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):

S&ME, Inc. (Consultant)

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

Name: William M. Miller, P.E. Phone: 828-687-9080

E-mail: wmiller@smeinc.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Duke Energy McGuire Nuclear Station Landfill #1	13339 Hagers Ferry Road Huntersville, NC 28078	60-04	.0500	January 11, 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
☐ 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.

William M. Miller, P.E. — Senior Project Engineer — 828-687-9080

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

William M. Miller — April 14, 2010 — Affix NC Licensed/ Professional Geologist Seal

Signature — Date

NORTH CAROLINA PROFESSIONAL SEAL 17661 ENGINEER WILLIAM M. MILLER

44 Buck Shoals Rd, Suite C-3, Arden, NC 28704

Facility Representative Address

F-0176

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

Revised 6/2009

SEMI-ANNUAL
GROUNDWATER MONITORING REPORT
JANUARY 2010 SAMPLING EVENT
DUKE ENERGY MCGUIRE NUCLEAR STATION
LANDFILL #1 (PERMIT #60-04)
HUNTERSVILLE, NORTH CAROLINA

S&ME Project No. 1411-09-047

Prepared For:

Prepared By:

S&ME, Inc.
44 Buck Shoals Road Suite C-3
Arden, North Carolina 28704

April 14, 2010

April 14, 2010

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

Reference: **Semi-Annual Groundwater Monitoring Report**
July 2009 Sampling Event
Duke Energy Carolinas – McGuire Nuclear Station
Landfill #1 (Permit # 60-04)
Huntersville, North Carolina
S&ME Project 1411-09-047

Dear Ms. Drummond:

This report presents the semi-annual groundwater monitoring for the McGuire Nuclear Station Landfill #1 (Permit #60-04). The landfill is closed and is located at Duke Energy's McGuire Nuclear Station near Huntersville, North Carolina, in Mecklenburg County. Groundwater sampling for the landfill was performed on January 11, 2010. S&ME is submitting this report on the behalf of Duke Energy.

The Groundwater Monitoring Report for the sampling event includes a summary of the groundwater monitoring activities, the analytical results, a figure showing groundwater contours at the site, 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 me at 828-687-9080.

Sincerely,

S&ME, Inc.

William M. Miller, P.E.
Senior Project Engineer

NORTH CAROLINA PROFESSIONAL SEAL 17661 ENGINEER WILLIAM M. MILLER

Larry Armstrong, P.E.
Senior Engineer

North Carolina Professional Engineering Firm License No. F-0176

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cc:

Duke Energy
PO Box 1006
Charlotte, NC 28201-1006
Attn: Mr. Andy Tinsley Mail Code EC13K

Solid Waste Management
Mecklenburg County
700 N. Tryon Street
Charlotte, NC 28202
Attn: Joseph S. Hack, QEP

NC DENR - Radiation Protection Section
1645 Mail Service Center
Raleigh, NC 27699-1645
Attn: Mr. Dale Dusenberry

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FIGURES
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Chain of Custody Form

1.0 BACKGROUND

The McGuire Nuclear Station Landfill #1 (Permit #60-04) is located at the Duke Energy (Duke) McGuire Nuclear Station, near Huntersville, North Carolina, in Mecklenburg County. The landfill is closed and no longer accepts waste. The landfill and nearby area is portrayed on Figure 1. The approximate limit of waste is also shown on Figure 1.

The landfill is located south of NC Highway 73, east of the Catawba River, and to the west of Cashion Road. Cashion Road runs along a topographic divide, with topography, sloping away from Cashion Road to the northwest and to the southeast. Thus, surface water to the northwest of Cashion Road drains towards the Catawba River. There are surface water drainage features to the northeast and southwest of the landfill that eventually merge to the northwest, toward a perennial, unnamed stream.

The monitoring system at the landfill consists of twelve (12) groundwater monitoring wells and one surface water sample location, as listed below.

Monitoring Wells:	MW-1
	MW-1D
	MW-2
	MW-2D
	MW-3
	MW-3D
	MW-4
	MW-4D
	MW-11
	MW-11D
	MW-12
	MW-12D
Surface Water Sample Location	SW-1

The monitoring wells and the surface water sample location are shown on Figure 1. The wells are installed as well pairs with one shallow well and one deeper well adjacent to each other. The well with the “D” designation is the deepest of the pair of wells.

2.0 SCOPE OF WORK

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

- Received information provided by Duke on field sampling and measurement of groundwater elevations (performed by Duke) for monitoring wells MW-1, MW-1D, MW-2, MW-2D, MW-3, MW-3D, MW-4, MW-4D, MW-11, MW-11D, MW-12, and MW-12D. The samples were collected on January 11, 2010.
- Received information provided by Duke of field sampling performed at surface water sample location SW-1. The sample was collected on January 11, 2010.
- Reviewed the laboratory analytical results for the samples described above. These laboratory analyses were performed by Pace Analytical. The results were provided in both in paper format and in an EXCEL file. The EXCEL file was manipulated to conform 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 review to determine if analytical results meet or exceed NC 2L groundwater standards.
- Provided a review to determine if analytical results meet or exceed the Solid Waste Section Limits (SWSLs)
- Prepared and submitted this Groundwater Monitoring Report to Duke and the NCDENR.

3.0 RESULTS

3.1 Site Groundwater Flow

Groundwater flow contours for the site are shown on Figure 2. These contours were developed using the groundwater elevations measured on January 11, 2010.

Groundwater flow beneath the landfill is generally from the south-east end of the landfill towards the surface water drainage features previously described. In more detail, the groundwater flow at the landfill would be described as follows:

- Groundwater flow along the northeast side of the landfill, in the region of wells MW-2/MW-2D, is to the northeast toward the surface water drainage feature located along the northeast side of the landfill.
- Groundwater flow from the northwest end of the landfill in the region of wells MW-3/MW-3D and MW-4/MW-4D, appears to be to the northwest, toward lower topography and the surface water feature located northwest of the landfill.
- Groundwater flow from the west side of the landfill, in the region between wells MW-4/MW-4D and MW-11/MW-11D, appears to be to the west towards the surface water drainage feature located along the west of the landfill.

- Groundwater flow from the southwest side of the landfill, in the region of wells MW-12/MW-12D, is to the southwest toward the lower topography and surface water drainage feature located southwest of the landfill.

3.2 Analytical Results

As noted, Duke collected and chemically analyzed water samples from the twelve (12) groundwater monitoring wells and one (1) surface water sample location comprising the landfill monitoring network. A summary of the field data is presented in Table 1.

Samples were analyzed for the compounds listed on the Chain of Custody form (attached). The results of the laboratory analyses are summarized in Table 2.[1]
The following groundwater monitoring well samples and/or surface water sample attained or exceeded the corresponding NCAC 2L groundwater quality standards:

- pH – pH values below 6.5 were measured in groundwater samples from wells MW-1, MW-1D, MW-3, MW-4, MW-4D, MW-11, MW-11D, MW-12, and MW-12D. The measured pH values below 6.5 ranged from 4.7 (Standard Units) in MW-11 to 6.5 in MW-3 and MW-4D.

  The pH values measured in these wells are consistent with historical measurements at the site.

- Trichloroethene – Trichloroethene was measured is in excess of the NCAC 2L groundwater standard of 0.7 µg/L in the groundwater sample at well MW-4. The concentration in this well was measured at 1.6 µg/L. This is a decrease in concentration from the previous sampling event. The values for this compound have varied as shown in the following table.

Sample Date	Trichloroethene Concentration (ug/L)
Jan 2007	1.5
July 2007	1.1
Jan 2008	0.89
July 2008	0.88
Jan 2009	1.5
July 2009	1.6
January 2010	1.3

This well is located approximately 15 from the waste boundary and approximately 110 feet inside of the NCAC 2L Review Boundary. In 2005 and 2006, wells MW-4D and MW-3 had detections of trichloroethene, however the concentrations at these wells dropped in 2007 to levels below the NCAC 2L standard. Duke should continue to monitor the results for this compound at this location.

[1] Analytical results were provided by Duke Energy. Reference Pace Lab Report Project 9261076, dated January 19, 2010.

The analytical results show concentrations that meet or exceed the SWSL's as follows:

Barium	MW-1
Trichloroethene	MW-4, MW-4D

Table 3 presents the results of analysis for radiological constituents. These results were provided by Duke Energy[2]. A copy of this report along with the report of the radiological laboratory analysis is submitted to the NCDENR Radiation Protection Section.

[2] Duke Lab Report 09-DEC-0008, dated 1/11/10.