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NC DENR

Environmental Monitoring Reporting Form

Division of Waste Management - Solid Waste

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: amoores@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 McGuire Nuclear Station Landfill #2	13339 Hagers Ferry Road Huntersville, NC 28078	60-04	.0500	June 20, 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 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.

Stuart A. Ryman

P.G.

(828) 281-3350

Facility Representative Name (Print)

Title

(Area Code) Telephone Number

Signature

Date

231 Haywood Street Asheville, NC 28801

Facility Representative Address

C-2185

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

Revised 6/2009



ALTAMONT ENVIRONMENTAL, INC.

ENGINEERING & HYDROGEOLOGY



**Semiannual Groundwater
Monitoring Report**

McGuire Nuclear Station

Landfill #2, Permit #60-04

June 2011 Sampling Event

September 12, 2011

Prepared for
Duke Energy Carolinas
13339 Hagers Ferry Road
Huntersville, NC 28078
Project Number 2369.09

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.

A handwritten signature in black ink, appearing to read 'SAR', is written over a horizontal line. The signature is stylized and cursive.

Stuart A. Ryman, P.G.

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1.0 Background

The McGuire Nuclear Station Landfill #2 is located at the Duke Energy Carolinas (Duke) McGuire Nuclear Station, in Mecklenburg County, NC. The landfill is permitted to accept waste that is specified by the Permit to Operate. The landfill was constructed with a high-density polyethylene (HDPE) synthetic liner and with a leachate collection and removal system. Leachate and contact stormwater are collected in a lined leachate collection basin and pumped to the McGuire Nuclear Station wastewater treatment system. The landfill is permitted under the North Carolina Department of Environment and Natural Resources (DENR) Solid Waste Permit #60-04.

The landfill and nearby area are portrayed on Figures 1 and 2. The landfill is located south of North Carolina Highway 73, north of Cashion Road, and to the west of Linderman Road. Cashion Road runs along a surface water divide, with surface flow draining to the northwest and to the southeast. A surface water drainage feature is located to the northeast of the landfill. This feature drains to the northwest, to a perennial, unnamed stream. Surface water sample location SW-1 is located in this unnamed stream, north of the landfill. The unnamed stream drains to the west, to the Catawba River. Surface water sample location SW-2 is located in this unnamed stream, west of the landfill. A second surface water drainage feature is located to the southwest of the landfill, draining to the northwest into the unnamed stream. There are no surface water monitoring locations in the drainage southwest of the landfill.

The monitoring system at the landfill consists of eleven groundwater monitoring wells and two surface water sample locations as listed below.

Monitoring Wells:	MW-5	MW-5A
	MW-6	MW-6A
	MW-7	MW-7A
	MW-8	MW-8A
	MW-9	MW-9A
	MW-10A	
Surface Water		
Sample Locations:	SW-1	SW-2

In addition, a water sample is collected from a leachate pipe which conveys leachate from the landfill to the leachate collection basin. The locations of the wells, the surface water sample locations, and the leachate collection basin are shown on Figure 2.

With the exception of well MW-10A, the wells are installed as well pairs with one shallow well and one deeper well adjacent to one another. The well with the "A" designation is the deepest of the pair of wells. Well pair MW-9 and MW-9A are installed adjacent to and downgradient from the Leachate Collection Basin. The remaining wells are installed adjacent to the landfill.

According to the *McGuire Nuclear Station Landfill #2, Permit Number 60-04 Groundwater Monitoring Program Sampling and Analysis Plan, February 24, 2009 (SAP)*, monitoring wells MW-5 and MW-5A are the upgradient wells, and are considered the background wells for the site.

2.0 Methods

2.1 Sampling and Analysis Methods

Groundwater sampling, surface water sampling, and documentation of sampling were performed by Duke personnel following the procedures outlined in the SAP. The groundwater and surface water samples were analyzed by Pace Analytical Services, Inc. Charlotte (North Carolina Laboratory Certification #12) and the Duke Energy Analytical Laboratory (North Carolina Laboratory Certification #248).

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

- Appendix I volatile organic compounds (VOC's) using United States Environmental Protection Agency (EPA) Method 8260
- Metals using EPA Methods 200.8 and 200.7
- Mercury using EPA Method 7470
- Diesel components using EPA Method 8015 Modified
- Chloride and sulfate using EPA Method 300.0

2.2 Statement of Work

Altamont Environmental Inc. (Altamont) completed the following tasks:

- Received field sampling information provided by Duke (performed by Duke personnel) for monitoring wells MW-5, MW-5A, MW-6, MW-6A, MW-7A, MW-8, MW-8A, MW-9, MW-9A, and MW-10A. No sample was collected from MW-7 due to insufficient volume. Data were also received for surface water sample locations SW-1 and SW-2, as well as for a leachate sample collected at the outfall of the pipe conveying leachate from the landfill to the Leachate Collection Basin. The samples were collected on June 20, 2011 and Altamont received the data on July 19, 2011.
- Reviewed the laboratory analytical results for samples. The Electronic Data Deliverable (EDD), provided by Duke, was adapted to conform to the format requirements of the DENR EDD template. Altamont added an italicized J data qualifier (*J*) to indicate a detected concentration that is greater than the laboratory's method reporting limit (MRL), but lower than the Solid Waste Section Limit (SWSL). A copy of the original EDD is retained in Altamont's files.
- Developed a groundwater surface contour map using map data and groundwater elevation data supplied by Duke.
- Prepared and submitted this Semiannual Groundwater Monitoring Report 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 the groundwater elevations measured on June 20, 2011.

Cashion Road is located along a surface water divide at elevations ranging from approximately 748 feet to 740 feet. The unnamed stream where surface water sample locations SW-1 and SW-2 are located ranges in elevation from approximately 691 feet near SW-1 to approximately 650 feet near SW-2.

Groundwater flow beneath the landfill is generally from the southeast end of the landfill toward the northwest and the surface water drainage features described above. Groundwater flow on the east side of the landfill is towards the northeast of MW-6, MW-6A, and MW-10A, based on the surface water drainage feature located northeast of the wells.

3.2 Analytical Results

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

The results of the laboratory analyses are summarized in Table 2. Results below the heavy black line in Table 2 are EPA Method 8260 constituents detected above the method detection limit (MDL) in at least one well. EPA Method 8260 constituents not listed were not detected above the MDL.

The results of the radiological analyses are presented in Table 3.

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

Results from the monitoring wells met the corresponding Title 15A, North Carolina Administrative Code (NCAC) Subchapter 2L standards (2L standards), with the exceptions noted below:

- pH values below 6.5 were measured in wells MW-5, MW-5A, MW-6, MW-6A, MW-7A, MW-8, MW-9, MW-9A, and MW-10A. The measured pH values below 6.5 ranged from 5.0 (Standard Units) in MW-5, which is the background well for the site, to 6.4 in MW-7A and MW-8. The pH values measured at these locations are consistent with historic readings at the site.

For several constituents the laboratory MDL was higher than the corresponding 2L standard. This was the case for 1,1,2,2-Tetrachloroethane, 1,2,3-Trichloropropane, 1,2-Dibromoethane (EDB), and vinyl chloride. In addition, the laboratory MDL for silver was higher than the corresponding 2B standard.

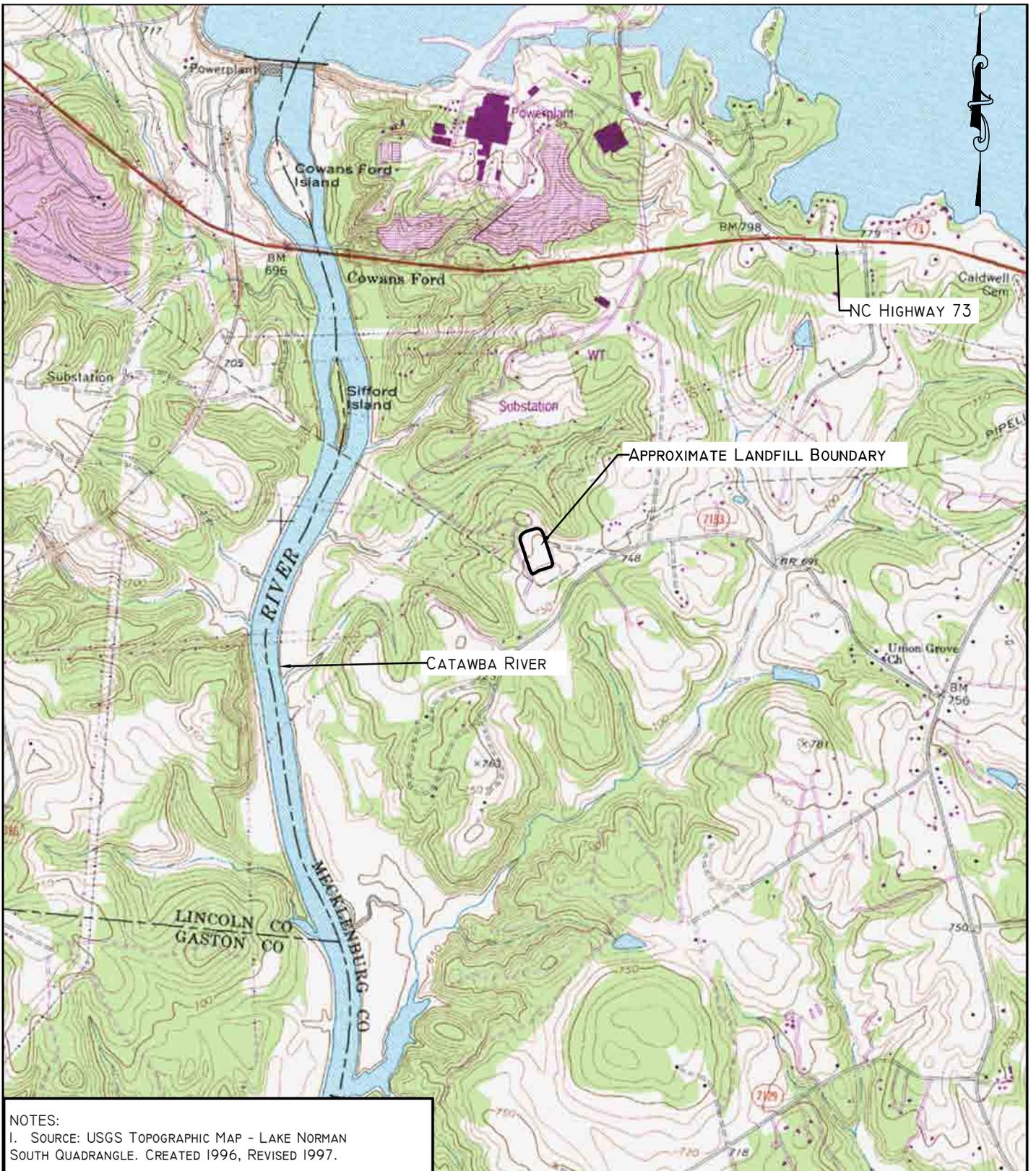
No volatile organic compounds (VOCs) or other constituents were detected in the monitoring wells or surface water sample locations equal to or above the NCAC 2L or 2B standards.

No volatile organic compounds (VOCs) or other constituents were detected in the monitoring wells or surface water sample locations equal to or above the SWSL standards.

Total petroleum hydrocarbon-diesel range organics (TPH-DRO) compounds were detected above the MDL but below the MRL in monitoring wells MW-5A, MW-6, MW-6A, MW-7A, MW-8, MW-8A, MW-9, MW-9A, MW-10A, SW-1, SW-2, and the field blank at concentrations ranging from 220 micrograms per liter ($\mu\text{g/L}$) in MW-8 and MW-9 to 410 $\mu\text{g/L}$ in SW-1. TPH-DRO compounds were detected above the MRL in MW-5 (0.67 $\mu\text{g/L}$) and the Leachate Pond (5 $\mu\text{g/L}$). No SWSL or 2L standards are established for TPH-DRO compounds.

Table 3 presents the results of analysis for radiological constituents. These results were provided by Duke. A copy of this report is submitted to the DENR Radiation Protection Section for reference.

FIGURES



NOTES:

1. SOURCE: USGS TOPOGRAPHIC MAP - LAKE NORMAN SOUTH QUADRANGLE. CREATED 1996, REVISED 1997.

ALTAMONT ENVIRONMENTAL, INC.

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DRAWN BY: ANDREW MOORE
 PROJECT MANAGER: WILLIAM M. MILLER
 CLIENT: DUKE ENERGY CAROLINAS
 DATE: 02/16/2011

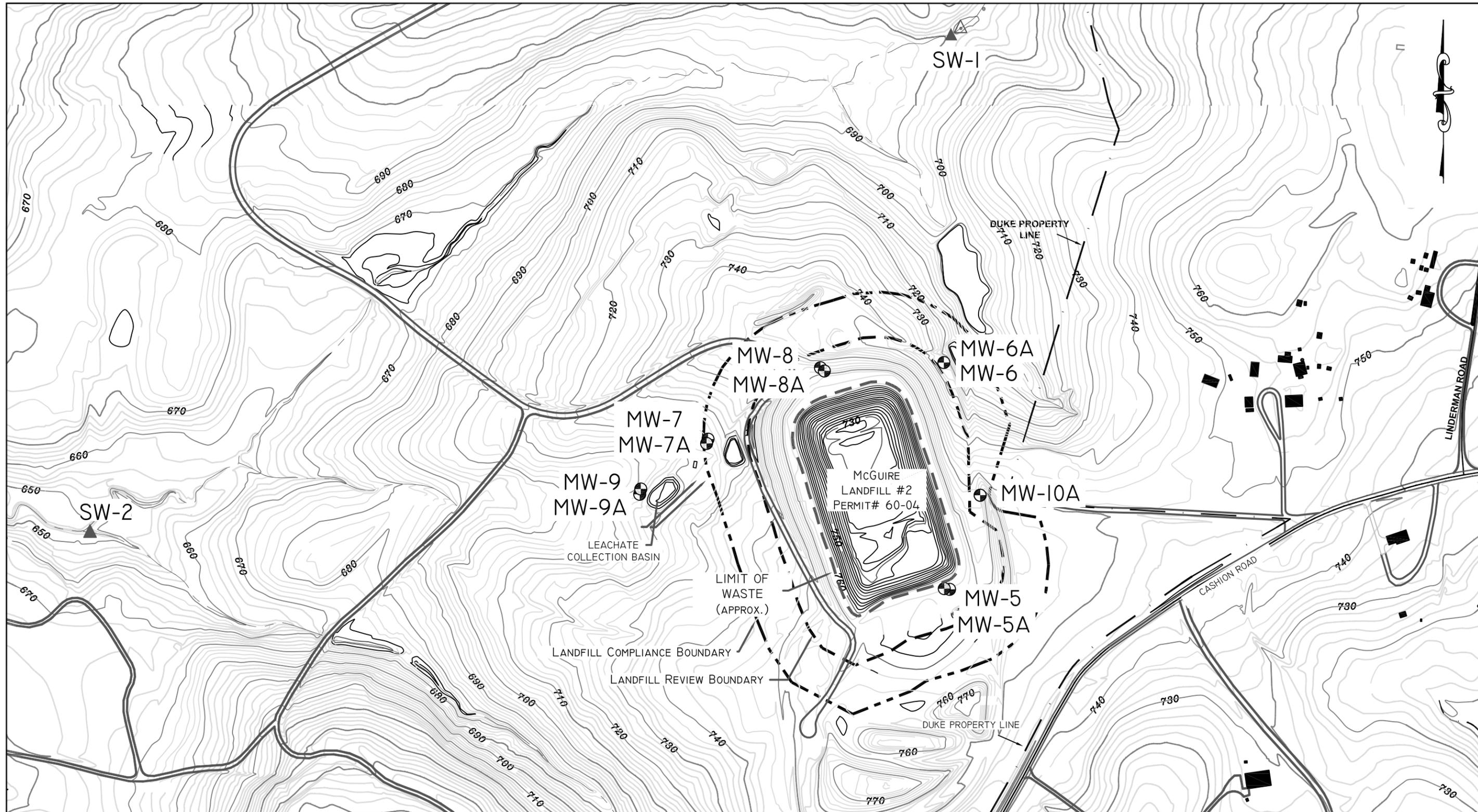


SITE LOCATION MAP

McGUIRE NUCLEAR STATION
 LANDFILL #2 PERMIT # 60-04

FIGURE

1



BASE MAP PROVIDED BY DUKE ENERGY CAROLINAS

Legend

	Groundwater Monitoring Well
	Surface Water Sample Location
	Landfill Review Boundary
	Landfill Compliance Boundary
	Approximate Limit of Waste

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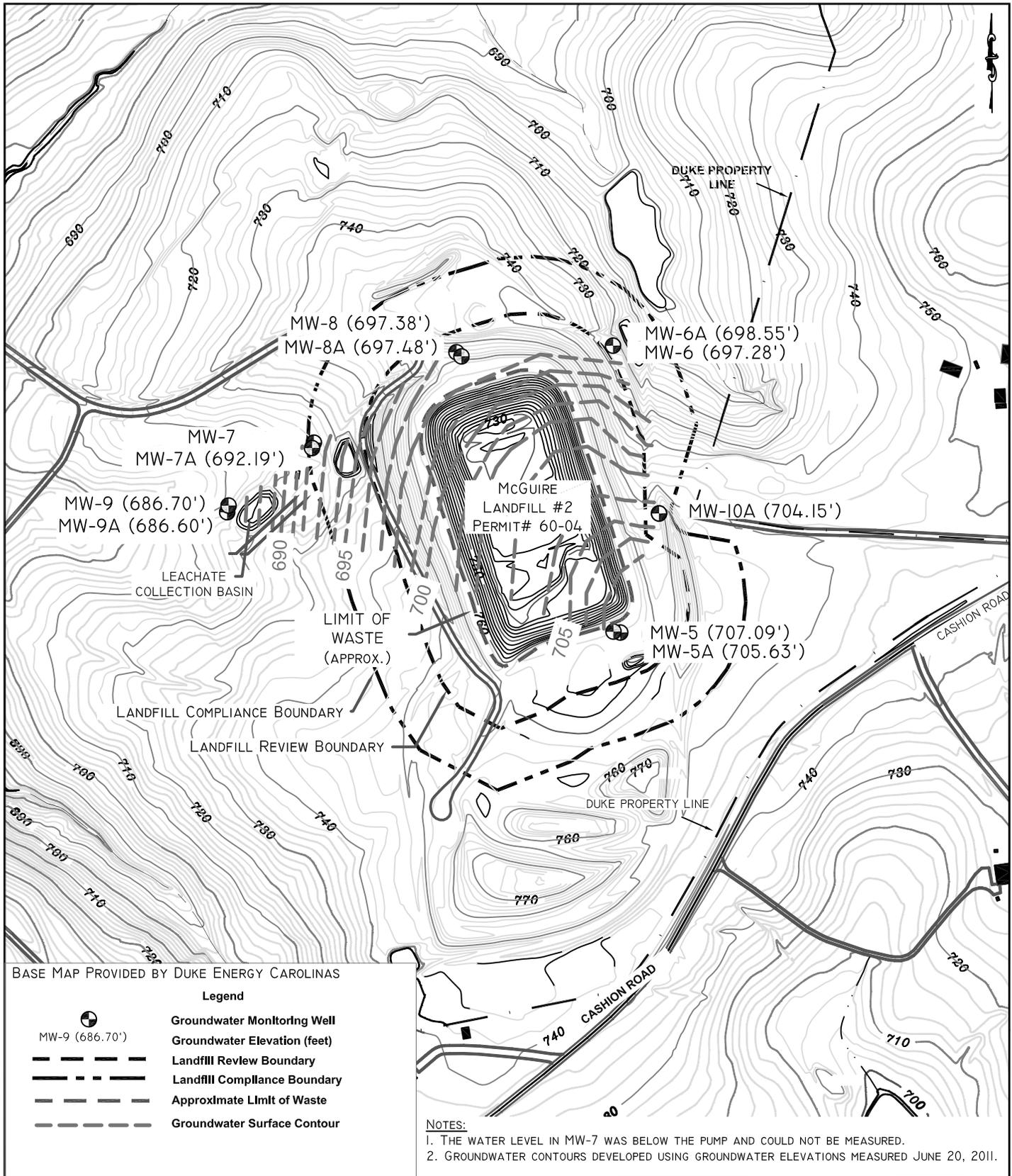
DRAWN BY: ANDREW MOORE
 PROJECT MANAGER: WILLIAM M. MILLER
 CLIENT: DUKE ENERGY CAROLINAS
 DATE: 8/5/11

SCALE (FEET)
 150 0 150 300

SAMPLE LOCATIONS

MCGUIRE NUCLEAR STATION
 LANDFILL #2 PERMIT #60-04

FIGURE
2



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GENERALIZED
 GROUNDWATER
 SURFACE CONTOURS
 JUNE 2011

McGUIRE LANDFILL #2
 PERMIT #60-04

FIGURE

3

DRAWN BY: ANDREW MOORE
 PROJECT MANAGER: WILLIAM M. MILLER
 CLIENT: DUKE ENERGY CAROLINAS
 DATE: 8/5/11



TABLES

Table 1 - Field Data Parameters
Duke Energy McGuire Nuclear Station
Landfill #2 - Permit # 60-04
Groundwater Monitoring Report

DATE	WELL No.	WELL DEPTH (feet)	DEPTH TO WATER (feet)	WATER ELEV. (feet)	DEPTH TO PRODUCT (feet)	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)
6/20/2011	MW-5	63.90	61.22	707.09	N/A	N/A	CP	N/A	0.44	0.75	YES	18.5	15	5.0	8.2	N/A	N/A
6/20/2011	MW-5A	96.00	62.79	705.63	N/A	N/A	CP	N/A	5.42	16.50	NO	16.9	54	6.1	2.2	N/A	N/A
6/20/2011	MW-6	37.20	31.17	697.28	N/A	N/A	CP	N/A	0.98	5.00	NO	16.5	116	5.7	0.8	N/A	N/A
6/20/2011	MW-6A	47.90	30.43	698.55	N/A	N/A	CP	N/A	2.85	9.00	NO	17.1	59	5.3	2.0	N/A	N/A
6/20/2011	MW-7	37.30	NM	NM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6/20/2011	MW-7A	59.40	32.47	692.19	N/A	N/A	CP	N/A	4.39	13.50	NO	17.4	108	6.4	2.1	N/A	N/A
6/20/2011	MW-8	71.50	62.22	697.38	N/A	N/A	CP	N/A	1.51	1.00	YES	17.7	141	6.4	7.5	N/A	N/A
6/20/2011	MW-8A	84.40	62.20	697.48	N/A	N/A	CP	N/A	3.62	11.25	NO	17.0	96	6.7	0.7	N/A	N/A
6/20/2011	MW-9	30.80	25.17	686.70	N/A	N/A	CP	N/A	0.92	3.00	NO	18.3	64	5.5	3.3	N/A	N/A
6/20/2011	MW-9A	47.80	25.53	686.60	N/A	N/A	CP	N/A	3.63	11.25	NO	18.6	103	6.3	1.2	N/A	N/A
6/20/2011	MW-10A	59.23	51.63	704.15	N/A	N/A	CP	N/A	1.24	3.75	NO	17.6	24	5.4	1.5	N/A	N/A
6/20/2011	SW-1	N/A	N/A	N/A	N/A	N/A	NP	N/A	N/A	N/A	N/A	22.0	133	6.7	64.2	N/A	N/A
6/20/2011	SW-2	N/A	N/A	N/A	N/A	N/A	NP	N/A	N/A	N/A	N/A	20.0	123	7.2	13.6	N/A	N/A
6/20/2011	LEACHATE POND	N/A	N/A	N/A	N/A	N/A	NP	N/A	N/A	N/A	N/A	20.4	1230	7.5	8.1	N/A	N/A

Notes:

1. Purge Methods; LF=Low Flow, CP=Conventional Purge (3-5 well volumes), BP=No Purge (HydraSleeve).
2. Field sampling performed by Duke Energy personnel.
3. Water level in MW-7 was below the pump and could not be measured. NM indicates not measured.
4. umho/cm indicates micro ohms per centimeter.
5. SU indicates Standard Units.
6. NTU indicates Nephelometric Turbidity Units.
7. mV-NHE indicates millivolts-Normal Hydrogen Electrode.
8. Information provided by Tim Hunsucker of Duke Energy Carolinas on July 19, 2011.

**Table 2 - Field and Analytical Results
Duke Energy McGuire Nuclear Station
Landfill #2 - Permit #60-04
Groundwater Monitoring Report**

Sample Date: June 20, 2011 Laboratory Certificate Codes:
Duke Energy Carolinas Field #5193
Duke Energy Analytical Laboratory #248
Pace Analytical Services, Inc. #12
Field Sampling performed by Duke Energy Carolinas

Parameter	SWS ID	Units	Certificate Code	Monitoring Wells								SWSL	15A NCAC 2L
				6004-MW-5	6004-MW-5A	6004-MW-6	6004-MW-6A	6004-MW-7	6004-MW-7A	6004-MW-8			
Field pH	320	SU	5193	5.0	6.1	5.7	5.3	NM	6.4	6.4		6.5-8.5	
Field Specific Conductivity	323	umho/cm	5193	15	54	116	59	NM	108	141			
Temperature	325	°C	5193	18.5	16.9	16.5	17.1	NM	17.4	17.7			
Top Casing	328	feet		768.31	768.42	728.45	728.98	725.86	724.66	759.6			
Depth to Water	318	feet		61.22	62.79	31.17	30.43	NM	32.47	62.22			
Water Elevation	427	feet		707.09	705.63	697.28	698.55	NM	692.19	697.38			
Well Depth	411	feet		63.90	96.00	37.20	47.90	37.30	59.40	71.5			
Arsenic	14	µg/L	248	0.67 U	0.67 U	0.67 U	0.67 U	NS	0.67 U	0.67 U	10	10	
Barium	15	µg/L	248	12.15 J	23.98 J	50.67 J	51.27 J	NS	3.49 J	23.13 J	100	700	
Cadmium	34	µg/L	248	0.67 U	0.67 U	0.67 U	0.67 U	NS	0.67 U	0.67 U	1	2	
Chloride	455	µg/L	248	1,106	1,244	11,680	6,526	NS	1,167	1,518	NE	250,000	
Chromium	51	µg/L	248	3.34 U	3.34 U	3.34 U	3.34 U	NS	3.34 U	3.34 U	10	10	
Lead	131	µg/L	248	0.67 U	0.67 U	0.67 U	0.67 U	NS	0.67 U	0.67 U	10	15	
Mercury	132	µg/L	248	0.03 U	0.03 U	0.03 U	0.03 U	NS	0.03 U	0.03 U	0.2	1	
Selenium	183	µg/L	248	0.67 U	0.67 U	0.67 U	0.67 U	NS	0.67 U	0.67 U	10	20	
Silver	184	µg/L	248	3.34 U	3.34 U	3.34 U	3.34 U	NS	3.34 U	3.34 U	10	20	
Sulfate	315	µg/L	248	738 J	2,489 J	392 J	61 J	NS	323 J	752 J	250,000	250,000	
TPH(DRO)	NE	µg/L	12	670	250 J	280 J	240 J	NS	260 J	220 J	NE	NE	
Gross Alpha	314	pCi/L	248	<0.0780	<0.22	<0.20	<0.30	NS	<0.72	<0.55	NE	15	
Gross Beta	NE	pCi/L	248	<0.430	<0.29	<0.14	<0.41	NS	<0.59	<0.083	NE	NE	
H3GW (Tritium)	NE	pCi/L	248	<25	<6.9	<32.3	<35	NS	<48.1	<8.02	NE	NE	
Acetone	3	µg/L	12	2.2 U	3 J	2.2 U	2.2 U	NS	2.2 U	3.3 J	100	6,000	
Chloromethane	137	µg/L	12	0.17 J	0.3 J	0.37 J	0.24 J	NS	0.11 U	0.53 J	1	3	
Ethylbenzene	110	µg/L	12	0.69 J	0.3 U	0.3 U	0.3 U	NS	0.3 U	0.3 U	1	600	
Iodomethane	142	µg/L	12	0.32 U	0.53 J	0.32 U	0.32 U	NS	0.32 U	0.32 U	10	NE	
m&p-Xylene	359	µg/L	12	2.8	0.66 U	0.66 U	0.66 U	NS	0.66 U	0.66 U	NE	500*	
o-Xylene	408	µg/L	12	1.5	0.23 U	0.23 U	0.23 U	NS	0.23 U	0.23 U	NE	500*	
Toluene	196	µg/L	12	1.9	0.26 U	0.26 U	0.26 U	NS	0.26 U	0.26 U	1	600	
Xylenes-Total	346	µg/L	12	4.3 J	0.66 U	0.66 U	0.66 U	NS	0.66 U	0.66 U	5	500	

Notes:

- Concentrations presented in micrograms per liter (µg/L) or picroCuries per liter (pCi/L).
- "SWS ID" is the Solid Waste Section Identification Number.
- "SWSL" is the Solid Waste Section Limit. DENR defines the SWSL as the lowest amount of analyte in a sample that can be quantitatively determined with suitable precision and accuracy.
- 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).
- Grayed values indicate values that attain or exceed the SWSL standard.
- Bold** values indicate values that attain or exceed the 15A NCAC 2L MCL.
- NE indicates not established. Blank cells indicate that there is no information relevant to the respective row.
- 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.
- Data obtained from Electronic Data Deliverable (EDD) and EnRad Laboratory Report MCGUIRE_17MAY2011_A provided by Tim Hunsucker of Duke Energy Carolinas on July 19, 2011.
- 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).
- * The 2L standard for Xylenes-Total used.
- NM indicates not measured.
- NS indicates no sample was collected.

**Table 2 - Field and Analytical Results
Duke Energy McGuire Nuclear Station
Landfill #2 - Permit #60-04
Groundwater Monitoring Report**

Parameter	SWS ID	Units	Certificate Code	Monitoring Wells				6004-Leachate	Trip Blank	Field Blank	SWSL	15A NCAC 2L
				6004-MW-8A	6004-MW-9	6004-MW-9A	6004-MW-10A					
Field pH	320	SU	5193	6.7	5.5	6.3	5.4	7.5				6.5-8.5
Field Specific Conductivity	323	umho/cm	5193	96	64	103	24	1,230				
Temperature	325	°C	5193	17.0	18.3	18.6	17.6	20.4				
Top Casing	328	feet		759.68	711.87	712.13	755.78					
Depth to Water	318	feet		62.20	25.17	25.53	51.63					
Water Elevation	427	feet		697.48	686.70	686.60	704.15					
Well Depth	411	feet		84.40	30.80	47.80	59.23					
Arsenic	14	µg/L	248	0.67 U	0.67 U	0.67 U	0.67 U	1.13 J		0.67 U	10	10
Barium	15	µg/L	248	23.88 J	18.12 J	8.32 J	15.81 J	66.43 J		3.34 U	100	700
Cadmium	34	µg/L	248	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U		0.67 U	1	2
Chloride	455	µg/L	248	2,026	2,206	1,495	1,238	112,000		28 J	NE	250,000
Chromium	51	µg/L	248	3.34 U	3.34 U	3.34 U	3.34 U	3.34 U		3.34 U	10	10
Lead	131	µg/L	248	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U		0.67 U	10	15
Mercury	132	µg/L	248	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U		0.03 U	0.2	1
Selenium	183	µg/L	248	0.67 U	0.67 U	0.67 U	0.67 U	0.84 J		0.67 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	1,098 J	200 J	235 J	464 J	122,400 J		18 U	250,000	250,000
TPH(DRO)	NE	µg/L	12	270 J	220 J	250 J	230 J	5,000		250 J	NE	NE
Gross Alpha	314	pCi/L	248	<-0.44	<-0.40	<-0.35	<-0.039	0.896	NA	NA	NE	15
Gross Beta	NE	pCi/L	248	<0.160	<-0.71	<-0.42	<-0.15	14.5	NA	NA	NE	NE
H3GW (Tritium)	NE	pCi/L	248	<-28	<68.2	<32.1	<57.7	2,880	NA	NA	NE	NE
Acetone	3	µg/L	12	2.2 U	3.1 J	2.2 U	2.2 U	3.9 J	2.2 U	2.2 U	100	6,000
Chloromethane	137	µg/L	12	0.11 U	0.47 J	0.27 J	0.11 U	0.31 J	0.34 J	0.24 J	1	3
Ethylbenzene	110	µg/L	12	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1	600
Iodomethane	142	µg/L	12	0.32 U	0.32 U	0.32 U	0.32 U	0.7 J	0.58 J	0.32 U	10	NE
m&p-xylene	359	µg/L	12	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U	NE	500*
o-xylene	408	µg/L	12	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	NE	500*
Toluene	196	µg/L	12	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	1	600
Xylenes-Total	346	µg/L	12	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U	5	500

Notes:

- Concentrations presented in micrograms per liter (µg/L) or picoCuries per liter (pCi/L).
- "SWS ID" is the Solid Waste Section Identification Number.
- "SWSL" is the Solid Waste Section Limit. DENR defines the SWSL as the lowest amount of analyte in a sample that can be quantitatively determined with suitable precision and accuracy.
- 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).
- Grayed values indicate values that attain or exceed the SWSL standard.
- Bold** values indicate values that attain or exceed the 15A NCAC 2L MCL.
- NE means not established. Blank cells indicate that there is no information relevant to the respective row.
- 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.
- Data obtained from Electronic Data Deliverable (EDD) and EnRad Laboratory Report MCGUIRE_17MAY2011_A provided by Tim Hunsucker of Duke Energy Carolinas on July 19, 2011.
- According to the Constituent Look-up webpage on the DENR Division of Waste Management webpage, there is no SWSL or 2L standard for chloride 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).
- * The 2L standard for Xylenes-Total used.
- NM indicates not measured.
- NS indicates no sample was collected.
- NA indicates not analyzed.

**Table 2 - Field and Analytical Results
Duke Energy McGuire Nuclear Station
Landfill #2 - Permit #60-04
Groundwater Monitoring Report**

Sample Date: June 20, 2011			Laboratory Certificate Codes: Duke Energy Carolinas Field #5193 Duke Energy Analytical Laboratory #248 Pace Analytical Services, Inc. #12						
Field Sampling performed by Duke Energy									
Parameter	SWS ID	Units	Certificate Code	Surface Water Sampling Locations				SWSL	15A NCAC 2B
				6004-SW-1		6004-SW-2			
Field pH	320	SU	5193	6.7		7.2			6.5-8.5
Field Specific Conductivity	323	umho/cm	5193	133		123			
Temperature	325	°C	5193	22.0		20.0			
Top Casing	328	feet							
Depth to Water	318	feet							
Water Elevation	427	feet							
Well Depth	411	feet							
Arsenic	14	µg/L	248	0.67	U	0.67	U	10	10
Barium	15	µg/L	248	42.91	J	17.29	J	100	200,000*
Cadmium	34	µg/L	248	0.67	U	0.67	U	1	2
Chloride	455	µg/L	248	1,892		2,137		NE	230,000
Chromium	51	µg/L	248	3.34	U	3.34	U	10	50
Lead	131	µg/L	248	0.67	U	0.67	U	10	25
Mercury	132	µg/L	248	0.03	U	0.03	U	0.2	0.012
Selenium	183	µg/L	248	0.67	U	0.67	U	10	5
Silver	184	µg/L	248	3.34	U	3.34	U	10	0.06
Sulfate	315	µg/L	248	480	J	2,541	J	250,000	LD*
TPH(DRO)	NE	µg/L	12	410	J	370	J	NE	NE
Gross Alpha	314	pCi/L	248	<-0.22		<-0.42		NE	NE
Gross Beta	NE	pCi/L	248	<0.610		<0.310		NE	NE
H3GW (Tritium)	NE	pCi/L	248	<-22		<59.9		NE	NE
Acetone	3	µg/L	12	3.1	J	2.2	U	100	2000*
Chloromethane	137	µg/L	12	0.23	J	0.17	J	1	96*
Ethylbenzene	110	µg/L	12	0.3	U	0.3	U	1	97*
Iodomethane	142	µg/L	12	0.32	U	0.32	U	10	NE
m&p-xylene	359	µg/L	12	0.66	U	0.66	U	NE	670**
o-xylene	408	µg/L	12	0.23	U	0.23	U	NE	800*
Toluene	196	µg/L	12	0.33	J	0.36	J	1	11
Xylenes-Total	346	µg/L	12	0.66	U	0.66	U	5	670*

Notes:

- Concentrations presented in micrograms per liter (µg/L) or picoCuries per liter (pCi/L).
- "SWS ID" is the Solid Waste Section Identification Number.
- "SWSL" is the Solid Waste Section Limit. DENR defines the SWSL as the lowest amount of analyte in a sample that can be quantitatively determined with suitable precision and accuracy.
- 2B Standard is from "North Carolina Administrative Code, Title 15A: Department of Environment and Natural Resources, Subchapter 2B - Surface Water and Wetland Standards," (last amended on May 1, 2007).
- * Indicates no 2B standard exists. Where no 2B standard exists the National Criteria per EPA used. NC and EPA Criteria Table downloaded from DENR website at <http://portal.ncdenr.org/web/wa/ps/csu/swstandards> (Downloaded 8/26/2011).
- Grayed values indicate values that attain or exceed the SWSL standard.
- Bold** values indicate values that attain or exceed the 15A NCAC 2B MCL.
- NE means not established. Blank cells indicate that there is no information relevant to the respective row.
- LD from NC and EPA Criteria Table and indicates limited data available.
- 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/-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.
- Data obtained from Electronic Data Deliverable (EDD) and EnRad Laboratory Report MCGUIRE_17MAY2011_A provided by Tim Hunsucker of Duke Energy Carolinas on July 19, 2011.
- ** The EPA Criteria standard for Xylenes-Total used.

**Table 3 - Radiological Analytical Results
Duke Energy McGuire Nuclear Station
Landfill # 2 - Permit # 60-04
Groundwater Monitoring Report**

Sample Date: June 20, 2011 Laboratory Certificate Codes:
Duke Energy Analytical Laboratory #248

Field Sampling Performed by Duke Energy

Parameter	Units	Certificate Code	Monitoring Well Identification											Leachate Pond	Surface Water 1	Surface Water 2
			MW-5	MW-5A	MW-6	MW-6A	MW-7	MW-7A	MW-8	MW-8A	MW-9	MW-9A	MW-10A			
Gross Alpha	pCi/L	248	<0.078	<-0.22	<-0.20	<-0.30	NS	<-0.72	<-0.55	<-0.44	<-0.40	<-0.35	<-0.039	0.896	<-0.22	<-0.42
BaLa-140	pCi/L	248	NS	<5.11	<5.96	<4.95	NS	<6.08	<6.36	<4.87	<2.97	<8.97	<5.03	<4.25	<6.45	<4.07
Be-7	pCi/L	248	NS	<34.6	<32.4	<24.8	NS	<38.0	<26.8	<28.3	<27.0	<44.1	<29.1	<24.8	<34.8	<25.3
Gross Beta	pCi/L	248	<0.430	<-0.29	<-0.14	<-0.41	NS	<-0.59	<-0.083	<-0.160	<-0.71	<-0.42	<-0.15	14.5	<0.610	<0.310
Co-58	pCi/L	248	NS	<2.69	<3.89	<4.58	NS	<4.36	<3.76	<3.43	<3.47	<5.04	<3.82	<3.35	<3.63	<2.91
Co-60	pCi/L	248	NS	<5.62	<6.44	<5.10	NS	<6.27	<5.30	<4.64	<5.42	<8.43	<5.38	<4.30	<7.11	<4.63
Cs-134	pCi/L	248	NS	<3.82	<3.64	<4.04	NS	<4.25	<4.71	<3.45	<3.65	<4.00	<4.32	<3.42	<3.77	<2.82
Cs-137	pCi/L	248	NS	<3.89	<5.78	<4.13	NS	<3.55	<4.28	<3.62	<4.39	<5.87	<4.49	<4.39	<3.92	<4.23
Fe-59	pCi/L	248	NS	<8.46	<8.06	<7.67	NS	<8.14	<7.61	<7.34	<7.82	<8.12	<7.42	<5.47	<10.3	<6.19
H3GW (Tritium)	pCi/L	248	<-25	<-6.9	<32.3	<-35	NS	<48.1	<8.02	<-28	<68.2	<32.1	<57.7	2,880	<-22	<59.9
I-131	pCi/L	248	NS	<5.26	<4.80	<4.21	NS	<5.25	<5.08	<4.40	<4.54	<4.89	<3.96	<3.61	<4.30	<4.07
K-40	pCi/L	248	NS	226	57.7	49.6	NS	226	99.7	54.5	96.8	<109	77.4	120	39.2	71.0
Mn-54	pCi/L	248	NS	<4.08	<4.09	<4.43	NS	<4.09	<5.06	<3.51	<3.55	<5.10	<3.70	<2.70	<3.39	<3.56
Nb-95	pCi/L	248	NS	<4.54	<4.05	<4.11	NS	<5.66	<3.46	<4.09	<3.45	<4.58	<3.72	<3.51	<3.58	<3.54
Zn-65	pCi/L	248	NS	<8.78	<8.79	<9.44	NS	<9.31	<9.34	<8.78	<8.30	<8.32	<8.12	<9.35	<8.62	<7.58
Zr-95	pCi/L	248	NS	<7.07	<7.51	<6.12	NS	<6.41	<7.40	<7.01	<6.81	<8.82	<6.47	<5.39	<7.09	<6.23

Notes:

- Analytical results provided by EnRad Laboratory and are found in Job MCGUIRE_17MAY2011_A.
- Concentrations presented in picocuries per liter (pCi/L).
- No gamma sample was collected for MW-5 due to insufficient volume.
- No sample was collected for MW-7 due to insufficient volume.
- NS indicates no sample was collected.

APPENDICES

APPENDIX A
Chain-of-Custody Forms



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

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

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

Analytical Laboratory Use Only

LIMS #J110600114		MATRIX: GW-RCRA		Samples Originating From	NC <input checked="" type="checkbox"/> SC <input type="checkbox"/>
Logged By	Date & Time	Vendor		SAMPLE PROGRAM	
<i>aw</i>	6-20-11 13:46	PACE		Ground Water <input checked="" type="checkbox"/> NPDES Drinking Water UST RCRA Waste	
Vendor	COOLER Temp (C)	PO #		MR #	
	5.6				
		Preserv.: 1=HCl 2=H ₂ SO ₄ 3=HNO ₃ 4=Ice 5=None			

19 Page 57 of 58 2
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

6/9/2011 rev

1) Project Name MNS LANDFILL 2 Permit # 60-04		2) Phone No: 875-5257	
3) Client C. Campbell / T Hunsucker		4) Fax No: 875-4349	
5) Business Unit: 20036	6) Process: BLDFLGN	7) Resp. To: MC00	
8) Project ID:	9) Activity ID:	10) Mail Code: MGO3A3	

Customer must complete

LAB USE ONLY
11 Lab ID
2011012455
2011012437
2011012441
2011012442
2011012443
2011012444
2011012445
2011012446
2011012447
2011012448
2011012449
2011012450

Customer to complete appropriate columns to right

12 Chem Desktop No.	13 Sample Description or ID	14 Collection Information			17 Comp.	18 Grab	VOC's (EPA8260) (See Attached List)	ALK (4.5), SO ₄ , Cl (IC)	Hg (7470)	Metals Prep - 3030C (ICP-EPA-200.7) Ag, Ba, Ca, Cr, K, MG, Na (IMS-EPA-200.8) As, Cd, Pb, Se	(8015 / 3520) TPH-DRO (V)	Chlorine (ppm)	20 Total # of Containers
		Date	Time	Signature									
	TRIP BLANK	6/20/11	0540	REW	X		3					n/a	3
	MW-5	6/20/11	0710	VC	X		3	1	1	1	1		7
	MW-5A	6/20/11	0750	VC	X		3	1	1	1	1		7
	MW-6	6/20/11	0725	REW	X		3	1	1	1	1		7
	MW-6A	6/20/11	0745	REW	X		3	1	1	1	1		7
	MW-7	NO SAMPLE - INSUFFICIENT VOL			X		3	1	1	1	1		7
	MW-7A	6/20/11	0935	VC	X		3	1	1	1	1		7
	MW-8	6/20/11	0945	REW	X		3	1	1	1	1		7
	MW-8A	6/20/11	1000	REW	X		3	1	1	1	1		7
	MW-9	6/20/11	1100	REW	X		3	1	1	1	1		7
	MW-9A	6/20/11	1115	REW	X		3	1	1	1	1		7
	MW-10A	6/20/11	0845	REW	X		3	1	1	1	1		7

Customer to sign & date below

21) Relinquished By: <i>[Signature]</i>	Date/Time: 6-20-11 1325	Accepted By: <i>[Signature]</i>	Date/Time: 6-20-11 1325	Customer, important please indicate desired turnaround	22) Requested Turnaround 14 Days <input checked="" type="checkbox"/> *7 Days 6-31-11 *48 Hr *Other * Add. Cost Will Apply
Relinquished By: <i>Candy Knox</i>	Date/Time: 6-20-11 950	Accepted By: <i>[Signature]</i>	Date/Time: 6-20-11 950		
Relinquished By:	Date/Time:	Accepted By:	Date/Time:		
23) Seal/Locked By:	Date/Time:	Sealed/Lock Opened By:	Date/Time:		
24) Comments: Regulatory Agency : NCDENR/DWM -SW Section - State EDD Format Required / Permit # 60-04 Use indicated or comparable analytical methods					

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM



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) 87

Analytical Laboratory Use Only

LIMS # J110600114		MATRIX: GW-RCRA		Samples Originating From <input type="checkbox"/> NC <input checked="" type="checkbox"/> SC	
Logged By <i>am</i>	Date & Time 6-20-11	13:46			
Vendor PACE		Cooler Temp (C) 2.2		SAMPLE PROGRAM Ground Water <input checked="" type="checkbox"/> NPDES <input type="checkbox"/> Drinking Water <input type="checkbox"/> UST <input type="checkbox"/> RCRA Waste <input type="checkbox"/>	

19 Page Page 58 of 58
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

6/9/2011 rev

1) Project Name MNS LANDFILL 2 Permit # 60-04		2) Phone No: 875-5257	
3) Client C. Campbell / T Hunsucker		4) Fax No: 875-4349	
5) Business Unit: 20036	6) Process: BLDLGN	7) Resp. To: MC00	
8) Project ID:	9) Activity ID:	10) Mail Code: MGO3A3	

Customer must Complete

PO #		15 Preserv.: 1=HCL 2=H ₂ SO ₄ 3=HNO ₃ 4=Ice 5=None		1	4	3	3	4										
MR #		<u>Customer to complete all appropriate NON-SHADED areas.</u>		16 Analyses Required		VOC's (EPA8260) 1, 4		ALK (4.5), SO4, Cl (IC)		Hg (7470)		Metals Prep - 3030C (ICP-EPA-200.7) Ag, Ba, Ca, Cr, K, MG, Na (IMS-EPA-200.8) As, Cd, Pb, Se (8015 / 3520) TPH-DRO (V) Chlorine (ppm)		20 Total # of Containers				
12 Chem Desktop No.		13 Sample Description or ID		14 Collection Information			17 Comp.	18 Grab	VOC's (EPA8260) (See Attached List)		ALK (4.5)	SO4, Cl (IC)	Hg (7470)	(ICP-EPA-200.7) Ag, Ba, Ca, Cr, K, MG, Na	(IMS-EPA-200.8) As, Cd, Pb, Se	(8015 / 3520) TPH-DRO (V)	Chlorine (ppm)	20 Total # of Containers
		Date	Time	Signature														
	SW-1	6/20/11	1110	<i>VC</i>		X	X	3	1	1				1	1			7
	SW-2	6/20/11	1040	<i>VC</i>		X	X	3	1	1				1	1			7
	LEACHATE POND	6/20/11	0955	<i>VC</i>		X	X	3	1	1				1	1			7
	QC - (WELL # MW-5A)	6/20/11	0750	<i>VC</i>		X								1	1			1
	FIELD BLANK	6/20/11	1150	<i>Rmd</i>		X	X	3	1	1				1	1	n/a		7

Customer to complete appropriate columns to right

LAB USE ONLY	
11 Lab ID	
2011012451	
2011012452	
2011012453	
2011012454	
2011012463	

Customer to sign & date below

21) Relinquished By <i>[Signature]</i>	Date/Time 6-20-11 1325	Accepted By <i>[Signature]</i>	Date/Time 6-20-11 1325	Customer, important please indicate desired turnaround	22 Requested Turnaround 14 Days <input checked="" type="checkbox"/> *7 Days <u>6-31-11</u> *48 Hr *Other * Add. Cost Will Apply
Relinquished By <i>Cindy Knox</i>	Date/Time 6-21-11 0950	Accepted By <i>[Signature]</i>	Date/Time 6-21-11 950		
Relinquished By	Date/Time	Accepted By	Date/Time		
23) Seal/Locked By	Date/Time	Sealed/Lock Opened By	Date/Time		
24) Comments: Regulatory Agency : NCDENR/DWM -SW Section - State EDD Format Required / Permit # 60-04 Use indicated or comparable analytical methods					



For Detailed Instructions, see:
<http://dewwww/lessenv/occl/>

1) Project Name **MNS LANDFILL 2**
 Permit # 60-04

3) Client **C. Campbell / T Hunsucker**

5) Business Unit: 20036

6) Process: **BLDFLGN**

7) Resp. To: **MC00**

8) Project ID:

9) Activity ID:

10) Mail Code: **MGO3A3**

2) Phone No: 875-5257

4) Fax No: 875-4349

7) Resp. To: **MC00**

10) Mail Code: **MGO3A3**

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

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

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

Analytical Laboratory Use Only

MCUJRE_17MAY2011_A Sample Class
 Samples Originating From: NC, SC

LYNN BURROW 5/17/2011 7:20
 SAMPLE PROGRAM
 Ground Water, NPDES, Drinking Water, UST, RCRA Waste

Vendor: Cooler Temp (C)
 1=Preserv., 1=HCL, 2=H₂SO₄, 3=HNO₃, 4=Ice, 5=None

LAB USE ONLY 11) Lab ID	12) Chem Desktop No.	13) Sample Description or ID	14) Collection Information		16) Analyses Required	17) Comp.	18) Grab	Gamma	Gross A & B	Tritium	20) Total # of Containers
			Date	Time							
214631		MW-5	6/20/11	0720	UDC	X	X	1	1	1	2
214632		MW-5A	6/20/11	0750	UDC	X	X	1	1	1	3
214633		MW-6	6/20/11	0725	UDC	X	X	1	1	1	3
214634		MW-6A	6/20/11	0745	UDC	X	X	1	1	1	3
214635		MW-7 - NO SAMPLE INSUFFICIENT			UDC	X	X	1	1	1	3
214636		MW-7A	6/20/11	0935	UDC	X	X	1	1	1	3
214637		MW-8	6/20/11	0945	UDC	X	X	1	1	1	3
214638		MW-8A	6/20/11	1000	UDC	X	X	1	1	1	3
214639		MW-9	6/20/11	1100	UDC	X	X	1	1	1	3
214640		MW-9A	6/20/11	1115	UDC	X	X	1	1	1	3
214641		MW-10A	6/20/11	0845	UDC	X	X	1	1	1	3

Customer to complete appropriate columns to right

Customer to sign & date below

21) Relinquished By: *[Signature]* Date/Time: 6-20-11 1315
 Relinquished By: *[Signature]* Date/Time: 6-20-11 1315
 Relinquished By: *[Signature]* Date/Time: 6-20-11 1315
 Relinquished By: *[Signature]* Date/Time: 6-20-11 1315

22) Seal/Locked By: *[Signature]* Date/Time: 6-20-11 1315
 Sealed/Locked Opened By: *[Signature]* Date/Time: 6-20-11 1315

23) Comments: **INSUFFICIENT REARRANGE TO COLLECT GAMMA SAMPLE - UDC**

24) Requested Turnaround: 14 Days 7 Days 48 Hr Other *Add. Cost Will Apply

