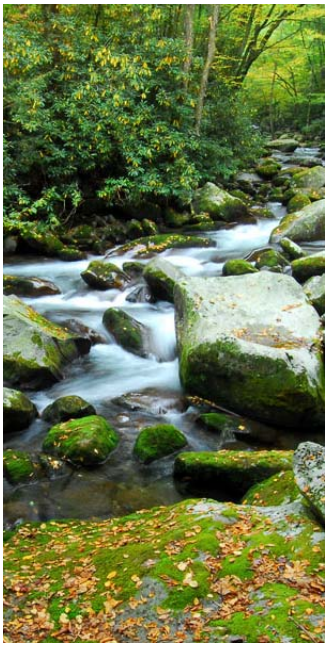
Facility Representative Address

C-2185

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







ALTAMONT ENVIRONMENTAL, INC.

ENGINEERING & HYDROGEOLOGY

Semiannual Groundwater Monitoring Report

Marshall Steam Station

FGD Residue Landfill, Phase 1, Cell 1
Permit No. 1809

March 2012 Sampling Event

June 6, 2012

Prepared for
Duke Energy Carolinas, LLC
Marshall Steam Station
8320 East NC Highway 150
Terrell, NC 28682
Project Number 2369.07

Prepared by
Altamont Environmental, Inc.
231 Haywood Street
Asheville, NC 28801
(828) 281-3350

Professional Certification

On behalf of Altamont Environmental, Inc., a firm licensed to practice both engineering (certification number C-2185) and geology (certification number C-299) in the State of North Carolina, I do hereby certify that the information contained in this report is correct and accurate to the best of my knowledge.

Stuart A. Ryman, P.G.

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A. Chain-of-Custody Forms

1.0 Background

Marshall Steam Station is owned and operated by Duke Energy Carolinas, LLC (Duke). The Marshall plant has a generating capacity of 2090 megawatts (MW) of electric power by combustion of coal. The plant is located in Catawba County, North Carolina, adjacent to Lake Norman, and is in the Piedmont physiographic region. The subsurface conditions beneath the plant area consist of residual soils and partially weathered rock, which have formed by the in-place weathering of the parent rock. These materials are underlain by bedrock.

The flue gas desulfurization (FGD) landfill is located northwest of the power plant and west of the Marshall Ash Basin (Figure 1). In general, the topography of the FGD landfill site slopes from the west-northwest to the east-southeast toward the Marshall Ash Basin.

The monitoring system at the landfill consists of nine groundwater monitoring wells (MS-8, MS-9, MS-10, MS-11, MS-12, MS-13, MS-14, MS-15, and MS-16) and one surface water sample location (SW-1). The locations of the wells and the surface water sample location are shown on Figures 2 and 3. Monitoring well MS-8 is located north of the landfill and, according to the *Groundwater Sampling and Analysis Plan*[1], is the background monitoring well for the site. Surface water sample location SW-1 is a groundwater seep located down gradient of the southwest portion of the FGD landfill and the analytical results are compared to Title 15A, North Carolina Administrative Code (NCAC), Subchapter 2L Standards (2L standards) for Class GA groundwater.

The landfill is permitted to receive FGD residue (gypsum), clarifier sludge, fly ash, bottom ash, asbestos waste, C&D waste, and mill rejects (pyrites). The clarifier sludge is generated from the FGD wastewater treatment system. Only Cell 1 of the FGD landfill is in operation and is approximately 18 acres in area. The landfill is constructed with an engineered liner system. Contact stormwater and leachate are collected in the lined Cell 1, and are then piped to the ash basin. The FGD landfill began receiving wastes in 2007.

[1] Marshall Steam Station Flue Gas Desulfurization (FGD) Residue Landfill Phase 1, Cell 1 Permit No. 18-09 *Groundwater Sampling and Analysis Plan*. Dated August 19, 2011.

2.0 Methods

2.1 Sampling and Analysis Methods

Groundwater sampling, surface water sampling, and documentation of sampling were performed by Duke personnel. The groundwater and surface water samples were analyzed by the Duke Energy Analytical Laboratory (North Carolina Laboratory Certification #248) and Pace Analytical Services, Inc., Asheville (North Carolina Laboratory Certification #40) and provided to Altamont by Duke.

The groundwater and surface water samples were analyzed for the following constituents:

- Select metals using U.S. Environmental Protection Agency (EPA) Methods 200.7 and 200.8
- Mercury using EPA Method 245.1
- Total dissolved solids using Standard Method (SM) 2540C
- Chloride, fluoride, nitrate as nitrogen, and sulfate using EPA Method 300.0

2.2 Statement of Work

Altamont completed the following tasks:

- Received field sampling information from Duke (performed by Duke personnel) for monitoring wells MS-8, MS-9, MS-10, MS-11, MS-12, MS-13, MS-14, MS-15, MS-16 and surface water sampling location SW-1. The samples were collected on March 13, 2012.
- Reviewed the laboratory analytical results for the samples noted above. The Electronic Data Deliverable (EDD), provided by Duke, was adapted to conform to the format requirements of the North Carolina Department of Environment and Natural Resources (DENR) EDD template. Altamont added an italicized J data qualifier (*J*) to certain analytical results to indicate a detected concentration that is greater than the laboratory's method reporting limit (MRL), but less than the Solid Waste Section Limit (SWSL). A copy of the original EDD is retained in Altamont's files.
- Developed a generalized groundwater surface contour map using map data and groundwater elevation data supplied by Duke.
- Prepared and submitted this Semiannual Groundwater Monitoring Report and the EDD to Duke and to DENR.

3.0 Results

3.1 Site Groundwater Flow

Generalized groundwater surface contours for the site are shown on Figure 3. These contours were developed using groundwater elevations measured in the FGD monitoring wells on March 13, 2012.

Figure 3 shows that groundwater flow in the area of the landfill is generally from areas of higher topography, located to the north and west of the landfill, toward the Marshall Ash Basin and sample location SW-1, located to the east and south of the landfill, respectively.

3.2 Analytical Results

A summary of the field data is presented in Table 1.

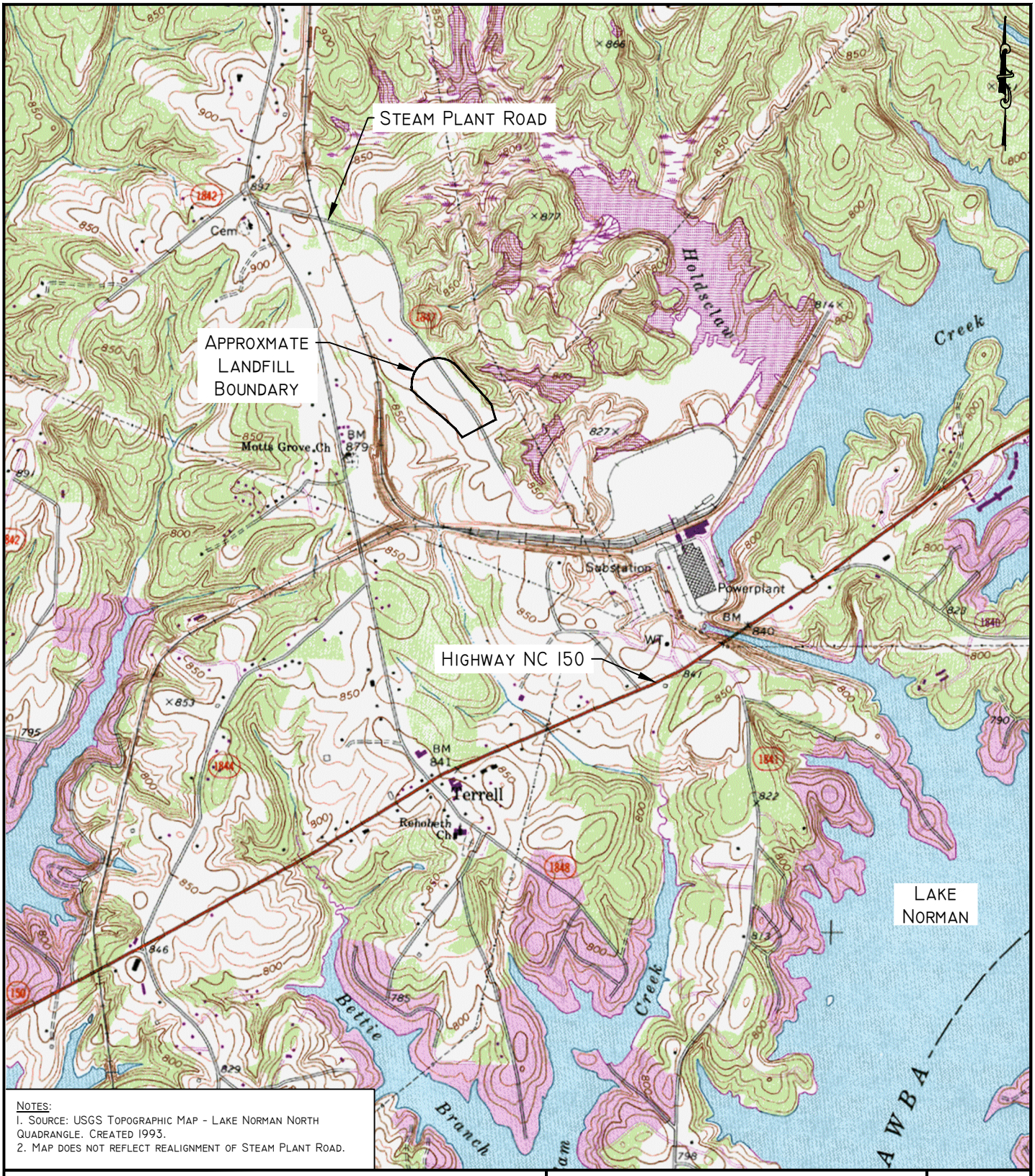
The field and analytical results of groundwater and surface water sampling are summarized in Table 2.

A summary of the 2L standards exceedances and a preliminary analysis of the cause and significance of the exceedances are presented in Table 3. The constituents listed in Table 3, with the exception of pH, were also detected at concentrations above their corresponding SWSLs.

Barium in the sample collected from monitoring well MS-10 was detected at a concentration in excess of its corresponding SWSL, but less than its 2L standard.

The chain-of-custody forms can be found in Appendix A.

FIGURES



Notes:
1. Source: USGS Topographic Map - Lake Norman North Quadrangle. Created 1993.
2. Map does not reflect realignment of Steam Plant Road.

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Site Location Map

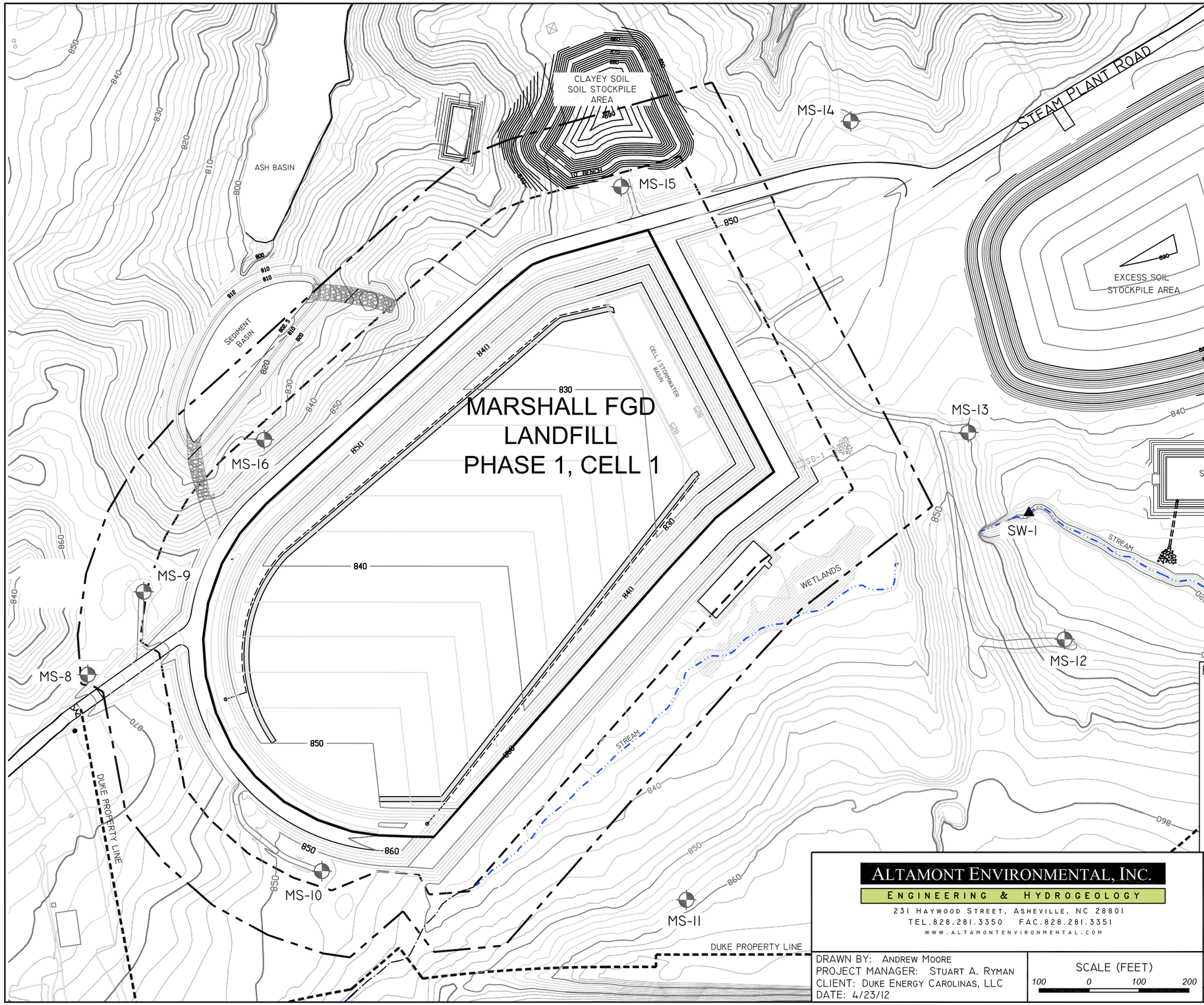
Marshall Steam Station
FGD Residue Landfill
Phase I, Cell I
Permit No. 1809

Figure 1

Drawn by: Andrew Moore
Project Manager: Stuart A. Ryman
Client: Duke Energy Carolinas, LLC
Date: 4/23/12

Scale (feet)
1000 0 1000 2000

File Path: P:\Duke - LF Groundwater Reports -2369\2369.06 MSS FGD LF\Figures\Site Location Map.dwg



Base Map Provided By Duke Energy Carolinas, LLC

MS-10	Groundwater Monitoring Well
SW-1	Surface Water Sampling Location
	Approximate Limit of Waste
	Landfill Review Boundary
	Landfill Compliance Boundary
	Stream

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www.altamontenvironmental.com

DRAWN BY: Andrew Moore
PROJECT MANAGER: Stuart A. Ryman
CLIENT: Duke Energy Carolinas, LLC
DATE: 4/23/12

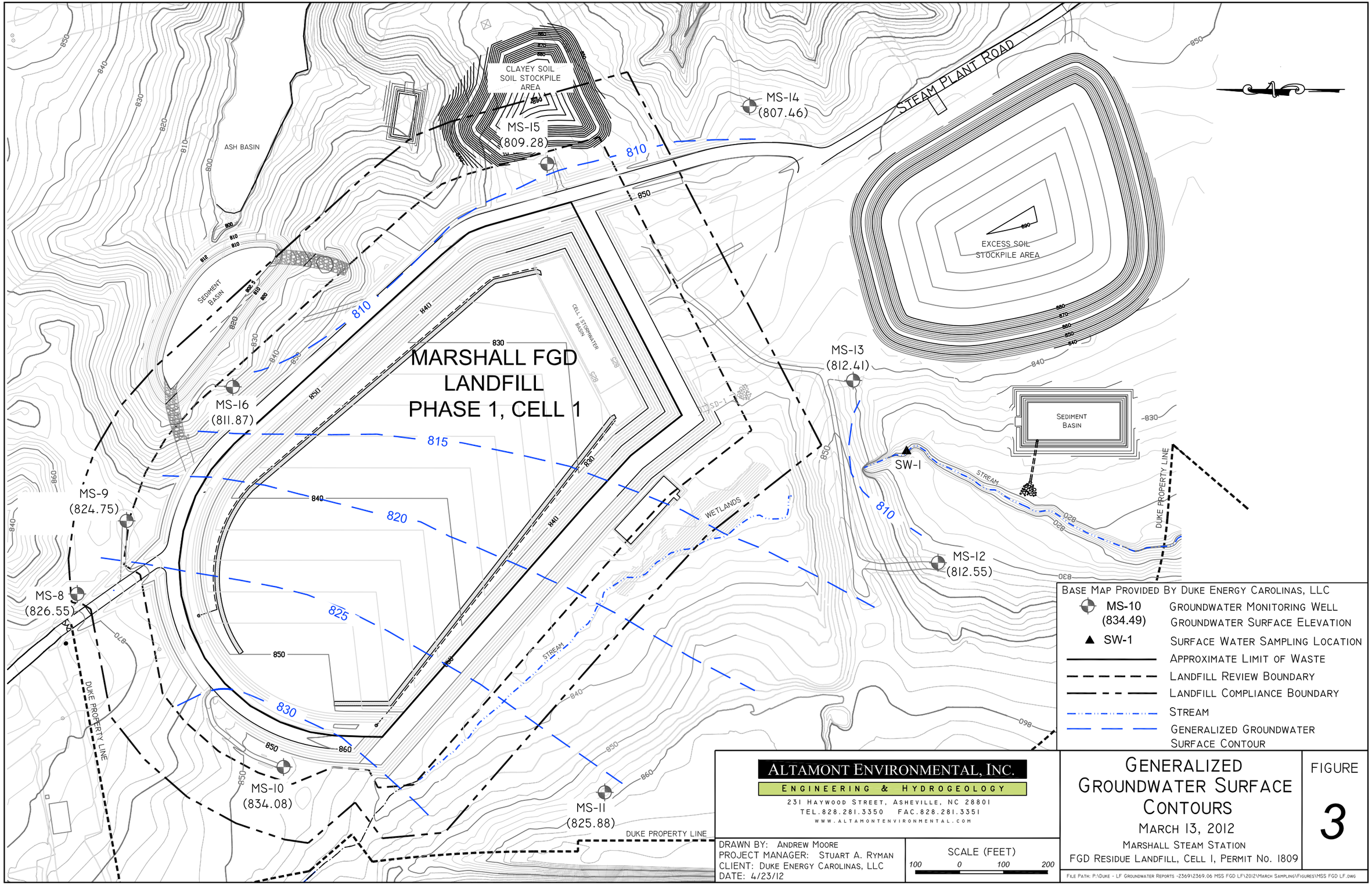
Scale (Feet)
100 0 100 200

Sample Locations

Marshall Steam Station
FGD Residue Landfill
Phase 1, Cell 1
Permit No. 1809

Figure
2

File Path: P:\Duke - LF Groundwater Reports -2369\2369.06 MSS FGD LF\2012\March Sampling\Figures\MSS FGD LF.dwg



BASE MAP PROVIDED BY DUKE ENERGY CAROLINAS, LLC

MS-10 (834.49)	GROUNDWATER MONITORING WELL GROUNDWATER SURFACE ELEVATION
SW-1	SURFACE WATER SAMPLING LOCATION
	APPROXIMATE LIMIT OF WASTE
	LANDFILL REVIEW BOUNDARY
	LANDFILL COMPLIANCE BOUNDARY
	STREAM
	GENERALIZED GROUNDWATER SURFACE CONTOUR

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DRAWN BY: ANDREW MOORE
PROJECT MANAGER: STUART A. RYMAN
CLIENT: DUKE ENERGY CAROLINAS, LLC
DATE: 4/23/12

SCALE (FEET)
100 0 100 200

GENERALIZED GROUNDWATER SURFACE CONTOURS

MARCH 13, 2012

MARSHALL STEAM STATION
FGD RESIDUE LANDFILL, CELL 1, PERMIT NO. 1809

FIGURE 3

FILE PATH: P:\DUKE - LF GROUNDWATER REPORTS -2369\2369.06 MSS FGD LF\2012\MARCH SAMPLING\FIGURES\MSS FGD LF.DWG

TABLES

Table 1–Field Data Parameters
Duke Energy Carolinas, LLC/Marshall Steam Station
FGD Residue Landfill, Phase 1, Cell 1–Permit No. 1809

DATE	WELL No.	WELL DEPTH (feet)	DEPTH TO WATER (feet)	WATER ELEV. (feet)	APPEARANCE	ODOR	PURGE METHOD	PUMP RATE (mL/min)	WELL VOLUME (gal)	EVAC VOLUME (gal)	EVAC (yes/no)	TEMP (deg C)	SPECIFIC CONDUCTANCE (umho/cm)	pH (SU)	TURBIDITY (NTU)	ORP (mV-NHE)	DO (mg/L)
3/13/2012	MS-8	51.58	45.79	826.55	Normal	None	C	N/A	0.94	3.00	NO	15.63	47	6.1	9.4	N/A	N/A
3/13/2012	MS-9	53.00	43.29	824.75	Normal	None	C	N/A	1.58	8.75	NO	15.49	98	6.4	1.8	N/A	N/A
3/13/2012	MS-10	23.34	17.21	834.08	Normal	None	C	N/A	1.00	4.00	NO	15.61	25	5.0	9.6	N/A	N/A
3/13/2012	MS-11	42.72	33.90	825.88	Normal	None	C	N/A	1.44	4.50	NO	15.07	41	5.4	3.2	N/A	N/A
3/13/2012	MS-12	31.09	23.11	812.55	Normal	None	C	N/A	1.30	4.50	NO	15.45	24	5.0	4.5	N/A	N/A
3/13/2012	MS-13	41.52	29.49	812.41	Normal	None	C	N/A	1.96	10.00	NO	15.36	98	5.3	2.4	N/A	N/A
3/13/2012	MS-14	44.38	36.61	807.46	Normal	None	C	N/A	1.27	4.50	NO	16.24	50	5.8	4.9	N/A	N/A
3/13/2012	MS-15	63.08	52.19	809.28	Normal	None	C	N/A	1.78	6.00	NO	16.61	149	6.8	5.7	N/A	N/A
3/13/2012	MS-16	37.46	25.11	811.87	Normal	None	C	N/A	2.01	3.00	YES	17.26	114	5.8	22.1	N/A	N/A
3/13/2012	SW-1	N/A	N/A	N/A	Normal	None	NP	N/A	N/A	N/A	N/A	14.43	34	5.2	13.0	N/A	N/A

Notes:

1. Purge Methods; LF=Low Flow, C=Conventional Purge (3-5 well volumes), NP=No Purge (HydraSleeve).
2. Field sampling performed by Duke Energy Carolinas, LLC personnel.
3. umho/cm indicates micromhos per centimeter.
4. SU indicates Standard Units.
5. NTU indicates Nephelometric Turbidity Units.
6. mV-NHE indicates millivolts-Normal Hydrogen Electrode.
7. Information provided by Tim Hunsucker of Duke Energy Carolinas, LLC on April 3, 2012.

Table 2–Field and Analytical Results
Duke Energy Carolinas, LLC/Marshall Steam Station
FGD Residue Landfill, Phase 1, Cell 1–Permit No. 1809

Sample Date: March 13, 2012

Laboratory Certificate Codes:
Duke Energy Carolinas Field #5193
Duke Energy Analytical Laboratory #248
Pace Analytical Services, Inc. #40

Field Sampling performed by Duke Energy Carolinas, LLC

Parameter	SWS ID	Units	Certificate Code	Monitoring Wells 1809 MS-8		1809 MS-9		1809 MS-10		1809 MS-11		1809 MS-12		SWSL	15A NCAC 2L
Field pH	320	SU	5193	**6.1**		**6.4**		**5.0**		**5.4**		**5.0**		-	6.5-8.5
Field Specific Conductance	323	umho/cm	5193	47		98		25		41		24		-	-
Temperature	325	°C	5193	15.63		15.49		15.61		15.07		15.45		-	-
Top of Casing	328	feet	-	872.34		868.04		851.29		859.78		835.66		-	-
Depth to Water	318	feet	-	45.79		43.29		17.21		33.90		23.11		-	-
Water Elevation	319	feet	-	826.55		824.75		834.08		825.88		812.55		-	-
Well Depth	411	feet	-	51.58		53.00		23.34		42.72		31.09		-	-
Arsenic	14	µg/L	248	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	10	10
Barium	15	µg/L	248	35.1	*J*	35.7	*J*	136		59.5	*J*	69.3	*J*	100	700
Boron	428	µg/L	248	33.4	U	33.4	U	33.4	U	33.4	U	33.4	U	NE	700
Cadmium	34	µg/L	248	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	1	2
Chloride	301	µg/L	248	1,135		1,086		1,351		2,702		2,968		NE	250,000
Chromium	51	µg/L	248	3.87	*J*	2	*J*	0.667	U	2.27	*J*	0.667	U	10	10
Copper	54	µg/L	248	3.34	U	3.34	U	3.34	U	3.34	U	3.34	U	10	1,000
Fluoride	312	µg/L	248	175	*J*	160	*J*	94.2	J	92.2	J	64	J	2,000	2,000
Iron	340	µg/L	248	294	*J*	23.4	*J*	96.9	*J*	122	*J*	26.6	*J*	300	300
Lead	131	µg/L	248	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	10	15
Manganese	342	µg/L	248	7.54	*J*	4.6	J	30	*J*	7.23	*J*	15	*J*	50	50
Mercury	132	µg/L	248	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.2	1
Nickel	152	µg/L	248	3.34	U	3.34	U	3.34	U	3.34	U	3.34	U	50	100
Nitrate as Nitrogen	303	µg/L	248	58.3	*J*	245	*J*	835	*J*	5.4	U	48.6	*J*	10,000	10,000
Selenium	183	µg/L	248	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	10	20
Silver	184	µg/L	248	3.34	U	3.34	U	3.34	U	3.34	U	3.34	U	10	20
Sulfate	315	µg/L	248	199	*J*	377	*J*	25.3	J	144	*J*	82.4	J	250,000	250,000
Total Dissolved Solids	311	µg/L	40	83,000		75,000		27,000		30,000		103,000		NE	500,000
Zinc	213	µg/L	248	3.34	U	3.34	U	7.48	*J*	3.34	U	3.75	J	10	1,000

Notes:

1. Concentrations presented in micrograms per liter (µg/L).
2. SWS ID is the Solid Waste Section Identification Number.
3. SWSL is the Solid Waste Section Limit. This limit (identified by DENR) is the lowest amount of analyte in a sample that can be quantitatively determined with suitable precision and accuracy.
4. 15A NCAC 2L standard is from "North Carolina Administrative Code, Title 15A: Department of Environment and Natural Resources, Subchapter 2L - Groundwater Classifications and Standards," DENR (last amended on January 1, 2010).
5. Grayed values indicate values that attain or exceed the SWSL standard.
6. Bold values indicate values that attain or exceed the 15A NCAC 2L standard.
7. NE means Not Established. Blank cells indicate that there is no information relevant to the respective row.
8. Qualifiers in non-italicized text are laboratory data qualifiers or "flags". "U" is used for parameters not detected at concentrations above the method detection limit (MDL). "J" is used for parameters detected at estimated concentrations above the MDL but below the laboratory's method reporting limit (MRL). An italicized *J*-flag is a data qualifier, added by Altamont, to indicate a detected concentration that is greater than the laboratory's MRL but less than the SWSL.
9. Data obtained from Electronic Data Deliverable (EDD) provided by Tim Hunsucker of Duke Energy Carolinas, LLC on April 3, 2012.
10. According to the Constituent Look-up webpage on the DENR Division of Waste Management webpage, there is no SWSL or 2L standard for choride associated with CAS number 16887-00-6, which is the CAS reported by the laboratory for the analyses completed. Therefore, the SWSL and 2L listed are for the chloride with CAS number SW301 as specified on the Constituent Look-up webpage (last updated June 13, 2011).

Table 2–Field and Analytical Results
Duke Energy Carolinas, LLC/Marshall Steam Station
FGD Residue Landfill, Phase 1, Cell 1–Permit No. 1809

Sample Date: March 13, 2012

Laboratory Certificate Codes:
Duke Energy Carolinas Field #5193
Duke Energy Analytical Laboratory #248
Pace Analytical Services, Inc. #40

Field Sampling performed by Duke Energy Carolinas, LLC

Parameter	SWS ID	Units	Certificate Code	Monitoring Wells 1809 MS-13		1809 MS-14		1809 MS-15		1809 MS-16		1809 SW-1		1809 Field Blank		SWSL	15A NCAC 2L
Field pH	320	SU	5193	**5.3**		**5.8**		6.8		**5.8**		**5.2**		-		-	6.5-8.5
Field Specific Conductance	323	umho/cm	5193	98		50		149		114		34		-		-	-
Temperature	325	°C	5193	15.36		16.24		16.61		17.26		14.43		-		-	-
Top of Casing	328	feet	-	841.90		844.07		861.47		836.98		-		-		-	-
Depth to Water	318	feet	-	29.49		36.61		52.19		25.11		-		-		-	-
Water Elevation	319	feet	-	812.41		807.46		809.28		811.87		-		-		-	-
Well Depth	411	feet	-	41.52		44.38		63.08		37.46		-		-		-	-
Arsenic	14	µg/L	248	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	10	10
Barium	15	µg/L	248	94.5	*J*	36.8	*J*	72.8	*J*	97.9	*J*	54.8	*J*	3.34	U	100	700
Boron	428	µg/L	248	33.4	U	33.4	U	33.4	U	33.4	U	33.4	U	33.4	U	NE	700
Cadmium	34	µg/L	248	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	1	2
Chloride	301	µg/L	248	3,651		860		2,161		1,582		3,365		22	U	NE	250,000
Chromium	51	µg/L	248	0.667	U	0.667	U	**21.5**		2.19	*J*	0.667	U	0.667	U	10	10
Copper	54	µg/L	248	3.34	U	3.34	U	3.34	U	3.34	U	3.34	U	3.34	U	10	1,000
Fluoride	312	µg/L	248	147	*J*	157	*J*	135	*J*	233	*J*	79.1	J	33.6	J	2,000	2,000
Iron	340	µg/L	248	32.3	*J*	70	*J*	46.3	*J*	**1,107**		**334**		6.67	U	300	300
Lead	131	µg/L	248	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	10	15
Manganese	342	µg/L	248	10.5	*J*	3.34	U	3.34	U	23.1	*J*	**68**		3.34	U	50	50
Mercury	132	µg/L	248	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.2	1
Nickel	152	µg/L	248	3.34	U	3.34	U	3.34	U	3.34	U	3.34	U	3.34	U	50	100
Nitrate as Nitrogen	303	µg/L	248	2,676	*J*	5.4	U	394	*J*	313	*J*	83.7	*J*	5.4	U	10,000	10,000
Selenium	183	µg/L	248	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	0.667	U	10	20
Silver	184	µg/L	248	3.34	U	3.34	U	3.34	U	3.34	U	3.34	U	3.34	U	10	20
Sulfate	315	µg/L	248	507	*J*	36.4	J	1,134	*J*	380	*J*	3,705	*J*	18	U	250,000	250,000
Total Dissolved Solids	311	µg/L	40	48,000		166,000		220,000		64,000		25,000	U	-		NE	500,000
Zinc	213	µg/L	248	3.34	U	3.34	U	3.34	U	7.57	*J*	3.34	U	3.34	U	10	1,000

Notes:

1. Concentrations presented in micrograms per liter (µg/L).
2. SWS ID is the Solid Waste Section Identification Number.
3. SWSL is the Solid Waste Section Limit. This limit (identified by DENR) is the lowest amount of analyte in a sample that can be quantitatively determined with suitable precision and accuracy.
4. 15A NCAC 2L standard is from "North Carolina Administrative Code, Title 15A: Department of Environment and Natural Resources, Subchapter 2L - Groundwater Classifications and Standards," DENR (last amended on January 1, 2010).
5. Grayed values indicate values that attain or exceed the SWSL standard.
6. Bold values indicate values that attain or exceed the 15A NCAC 2L standard.
7. NE means Not Established. Blank cells indicate that there is no information relevant to the respective row.
8. Qualifiers in non-italicized text are laboratory data qualifiers or "flags". "U" is used for parameters not detected at concentrations above the method detection limit (MDL). "J" is used for parameters detected at estimated concentrations above the MDL but below the laboratory's method reporting limit (MRL). An italicized *J*-flag is a data qualifier, added by Altamont, to indicate a detected concentration that is greater than the laboratory's MRL but less than the SWSL.
9. Data obtained from Electronic Data Deliverable (EDD) provided by Tim Hunsucker of Duke Energy Carolinas, LLC on April 3, 2012.
10. According to the Constituent Look-up webpage on the DENR Division of Waste Management webpage, there is no SWSL or 2L standard for choride associated with CAS number 16887-00-6, which is the CAS reported by the laboratory for the analyses completed. Therefore, the SWSL and 2L listed are for the chloride with CAS number SW301 as specified on the Constituent Look-up webpage (last updated June 13, 2011).

Table 3–North Carolina Administrative Code (NCAC) 2L Groundwater Quality Exceedances
Duke Energy Carolinas, LLC/Marshall Steam Station
FGD Residue Landfill, Phase 1, Cell 1 - Permit No. 1809

Sample Date: March 13, 2012

Parameter	Well ID	Result	Units	15A NCAC 2L Standard	Historic Concentrations	Cause and Significance
pH	MS-8	6.1	SU	6.5-8.5	5.2 - 6.3	pH consistent with historic readings at well.
	MS-9	6.4	SU		6.5 - 10.3	pH lowest since sampling began.
	MS-10	5.0	SU		4.5 - 5.3	pH consistent with historic readings at well.
	MS-11	5.4	SU		5.1 - 5.5	pH consistent with historic readings at well.
	MS-12	5.0	SU		4.5 - 5.1	pH consistent with historic readings at well.
	MS-13	5.3	SU		4.9 - 5.4	pH consistent with historic readings at well.
	MS-14	5.8	SU		5.5 - 6.2	pH consistent with historic readings at well.
	MS-16	5.8	SU		5.9 - 6.4	pH lowest since sampling began.
	SW-1	5.2	SU		5.1 - 6.1	pH consistent with historic readings at well.
Chromium	MS-15	21.5	µg/L	10	11.5 - 20.5	March 2012 chromium concentration consistent with concentration of groundwater sample collected from MS-15 prior to waste placement of 19.3 µg/L. Concentration of chromium in MS-15 likely reflective of background concentration.
Iron	MS-16	1,107	µg/L	300	359- 57,572	Iron concentration consistent with historic readings at well.
	SW-1	334	µg/L		624 - 3,816	Iron concentration in surface water sampling location lowest since sampling began.
Manganese	SW-1	68.0	µg/L	50	22.1 - 447	Manganese concentration consistent with historic readings at well.

Notes:
1. Concentrations presented in micrograms per liter (µg/L).
2. 15A NCAC 2L standard is from "North Carolina Administrative Code, Title 15A: Department of Environment and Natural Resources, Subchapter 2L - Groundwater Classifications and Standards," DENR (last amended on January 1, 2010).
3. Data obtained from Electronic Data Deliverable (EDD) provided by Tim Hunsucker of Duke Energy Carolinas, LLC on April 3, 2012.
4. Historic concentrations based on data in Duke Energy Carolins, LLC analytical results database.

APPENDIX A
Chain-of-Custody Forms

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Duke Energy℠

For Detailed Instructions, see:
http://dewww/essenv/coc/

Duke Energy Analytical Lab Services
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-5038

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DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

Rev 11/5/11

Analytical Laboratory Use Only

LIMS # J12030008 | MATRIX: GW-RCRA | Samples Originating From: NC √ SC ___

Logged By: cpk | Date & Time: 3-14-12 0748

SAMPLE PROGRAM: Ground Water √ | NPDES ___ | Drinking Water ___ | UST ___ | RCRA Waste ___

Cooler Temp (C): <1

PACE
PO #146146

Customer must Complete

1)Project Name: MARSHALL FGD LANDFILL, Permit # 18-09
2)Phone No: 875-5257
3)Client: LDC / TSH / Ed Sullivan
4)Fax No:875-4349
5)Business Unit: 20035
6)Process: BENVWS
7)Resp. To: MS00
8)Project ID:
9)Activity ID:
10)Mail Code: MGO3A3

MR #

Customer to complete all appropriate NON-SHADED areas.

[15]Preserv.: 1=HCL 2=H_2SO_4 3=HNO_3 4=Ice 5=None

Customer to complete appropriate columns to right

LAB USE ONLY [11]Lab ID	[12]Chem Desktop No.	[13]Sample Description or ID	[14]Collection Information Date	Time	Signature	[17]Comp.	[18]Grab	Alk (4.5)	NO3-N, Cl, F, SO4 (IC)	Hg (EPA 245.1)	Metals Prep - 3030C (ICP - EPA 200.7) Ag, B, Ba, Ca, Cu, Fe, K, Mg, Mn, Na, Ni, Zn	(IMS - EPA 200.8) As, Cd, Cr, Pb, Se			TDS		[20]Total # of Containers
							[16]Analyses Required	4	3		3				4		
2012004912		MS-8	3/13/12	0930	VC		X	1	1		1				1		4
2012004913		MS-9	3/13/12	0755	VC		X	1	1		1				1		4
2012004914		MS-10	3/13/12	1045	VC		X	1	1		1				1		4
2012004915		MS-11	3/13/12	1650	VC		X	1	1		1				1		4
2012004916		MS-12	3/13/12	1555	VC		X	1	1		1				1		4
2012004917		MS-13	3/13/12	1510	VC		X	1	1		1				1		4
2012004918		MS-14	3/13/12	1250	VC		X	1	1		1				1		4
2012004919		MS-15	3/13/12	1155	VC		X	1	1		1				1		4
2012004920		MS-16	3/13/12	1355	VC		X	1	1		1				1		4
2012004921		SW-1	3/13/12	1750	VC		X	1	1		1				1		4
2012004922		FIELD BLANK	3/13/12	1850	VC		X	1	1		1				10		3

Pace

Customer to sign & date below

	Date/Time		Date/Time
21)Relinquished By: Ed Sull	3/14/12 0400	Accepted By: Cindy Knox	3-14-12 0730
Relinquished By: Cindy Knox	3-14-12 1310	Accepted By: [signature] Pace	3-14-12 13:10
Relinquished By:		Accepted By:	
23)Seal/Locked By		Sealed/Lock Opened By	

Pa

24)Comments: Regulatory Agency : NCDENR/DWM -SW Section - State EDD Format Required / Permit # 18-09
Use indicated or comparible analytical methods

Customer, important please indicate desired turnaround

[22]Requested Turnaround
14 Days √
*7 Days
~~48 Hr~~ 3-21-12
*Other
* Add. Cost Will Apply