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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 McGuire Nuclear Station Landfill #1	13339 Hagers Ferry Road Huntersville, NC 28078	60-04	.0500	July 18, 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

Affix NC Licensed/ Professional Geologist Seal

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 #1, Permit #60-04

July 2011 Sampling Event

October 11, 2011

Prepared for
Duke Energy Carolinas
13339 Hagers Ferry Road
Huntersville, NC 28078
Project #2369.08

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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1.0 Background

The McGuire Nuclear Station Landfill #1 (Permit #60-04) is located at the Duke Energy Carolinas (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 are portrayed on Figure 1. The approximate limit of waste is shown on Figure 2.

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.

As described in *McGuire Nuclear Station Landfill #1, Permit Number 60-04, Ground-Water Monitoring Program Sampling and Analysis Plan (SAP)*, September 14, 1996, Revised, November 24, 1997, March 9, 2001, the monitoring system at the landfill consists of twelve groundwater monitoring wells and one surface water sample location, as listed below.

Monitoring Wells:	MW-1 MW-1D MW-2A 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 2. The wells were 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. The shallow wells are screened to intercept the water table. The deep wells are constructed so that the bottom of the screen is located in residual material just above auger refusal. Monitoring wells MW-1 and MW-1D are located upgradient of the landfill.

2.0 Methods

2.1 Sampling and Analysis Methods

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

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

- Select metals using US Environmental Protection Agency (EPA) Methods 200.7 and 200.8
- Sulfate using EPA Method 300.0
- Volatile organic compounds (VOCs) using EPA Method 8260

In addition, the samples were analyzed for the following radiological parameters:

- Gross alpha radioactivity
- Gross beta radioactivity
- Tritium
- Gamma radioactivity for select isotopes

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-1, MW-1D, MW-2A, MW-2D, MW-3, MW-3D, MW-4, MW-4D, MW-11, MW-11D, MW-12, and MW-12D. Data were also received for surface water sample location SW-1. The samples were collected on July 18, 2011 and Altamont received the data on August 4, 2011.
- Reviewed the laboratory analytical results for the 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 generalized 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 the North Carolina Department of Environment and Natural Resources (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 in the shallow wells on July 18, 2011.

Groundwater flow at the site is generally from the southeast, near MW-1 and Cashion Road, toward the northwest and MW-3.

3.2 Analytical Results

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

The field and analytical results of groundwater sampling are summarized in Table 2. The field and analytical results of surface water sampling are summarized in Table 3. Results below the heavy black line in Tables 2 and 3 are EPA Method 8260 constituents detected above the method detection limit (MDL) in at least one well or surface water sampling location. EPA Method 8260 constituents not listed were not detected above the MDL.

A summary of the North Carolina Administrative Code (NCAC) 2L groundwater quality exceedances and a preliminary analysis of the cause and significance of the exceedances are presented in Table 4.

The MDL was greater than the respective 2L standard for the following constituents:

- 1,1,2,2-Tetrachloroethane
- 1,2,3-Trichloropropane
- 1,2-Dibromo-3-chloropropane
- 1,2-Dibromoethane (EDB)
- Hexachloro-1,3-butadiene
- Vinyl chloride

The MDL was greater than the respective 2B standard for the following constituents:

- Mercury
- Silver

The MDLs for the abovementioned constituents were all below their corresponding Solid Waste Section Limits (SWSL) as required by the February 23, 2007 DENR memo. Therefore, in accordance with the February 23, 2007 memo, the results are qualified as estimated.

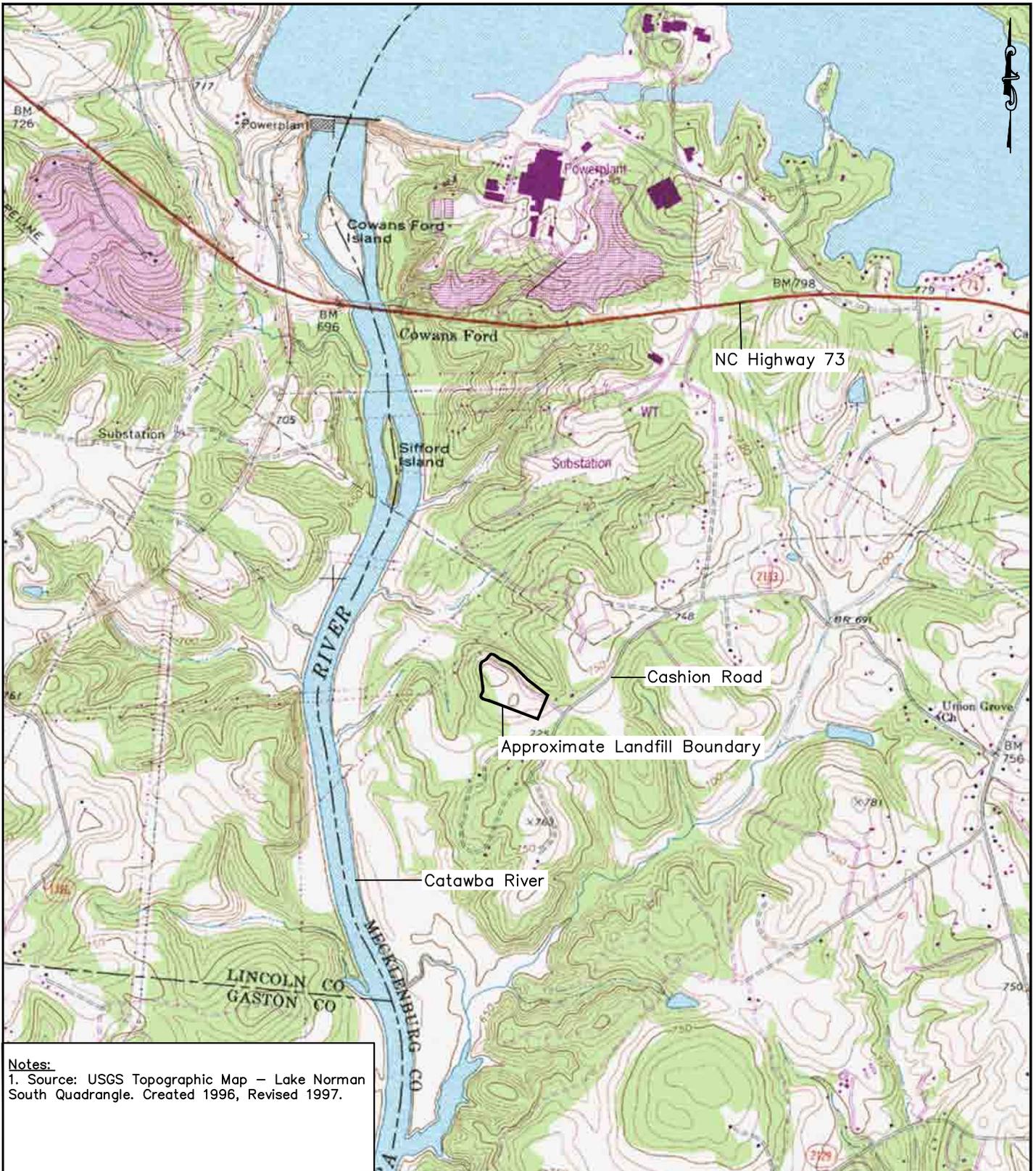
In addition to the constituents listed in Table 4, the concentrations of the compounds at the following wells and surface water sample locations were equal to or above the corresponding Solid Waste Section Limits (SWSL):

- Barium in MW-1
- Trichloroethene in MW-4 and MW-4D
- Toluene in SW-1
- cis-1,3-Dichloropropene in SW-1

Table 5 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.

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

FIGURES



Notes:
 1. Source: USGS Topographic Map – Lake Norman South Quadrangle. Created 1996, Revised 1997.

ALTAMONT ENVIRONMENTAL, INC.
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SITE LOCATION MAP

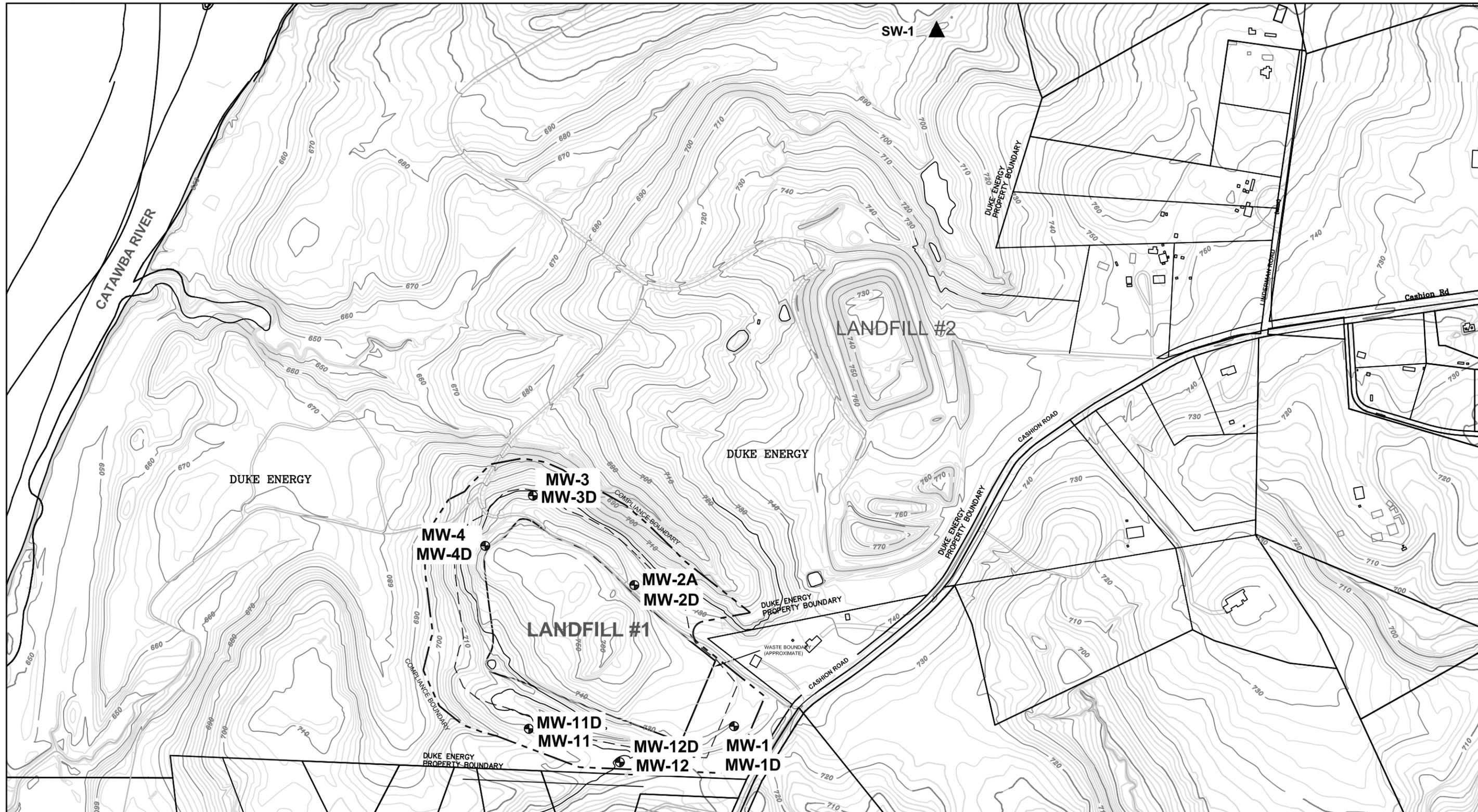
MC GUIRE NUCLEAR STAION
 LANDFILL #1 PERMIT #60-04

FIGURE

1

DRAWN BY: ANDREW MOORE
 PROJECT MANAGER: WILLIAM M. MILLER
 CLIENT: DUKE ENERGY CAROLINAS
 DATE: 3/14/11





BASE MAP PROVIDED BY DUKE ENERGY

-  GROUNDWATER MONITORING WELL
-  SURFACE WATER SAMPLING LOCATION
-  LANDFILL REVIEW BOUNDARY
-  LANDFILL COMPLIANCE BOUNDARY
-  APPROXIMATE LIMIT OF WASTE

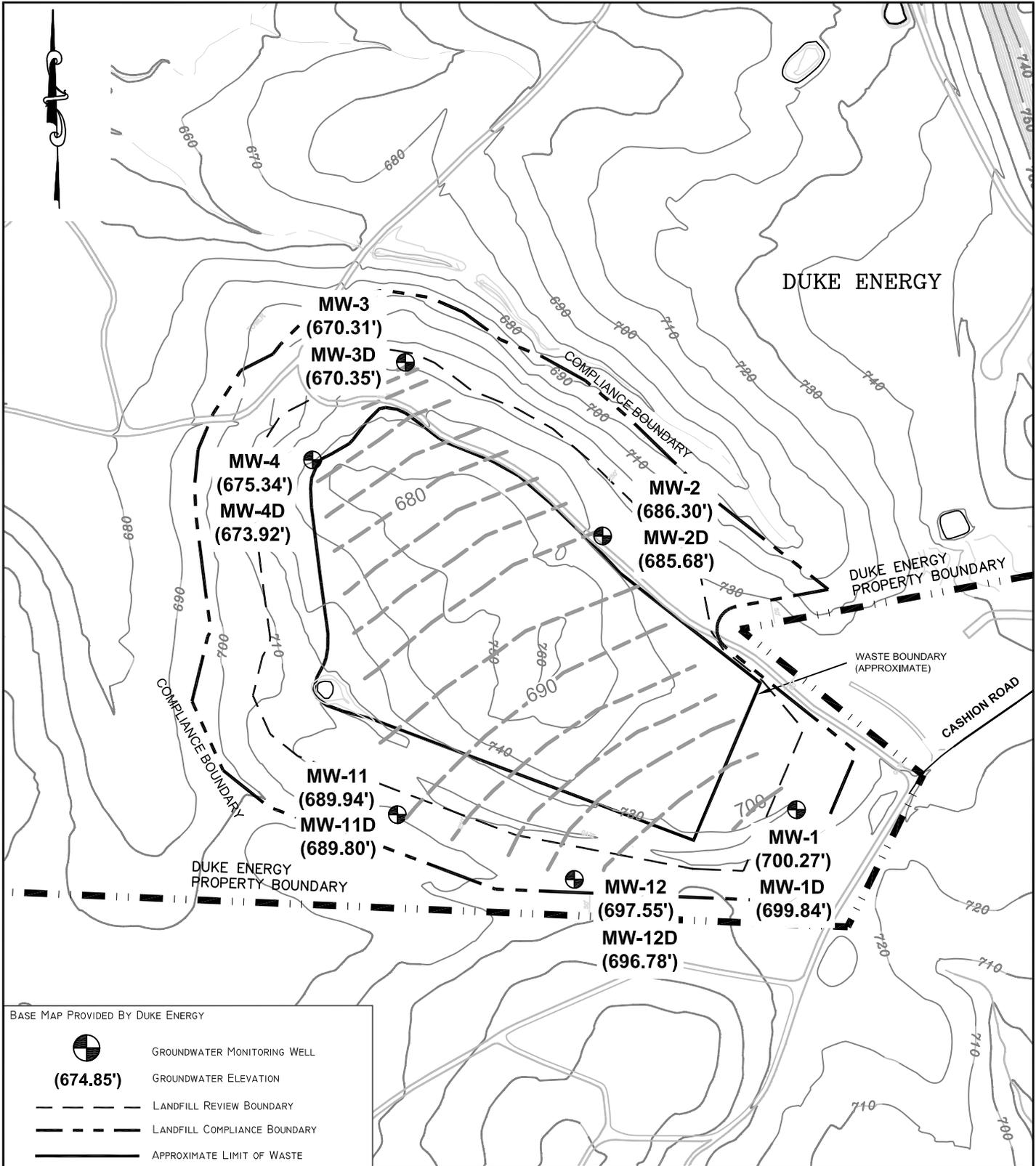
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DRAWN BY: ANDREW MOORE
 PROJECT MANAGER: WILLIAM M. MILLER
 CLIENT: DUKE ENERGY CAROLINAS
 DATE: 8/23/11

SCALE (FEET)
 0 200 400

SAMPLE LOCATIONS
 MCGUIRE NUCLEAR STATION
 LANDFILL #1 PERMIT #60-04

FIGURE
2



BASE MAP PROVIDED BY DUKE ENERGY

-  GROUNDWATER MONITORING WELL
- (674.85')** GROUNDWATER ELEVATION
-  LANDFILL REVIEW BOUNDARY
-  LANDFILL COMPLIANCE BOUNDARY
-  APPROXIMATE LIMIT OF WASTE
-  GROUNDWATER SURFACE CONTOUR

NOTES:
 1. GROUNDWATER SURFACE CONTOURS DEVELOPED USING GROUNDWATER ELEVATIONS MEASURED IN SHALLOW WELLS ON JULY 18, 2011.

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GENERALIZED
 GROUNDWATER
 SURFACE CONTOURS
 JULY 2011
 MCGUIRE NUCLEAR SATION
 LANDFILL #1 PERMIT #60-04

FIGURE
3

DRAWN BY: ANDREW MOORE
 PROJECT MANAGER: WILLIAM M. MILLER
 CLIENT: DUKE ENERGY CAROLINAS
 DATE: 8/23/11



FILE PATH: P:\DUKE-LF GROUNDWATER REPORTS-2369\2369.07 MNS #1\11\2011\JULY SAMPLING\FIGURES\MNS LF #1-GW.DWG

TABLES

**Table 1 - Field Data Parameters
Duke Energy McGuire Nuclear Station
Landfill #1 - 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)
7/18/2011	MW-1	69.00	30.02	700.27	N/A	N/A	CP	N/A	6.36	19.50	NO	16.3	96	6.2	10.5	N/A	N/A
7/18/2011	MW-1D	88.60	30.83	699.84	N/A	N/A	CP	N/A	9.42	28.50	NO	16.9	81	6.1	17.1	N/A	N/A
7/18/2011	MW-2A	78.00	53.95	686.30	N/A	N/A	CP	N/A	3.92	12.00	NO	17.6	60	6.5	1.1	N/A	N/A
7/18/2011	MW-2D	110.10	55.11	685.68	N/A	N/A	CP	N/A	8.97	27.00	NO	17.1	58	6.9	2.0	N/A	N/A
7/18/2011	MW-3	71.00	58.73	670.31	N/A	N/A	CP	N/A	2.00	6.00	NO	15.8	69	6.0	1.9	N/A	N/A
7/18/2011	MW-3D	88.88	58.08	670.35	N/A	N/A	CP	N/A	5.02	15.00	NO	16.3	94	6.4	0.3	N/A	N/A
7/18/2011	MW-4	73.95	65.90	675.34	N/A	N/A	CP	N/A	1.31	1.50	YES	17.1	161	5.4	1.1	N/A	N/A
7/18/2011	MW-4D	101.48	66.77	673.92	N/A	N/A	CP	N/A	5.66	17.25	NO	16.4	124	6.2	0.5	N/A	N/A
7/18/2011	MW-11	38.54	32.68	689.94	N/A	N/A	CP	N/A	0.96	1.25	YES	16.1	15	4.6	16.0	N/A	N/A
7/18/2011	MW-11D	101.80	33.36	689.80	N/A	N/A	CP	N/A	11.16	23.50	NO	15.8	27	5.5	10.9	N/A	N/A
7/18/2011	MW-12	29.59	27.28	697.55	N/A	N/A	CP	N/A	0.38	0.50	YES	18.2	25	5.3	84.3	N/A	N/A
7/18/2011	MW-12D	68.56	28.02	696.78	N/A	N/A	CP	N/A	6.61	21.00	NO	15.8	97	6.2	13.7	N/A	N/A
7/18/2011	SW-1	N/A	N/A	N/A	N/A	N/A	NP	N/A	N/A	N/A	N/A	23.7	180	6.6	63.2	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 Carolinas personnel.
3. umho/cm indicates micro ohms per centimeter.
4. SU indicates Standard Units.
5. NTU indicates Nephelometric Turbidity Units.
6. mV-NHE indicates millivolts-Normal Hydrogen Electrode.

**Table 2 - Groundwater Field and Analytical Results
Duke Energy McGuire Nuclear Station
Landfill #1 - Permit #60-04
Groundwater Monitoring Report**

Sample Date: July 18, 2011

Laboratory Certificate Codes:
Duke Energy Carolinas Field #5193
Duke Energy Analytical Laboratory #248
Pace Lab #12

Field Sampling performed by Duke Energy Carolinas

Parameter	SWS ID	Units	Certificate Code	Monitoring Wells					SWSL	15A NCAC 2L
				6004 MW-1	6004 MW-1D	6004 MW-2A	6004 MW-2D	6004 MW-3		
Field pH	320	SU	5193	6.2	6.1	6.5	6.9	6.0	-	6.5-8.5
Field Specific Conductivity	323	umho/cm	5193	96	81	60	58	69	-	-
Temperature	325	°C	5193	16.3	16.9	17.6	17.1	15.8	-	-
Top of Casing	328	feet	-	730.29	730.67	740.25	740.79	729.04	-	-
Depth to Water	318	feet	-	30.02	30.83	53.95	55.11	58.73	-	-
Water Elevation	427	feet	-	700.27	699.84	686.30	685.68	670.31	-	-
Well Depth	411	feet	-	69.00	88.60	78.00	110.10	71.00	-	-
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	191	71.2 J	16.5 J	14.5 J	41 J	100	700
Cadmium	34	µg/L	248	0.667 U	0.667 U	0.667 U	0.667 U	0.667 U	1	2
Chromium	51	µg/L	248	3.34 U	3.34 U	3.34 U	3.34 U	3.34 U	10	10
Lead	131	µg/L	248	0.667 U	0.667 U	0.667 U	0.667 U	2.5 J	10	15
Mercury	132	µg/L	248	0.0334 U	0.0334 U	0.0334 U	0.0334 U	0.0334 U	0.2	1
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	274 J	309 J	709 J	369 J	555 J	250,000	250,000
Chloromethane	137	µg/L	12	0.19 J	0.11 U	0.11 U	0.11 U	0.11 U	1	3
Dichlorodifluoromethane	74	µg/L	12	0.21 U	0.21 U	0.21 U	0.21 U	0.35 J	5	1,000
Ethylbenzene	110	µg/L	12	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1	600
Tetrachloroethene	192	µg/L	12	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	1	0.7
Toluene	196	µg/L	12	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	1	600
Trichloroethene	201	µg/L	12	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	1	3
Trichlorofluoromethane	203	µg/L	12	0.2 U	0.2 U	0.2 U	0.2 U	0.33 J	1	2,000
cis-1,2-Dichloroethene	78	µg/L	12	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	5	70
cis-1,3-Dichloropropene	86	µg/L	12	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	1	0.4
m&p-Xylene	359	µg/L	12	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	NE	500*

Notes:

- Concentrations presented in micrograms per liter (µg/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) provided by Tim Hunsucker of Duke Energy Carolinas on August 4, 2011.
- * The 2L standard for Xylenes-Total used.

**Table 2 - Groundwater Field and Analytical Results
Duke Energy McGuire Nuclear Station
Landfill #1 - Permit #60-04
Groundwater Monitoring Report**

Sample Date: July 18, 2011

Laboratory Certificate Codes:
Duke Energy Carolinas Field #5193
Duke Energy Analytical Laboratory #248
Pace Lab #12

Field Sampling performed by Duke Energy Carolinas

Parameter	SWS ID	Units	Certificate Code	Monitoring Wells					SWSL	15A NCAC 2L
				6004 MW-3D	6004 MW-4	6004 MW-4D	6004 MW-11	6004 MW-11D		
Field pH	320	SU	5193	6.4	5.4	6.2	4.6	5.5	-	6.5-8.5
Field Specific Conductivity	323	umho/cm	5193	94	161	124	15	27	-	-
Temperature	325	°C	5193	16.3	17.1	16.4	16.1	15.8	-	-
Top of Casing	328	feet	-	728.43	741.24	740.69	722.62	723.16	-	-
Depth to Water	318	feet	-	58.08	65.90	66.77	32.68	33.36	-	-
Water Elevation	427	feet	-	670.35	675.34	673.92	689.94	689.80	-	-
Well Depth	411	feet	-	88.88	73.95	101.48	38.54	101.80	-	-
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	21.2 J	72.3 J	21.7 J	6.43 J	10.3 J	100	700
Cadmium	34	µg/L	248	0.667 U	0.667 U	0.667 U	0.667 U	0.667 U	1	2
Chromium	51	µg/L	248	3.34 U	3.34 U	3.34 U	3.34 U	3.34 U	10	10
Lead	131	µg/L	248	0.667 U	0.667 U	0.667 U	0.667 U	0.667 U	10	15
Mercury	132	µg/L	248	0.0334 U	0.0334 U	0.0334 U	0.0334 U	0.0334 U	0.2	1
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	890 J	1,043 J	347 J	517 J	578 J	250,000	250,000
Chloromethane	137	µg/L	12	0.11 U	0.28 J	0.11 U	0.11 U	0.11 U	1	3
Dichlorodifluoromethane	74	µg/L	12	0.81 J	0.21 U	0.66 J	0.21 U	0.21 U	5	1,000
Ethylbenzene	110	µg/L	12	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1	600
Tetrachloroethene	192	µg/L	12	0.46 U	1.2	0.75 J	0.46 U	0.46 U	1	0.7
Toluene	196	µg/L	12	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	1	600
Trichloroethene	201	µg/L	12	0.47 U	1.9	1.7	0.47 U	0.47 U	1	3
Trichlorofluoromethane	203	µg/L	12	0.41 J	0.2 U	0.2 U	0.2 U	0.2 U	1	2,000
cis-1,2-Dichloroethene	78	µg/L	12	0.26 J	4.2 J	2.5 J	0.19 U	0.19 U	5	70
cis-1,3-Dichloropropene	86	µg/L	12	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	1	0.4
m&p-Xylene	359	µg/L	12	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	1.1	0.23 U	0.23 U	NE	500*

Notes:

- Concentrations presented in micrograms per liter (µg/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) provided by Tim Hunsucker of Duke Energy Carolinas on August 4, 2011.
- * The 2L standard for Xylenes-Total used.

**Table 2 - Groundwater Field and Analytical Results
Duke Energy McGuire Nuclear Station
Landfill #1 - Permit #60-04
Groundwater Monitoring Report**

Sample Date: July 18, 2011				Laboratory Certificate Codes: Duke Energy Carolinas Field #5193 Duke Energy Analytical Laboratory #248 Pace Lab #12					
Field Sampling performed by Duke Energy Carolinas									
Parameter	SWS ID	Units	Certificate Code	Monitoring Wells		Trip Blank	Field Blank	SWSL	15A NCAC 2L
				6004 MW-12	6004 MW-12D				
Field pH	320	SU	5193	5.3	6.2	-	-	-	6.5-8.5
Field Specific Conductivity	323	umho/cm	5193	25	97	-	-	-	-
Temperature	325	°C	5193	18.2	15.8	-	-	-	-
Top of Casing	328	feet	-	724.83	724.80	-	-	-	-
Depth to Water	318	feet	-	27.28	28.02	-	-	-	-
Water Elevation	427	feet	-	697.55	696.78	-	-	-	-
Well Depth	411	feet	-	29.59	68.56	-	-	-	-
Arsenic	14	µg/L	248	0.667 U	0.667 U	-	0.667 U	10	10
Barium	15	µg/L	248	13.9 J	12.4 J	-	3.34 U	100	700
Cadmium	34	µg/L	248	0.667 U	0.667 U	-	0.667 U	1	2
Chromium	51	µg/L	248	3.34 U	3.34 U	-	3.34 U	10	10
Lead	131	µg/L	248	0.667 U	0.667 U	-	0.667 U	10	15
Mercury	132	µg/L	248	0.0334 U	0.0334 U	-	0.0334 U	0.2	1
Selenium	183	µg/L	248	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	10	20
Sulfate	315	µg/L	248	219 J	207 J	-	18 U	250,000	250,000
Chloromethane	137	µg/L	12	0.11 U	0.11 U	0.11 U	0.11 U	1	3
Dichlorodifluoromethane	74	µg/L	12	0.21 U	0.21 U	0.21 U	0.21 U	5	1,000
Ethylbenzene	110	µg/L	12	0.3 U	0.3 U	0.3 U	0.3 U	1	600
Tetrachloroethene	192	µg/L	12	0.46 U	0.46 U	0.46 U	0.46 U	1	0.7
Toluene	196	µg/L	12	0.26 U	0.26 U	0.26 U	0.26 U	1	600
Trichloroethene	201	µg/L	12	0.47 U	0.47 U	0.47 U	0.47 U	1	3
Trichlorofluoromethane	203	µg/L	12	0.2 U	0.2 U	0.2 U	0.2 U	1	2,000
cis-1,2-Dichloroethene	78	µg/L	12	0.19 U	0.19 U	0.19 U	0.13 U	5	70
cis-1,3-Dichloropropene	86	µg/L	12	0.13 U	0.13 U	0.13 U	0.13 U	1	0.4
m&p-Xylene	359	µg/L	12	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	NE	500*

Notes:

- Concentrations presented in micrograms per liter (µg/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) provided by Tim Hunsucker of Duke Energy Carolinas on August 4, 2011.
- * The 2L standard for Xylenes-Total used.

**Table 3 - Surface Water Field and Analytical Results
Duke Energy McGuire Nuclear Station
Landfill #1 - Permit #60-04
Groundwater Monitoring Report**

Sample Date: July 18, 2011 Laboratory Certificate Codes:
Duke Energy Carolinas Field #5193
Duke Energy Analytical Laboratory #248
Field Sampling performed by Duke Energy Carolinas Pace Lab #12

Parameter	SWS ID	Units	Certificate Code	SW-1	SWSL	15A NCAC 2B
Field pH	320	SU	5193	6.6	-	6.0-9.0
Field Specific Conductivity	323	umho/cm	5193	180	-	-
Temperature	325	°C	5193	23.7	-	-
Top of Casing	328	feet	-	-	-	-
Depth to Water	318	feet	-	-	-	-
Water Elevation	427	feet	-	-	-	-
Well Depth	411	feet	-	-	-	-
Arsenic	14	µg/L	248	0.667 U	10	10
Barium	15	µg/L	248	65.8 J	100	200,000*
Cadmium	34	µg/L	248	0.667 U	1	2
Chromium	51	µg/L	248	3.34 U	10	50
Lead	131	µg/L	248	0.667 U	10	25
Mercury	132	µg/L	248	0.0334 U	0.2	0.012
Selenium	183	µg/L	248	0.667 U	10	5
Silver	184	µg/L	248	3.34 U	10	0.06
Sulfate	315	µg/L	248	1,322 J	250,000	LD
Chloromethane	137	µg/L	12	0.11 U	1	96*
Dichlorodifluoromethane	74	µg/L	12	0.21 U	5	NE
Ethylbenzene	110	µg/L	12	0.39 J	1	97*
Tetrachloroethene	192	µg/L	12	0.46 U	1	3.3
Toluene	196	µg/L	12	2.1	1	11
Trichloroethene	201	µg/L	12	0.47 U	1	30
Trichlorofluoromethane	203	µg/L	12	0.2 U	1	67,000*
cis-1,2-Dichloroethene	78	µg/L	12	0.19 U	5	4,900*
cis-1,3-Dichloropropene	86	µg/L	12	1.8	1	NE
m&p-Xylene	359	µg/L	12	1.4 J	NE	670**
o-Xylene	408	µg/L	12	0.41 J	NE	800*

Notes:

- Concentrations presented in micrograms per liter (µg/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/wq/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 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) provided by Tim Hunsucker of Duke Energy Carolinas on August 4, 2011.
- ** The EPA Criteria standard for Xylenes-Total used.

**Table 4 - North Carolina Administrative Code (NCAC) 2L Groundwater Quality Exceedances
Duke Energy McGuire Nuclear Station
Landfill #1 - Permit #60-04
Groundwater Monitoring Report**

Sample Date: July 18, 2011					
Field sampling performed by Duke Energy Carolinas					
Parameter	Well ID	Units	Result	2L Standard	Cause and Significance
pH	MW-1	SU	6.2	6.5-8.5	pH consistent with historic readings at MW-1.
	MW-1D	SU	6.1		pH consistent with historic readings at MW1-D.
	MW-3	SU	6.0		pH consistent with historic readings at MW-3.
	MW-3D	SU	6.4		pH consistent with historic readings at MW-3D.
	MW-4	SU	5.4		pH consistent with historic readings at MW-4.
	MW-4D	SU	6.2		pH consistent with historic readings at MW-4D.
	MW-11	SU	4.6		pH consistent with historic readings at MW-11.
	MW-11D	SU	5.5		pH readings over the past three years range from 5.6-5.8. Duke will closely monitor pH at this location in future sampling events.
	MW-12	SU	5.3		pH consistent with historic readings at MW-12.
	MW-12D	SU	6.2		pH readings over the past three years range from 6.3-6.5. Duke will closely monitor pH at this location in future sampling events.
Tetrachlorethene	MW-4	µg/L	1.2	0.7	Consistent with historic readings at the site. MW-4 and MW-4D are located approximately 15 feet from waste boundary and approximately 110 feet within the landfill review boundary.
	MW-4D	µg/L	0.75 J		

Notes:

1. 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).
2. Data obtained from Electronic Data Deliverable (EDD) provided by Tim Hunsucker of Duke Energy Carolinas on August 4, 2011.

**Table 5 - Radiological Analytical Results
Duke Energy McGuire Nuclear Station
Landfill # 1 - Permit #60-04
Groundwater Monitoring Report**

Sample Date: July 18, 2011			Laboratory Certification Code Duke Energy Analytical Laboratory #248												
Field Sampling Performed by Duke Energy Carolinas															
Parameter	Units	Certificate Code	Monitoring Wells												SW-1
			MW-1	MW-1D	MW-2A	MW-2D	MW-3	MW-3D	MW-4	MW-4D	MW-11	MW-11D	MW-12	MW-12D	
Alpha	pCi/L	248	<-0.56	<-0.25	<-0.29	<-0.097	<-2.5	<-0.42	<-2.6	<-2.7	<0.160	<0.0403	<0.201	<0.259	<-2.5
BaLa-140	pCi/L	248	<6.40	<4.86	<6.47	<5.75	<4.56	<5.34	<5.90	<12.7	<6.17	<4.27	NS	<8.15	<4.21
Be-7	pCi/L	248	<41.1	<33.9	<35.0	<34.0	<28.2	<26.5	<34.9	<54.9	<41.4	<32.4	NS	<28.1	<33.0
Beta	pCi/L	248	1.29	0.686	<-0.21	<-0.082	0.656	<0.293	0.715	<0.445	<0.159	<0.396	0.845	<-0.086	1.45
Co-58	pCi/L	248	<4.12	<3.93	<4.73	<3.66	<3.90	<3.54	<4.74	<7.43	<4.05	<3.82	NS	<4.10	<3.20
Co-60	pCi/L	248	<6.68	<4.84	<6.23	<5.55	<5.01	<5.27	<5.58	<8.55	<6.84	<4.66	NS	<5.89	<3.90
Cs-134	pCi/L	248	<4.79	<4.00	<4.47	<4.20	<3.62	<3.52	<3.89	<5.88	<4.62	<3.74	NS	<4.96	<4.10
Cs-137	pCi/L	248	<4.60	<4.07	<5.32	<4.95	<3.60	<4.67	<4.35	<8.11	<5.58	<4.58	NS	<6.04	<4.69
Fe-59	pCi/L	248	<7.84	<7.83	<8.30	<8.58	<8.00	<8.18	<8.23	<15.2	<10.9	<7.70	NS	<9.37	<5.77
H3GW	pCi/L	248	<8.13	<30.4	<-30	<0.00	<-63	<-16	<-29	<53.6	<46.3	<-4.1	<6.08	<46.4	<51.8
I-131	pCi/L	248	<5.07	<5.13	<5.20	<4.92	<3.72	<4.07	<4.50	<9.12	<5.56	<3.81	NS	<5.40	<4.30
K-40	pCi/L	248	41.1	240	107	224	42.8	50.5	15.4	<136	254	108	NS	<96.1	88.1
Mn-54	pCi/L	248	<5.75	<4.04	<5.16	<4.72	<3.90	<3.68	<4.92	<7.41	<3.69	<4.31	NS	<4.90	<4.37
Nb-95	pCi/L	248	<5.55	<4.04	<4.67	<4.95	<3.77	<3.51	<5.28	<6.39	<4.83	<4.39	NS	<4.87	<4.30
Zn-65	pCi/L	248	<9.32	<8.72	<9.36	<8.20	<7.54	<9.35	<9.06	<7.75	<8.06	<9.24	NS	<9.06	<7.66
Zr-95	pCi/L	248	<8.51	<6.24	<8.38	<7.41	<7.14	<6.20	<8.12	<9.69	<6.96	<6.08	NS	<9.00	<5.47

Notes:

1. Analytical results provided by EnRad Laboratory and are found in MCGUIRE_23JUN2011_A.
2. Concentrations presented in picocuries per liter (pCi/L).
3. No gamma sample was collected for MW-12 due to insufficient volume.
4. 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

MCGUIRE_23JUN#2011_A	Sample Class	Samples Originating From	NC <input checked="" type="checkbox"/> SC <input type="checkbox"/>
LYNN BURROW	6/23/2011 9:39	SAMPLE PROGRAM Groundwater <input checked="" type="checkbox"/> NPDES <input type="checkbox"/> Drinking Water <input type="checkbox"/> UST <input type="checkbox"/> RCRA Waste <input type="checkbox"/>	
VENDOR		Cooler Temp (C) 15 Preserv.: 1=HCL 2=H ₂ SO ₄ 3=HNO ₃ 4=Ice 5=None	

19 Page 1 of 1
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

1) Project Name **MNS LANDFILL 1 # 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

LAB USE ONLY

11 Lab ID
216649
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12 Chem Desktop No.	13 Sample Description or ID	14 Collection Information			17 Comp.	18 Grab	Gamma	Gross A & B	Tritium	19 Total # of Containers
		Date	Time	Signature						
	MW-1	7/18/11	1115	WC		X	1	1	1	3
	MW-1D	7/18/11	1150	WC		X	1	1	1	3
	MW-2A	7/18/11	1010	RAW		X	1	1	1	3
	MW-2D	7/18/11	1030	RAW		X	1	1	1	3
	MW-3	7/18/11	0830	RAW		X	1	1	1	3
	MW-3D	7/18/11	0850	RAW		X	1	1	1	3
	MW-4	7/18/11	0700	RAW		X	1	1	1	3
	MW-4D	7/18/11	0730	RAW		X	1	1	1	3
	MW-11	7/18/11	0700	WC		X	1	1	1	3
	MW-11D	7/18/11	0805	WC		X	1	1	1	3
	MW-12	7/18/11	0855	WC		X	1	1	1	3
	MW-12D	7/18/11	0955	WC		X	1	1	1	3
	SW-1	7/18/11	1210	WC		X	1	1	1	3

Customer to sign & date below

21) Relinquished By: <i>[Signature]</i>	Date/Time: 7/18/11 1355	Accepted By: <i>[Signature]</i>	Date/Time: 7/18/11 1355
Relinquished By:	Date/Time:	Accepted By:	Date/Time:
Relinquished By:	Date/Time:	Accepted By:	Date/Time:
23) Seal/Locked By:	Date/Time:	Sealed/Lock Opened By:	Date/Time:
24) Comments: INSUFFICIENT VOL / ACCORDING TO COLLECT GAMMA AT MW-12			

22) Requested Turnaround

14 Days

*7 Days

*48 Hr

*Other

*Add. Cost Will Apply

EnRad Page 1 of 12

Customer must Complete

Customer to complete appropriate columns to right

16 Analyses Required

Customer to complete all appropriate NON-SHADED areas.