

## **DUKE RIVERBEND STEAM STATION**

### **PERMIT NC0004961**

#### **GROUNDWATER MONITORING WELL CONSTRUCTION AND SAMPLING PLAN**

1. The permittee shall conduct groundwater monitoring as may be required to determine the compliance of this NPDES permitted facility with the current groundwater Standards found under 15A NCAC 2L .0200
2. WELL CONSTRUCTION. Within 120 days of permit issuance, monitoring wells, as proposed on Attachment 1, shall be installed to monitor groundwater quality.
  - a. Shallow (S) monitoring wells shall be constructed such that the water level in the monitoring well is never above or below the screened (open) portion of the well at any time during the year. Deep (D) monitoring wells shall have screen(s) at designated intervals in the water column below the static shallow groundwater level. The deep wells should be constructed such that the screened portion is discrete and situated in the transition zone between competent bedrock and the regolith. Monitoring wells shall be constructed in accordance with 15A NCAC 02C .0108 (Standards of Construction for Wells Other than Water Supply) and any other jurisdictional laws and regulations pertaining to well construction. The general locations for all monitoring wells are indicated on Attachment 1.
  - b. The Mooresville Regional Office, telephone number (704) 663-1699 shall approve the location of new monitoring wells prior to installation. The regional office shall be notified at least 48 hours prior to the construction of any monitoring well and such notification to the Aquifer Protection Section's regional supervisor shall be made from 8:00 a.m. until 5:00 p.m. on Monday through Friday, excluding State Holidays.
  - c. Within 60 days of completion of the monitoring wells, the Permittee shall submit two original copies of a site map with a scale no greater than 1-inch equals 500 feet. At a minimum, the map shall include the following information:
    - i. The location and identity of each monitoring well.
    - ii. The location of major components of the waste disposal system.
    - iii. The location of property boundaries within 500 feet of the disposal areas.
    - iv. The latitude and longitude of the established horizontal control monument.
    - v. The elevation of the top of the well casing (i.e., measuring point) relative to a common datum.
    - vi. The depth of water below the measuring point at the time the measuring point is established.
    - vii. The location of compliance and review boundaries.
    - viii. The date the map is prepared and/or revised.
    - ix. Topographic contours in no more than ten (10) foot intervals
  - d. The above information should be overlaid on the most recent aerial photograph taken of the site. Control monuments shall be installed in such a manner and made of such materials that the monument will not be destroyed due to activities taking place on the property. The map and any supporting documentation shall be sent to the Division of Water Quality, Aquifer Protection Section, 1636 Mail Service Center, Raleigh, NC 27699-1636.

- e. The well(s) must be constructed by a North Carolina Certified Well Contractor, the property owner, or the property lessee according to General Statutes 87-98.4. If the construction is not performed by a certified well contractor, the property owner or lessee, provided they are a natural person, must physically perform the actual well construction activities.
  - f. The monitoring wells shall be regularly maintained. Such maintenance shall include ensuring that the well caps are rust-free and locked at all times, the outer casing is upright and undamaged, and the well does not serve as a conduit for contamination.
3. GROUNDWATER SAMPLING. Monitoring wells shall be sampled after construction and thereafter at the frequencies and for the parameters as specified in Attachment XX. Groundwater sampling done by other than monitoring wells shall be monitored at the same frequency and for the same parameters as required for monitoring wells. The method(s) for sampling other than by wells shall be at the discretion of the Permittee, but should be conducted at or as close to the compliance boundary as physically possible. All mapping, well construction forms, well abandonment forms and monitoring data shall refer to the permit number and the well nomenclature as provided on Attachment XX.
- a. Per 15A NCAC 02H .0800, a Division certified laboratory shall conduct all laboratory analyses for the required effluent, groundwater or surface water parameters.
  - b. The measurement of water levels shall be made prior to purging the wells. The depth to water in each well shall be measured from the surveyed point on the top of the casing. The measurement of pH shall be made after purging and prior to sampling for the remaining parameters.
  - c. The measuring points (top of well casing) of all monitoring wells shall be surveyed to provide the relative elevation of the measuring point for each monitoring well. The measuring points (top of casing) of all monitoring wells shall be surveyed relative to a common datum.
  - d. For initial sampling of monitoring wells, the Permittee shall submit a Compliance Monitoring Form (GW-59) and a Well Construction Record Form (GW-1) listing this permit number and the appropriate monitoring well identification number. Initial Compliance Monitoring Forms (GW-59) without copies of the Well Construction Record Forms (GW-1) are deemed incomplete, and may be returned to the Permittee without being processed.
  - e. Two copies of the monitoring well sampling and analysis results shall be submitted on a Compliance Monitoring Form (GW-59), along with attached copies of laboratory analyses, on or before the last working day of the month following the sampling month. The Compliance Monitoring Form (GW-59) shall include this permit number, the appropriate well identification number, and one GW-59a certification form shall be submitted with each set of sampling results. All information shall be submitted to the following address:

Division of Water Quality  
Information Processing Unit  
1617 Mail Service Center  
Raleigh, North Carolina 27699-1617

4. **COMPLIANCE BOUNDARY.** The compliance boundary for the disposal system shall be specified in accordance with 15A NCAC 02L .0107(a). This disposal system was individually permitted prior to December 30, 1983; therefore, the compliance boundary is established at either 500 feet from the effluent disposal area, or at the property boundary, whichever is closest to the effluent disposal area. An exceedance of groundwater standards at or beyond the compliance boundary is subject to remediation action according to 15A NCAC 02L .0106(c) as well as enforcement actions in accordance with North Carolina General Statute 143-215.6A through 143-215.6C.

**ATTACHMENT 1 – GROUNDWATER MONITORING PLAN**

**Permit Number: NC0004961**

**Version 1.0**

| WELL<br>NOMENCLATURE  | PARAMETER DESCRIPTION |                 |                  |                    | FREQUENCY               |
|---|-----------------------|-----------------|------------------|--------------------|-------------------------|
| <b>Monitoring Wells:<br/>MW-7S, MW-7D, MW-8S,<br/>MW-8D, MW-9, MW-10,<br/>MW-11S, MW-11D, MW-12,<br/>MW-13, MW-14</b> | <b>Antimony</b>       | <b>Chloride</b> | <b>Manganese</b> | <b>Sulfate</b>     | January, May, September |
|   | <b>Arsenic</b>        | <b>Chromium</b> | <b>Mercury</b>   | <b>TDS</b>         |                         |
|   | <b>Barium</b>         | <b>Copper</b>   | <b>Nickel</b>    | <b>Thallium</b>    |                         |
|   | <b>Boron</b>          | <b>Iron</b>     | <b>Nitrate</b>   | <b>Water Level</b> |                         |
|   | <b>Cadmium</b>        | <b>Lead</b>     | <b>pH</b>        | <b>Zinc</b>        |                         |
|   |                       |                 | <b>Selenium</b>  |                    |                         |

Note 1: For locations of monitoring wells, see attached map.

Note 2: Monitoring revisions may be considered, as applicable, if there are no significant detections prior to permit renewal.







## **DUKE ALLEN STEAM STATION NCO004979**

### **GROUNDWATER MONITORING WELL CONSTRUCTION AND SAMPLING PLAN**

1. The permittee shall conduct groundwater monitoring as may be required to determine the compliance of this NPDES permitted facility with the current groundwater Standards found under 15A NCAC 2L .0200
2. WELL CONSTRUCTION. Within 120 days of permit issuance, monitoring wells, as proposed on Attachment 1, shall be installed to monitor groundwater quality.
  - a. Shallow (S) monitoring wells shall be constructed such that the water level in the monitoring well is never above or below the screened (open) portion of the well at any time during the year. Deep (D) monitoring wells shall have screen(s) at designated intervals in the water column below the static shallow groundwater level. The deep wells should be constructed such that the screened portion is discrete and situated in the transition zone between competent bedrock and the regolith. Monitoring wells shall be constructed in accordance with 15A NCAC 02C .0108 (Standards of Construction for Wells Other than Water Supply) and any other jurisdictional laws and regulations pertaining to well construction. The general locations for all monitoring wells are indicated on Attachment 1.
  - b. The Mooresville Regional Office, telephone number (704) 663-1699 shall approve the location of new monitoring wells prior to installation. The regional office shall be notified at least 48 hours prior to the construction of any monitoring well and such notification to the Aquifer Protection Section's regional supervisor shall be made from 8:00 a.m. until 5:00 p.m. on Monday through Friday, excluding State Holidays.
  - c. Within 60 days of completion of the monitoring wells, the Permittee shall submit two original copies of a site map with a scale no greater than 1-inch equals 500 feet. At a minimum, the map shall include the following information:
    - i. The location and identity of each monitoring well.
    - ii. The location of major components of the waste disposal system.
    - iii. The location of property boundaries within 500 feet of the disposal areas.
    - iv. The latitude and longitude of the established horizontal control monument.
    - v. The elevation of the top of the well casing (i.e., measuring point) relative to a common datum.
    - vi. The depth of water below the measuring point at the time the measuring point is established.
    - vii. The location of compliance and review boundaries.
    - viii. The date the map is prepared and/or revised.
    - ix. Topographic contours in no more than ten (10) foot intervals
  - d. The above information should be overlaid on the most recent aerial photograph taken of the site. Control monuments shall be installed in such a manner and made of such materials that the monument will not be destroyed due to activities taking place on the property. The map and any supporting documentation shall be sent to the Division of Water Quality, Aquifer Protection Section, 1636 Mail Service Center, Raleigh, NC 27699-1636.
  - e. The well(s) must be constructed by a North Carolina Certified Well Contractor, the property owner, or the property lessee according to General Statutes 87-98.4. If the construction is not performed by a certified well contractor, the property owner or lessee, provided they are a natural person, must physically perform the actual well construction activities.

- f. The monitoring wells shall be regularly maintained. Such maintenance shall include ensuring that the well caps are rust-free and locked at all times, the outer casing is upright and undamaged, and the well does not serve as a conduit for contamination.
3. GROUNDWATER SAMPLING. Monitoring wells shall be sampled after construction and thereafter at the frequencies and for the parameters as specified in Attachment XX. Groundwater sampling done by other than monitoring wells shall be monitored at the same frequency and for the same parameters as required for monitoring wells. The method(s) for sampling other than by wells shall be at the discretion of the Permittee, but should be conducted at or as close to the compliance boundary as physically possible. All mapping, well construction forms, well abandonment forms and monitoring data shall refer to the permit number and the well nomenclature as provided on Attachment XX.
- a. Per 15A NCAC 02H .0800, a Division certified laboratory shall conduct all laboratory analyses for the required effluent, groundwater or surface water parameters.
  - b. The measurement of water levels shall be made prior to purging the wells. The depth to water in each well shall be measured from the surveyed point on the top of the casing. The measurement of pH shall be made after purging and prior to sampling for the remaining parameters.
  - c. The measuring points (top of well casing) of all monitoring wells shall be surveyed to provide the relative elevation of the measuring point for each monitoring well. The measuring points (top of casing) of all monitoring wells shall be surveyed relative to a common datum.
  - d. For initial sampling of monitoring wells, the Permittee shall submit a Compliance Monitoring Form (GW-59) and a Well Construction Record Form (GW-1) listing this permit number and the appropriate monitoring well identification number. Initial Compliance Monitoring Forms (GW-59) without copies of the Well Construction Record Forms (GW-1) are deemed incomplete, and may be returned to the Permittee without being processed.
  - e. Two copies of the monitoring well sampling and analysis results shall be submitted on a Compliance Monitoring Form (GW-59), along with attached copies of laboratory analyses, on or before the last working day of the month following the sampling month. The Compliance Monitoring Form (GW-59) shall include this permit number, the appropriate well identification number, and one GW-59a certification form shall be submitted with each set of sampling results. All information shall be submitted to the following address:  

Division of Water Quality  
Information Processing Unit  
1617 Mail Service Center  
Raleigh, North Carolina 27699-1617
4. COMPLIANCE BOUNDARY. The compliance boundary for the disposal system shall be specified in accordance with 15A NCAC 02L .0107(a). This disposal system was individually permitted prior to December 30, 1983; therefore, the compliance boundary is established at either 500 feet from the effluent disposal area, or at the property boundary, whichever is closest to the effluent disposal area. An exceedance of groundwater standards at or beyond the compliance boundary is subject to remediation action according to 15A NCAC 02L .0106(c) as well as enforcement actions in accordance with North Carolina General Statute 143-215.6A through 143-215.6C.

## ATTACHMENT 1 – GROUNDWATER MONITORING PLAN

**Permit Number: NC0004979**

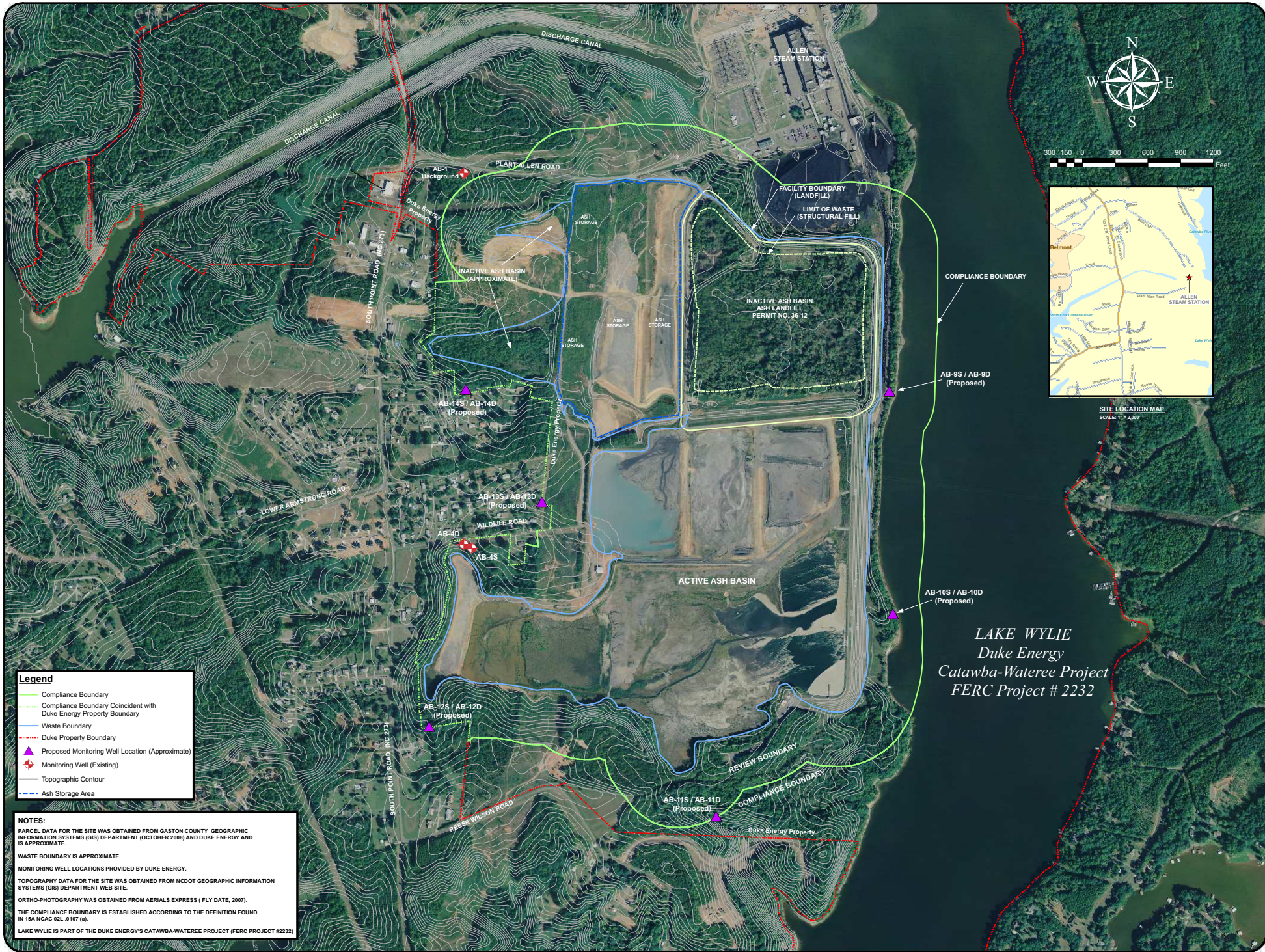
**Version 1.0**

| WELL NOMENCLATURE  | PARAMETER DESCRIPTION |          |           |             | FREQUENCY               |
|--|-----------------------|----------|-----------|-------------|-------------------------|
| <b>Monitoring Wells:</b><br>AB-1 (Background),<br>AB-4S, AB-4D, AB-9S, AB-9D, AB-10S, AB-10D, AB-11S, AB-11D, AB-12S, AB-12D, AB-13S- AB-13D, 14S, 14D | Antimony              | Chloride | Manganese | Sulfate     | January, May, September |
|  | Arsenic               | Chromium | Mercury   | TDS         |                         |
|  | Barium                | Copper   | Nickel    | Thallium    |                         |
|  | Boron                 | Iron     | Nitrate   | Water Level |                         |
|  | Cadmium               | Lead     | pH        | Zinc        |                         |
|  |                       |          | Selenium  |             |                         |

Note 1: For locations of monitoring wells, see attached map.

Note 2: Monitoring revisions may be considered, as applicable, if there are no significant detections prior to permit renewal.





| Legend |   |
|--------|---|
|        | Compliance Boundary   |
|        | Compliance Boundary Coincident with Duke Energy Property Boundary |
|        | Waste Boundary  |
|        | Duke Property Boundary  |
|        | Proposed Monitoring Well Location (Approximate)                   |
|        | Monitoring Well (Existing)  |
|        | Topographic Contour   |
|        | Ash Storage Area  |

**NOTES:**  
 PARCEL DATA FOR THE SITE WAS OBTAINED FROM GASTON COUNTY GEOGRAPHIC INFORMATION SYSTEMS (GIS) DEPARTMENT (OCTOBER 2008) AND DUKE ENERGY AND IS APPROXIMATE.  
 WASTE BOUNDARY IS APPROXIMATE.  
 MONITORING WELL LOCATIONS PROVIDED BY DUKE ENERGY.  
 TOPOGRAPHY DATA FOR THE SITE WAS OBTAINED FROM NCDOT GEOGRAPHIC INFORMATION SYSTEMS (GIS) DEPARTMENT WEB SITE.  
 ORTHO-PHOTOGRAPHY WAS OBTAINED FROM AERIALS EXPRESS (FLY DATE, 2007).  
 THE COMPLIANCE BOUNDARY IS ESTABLISHED ACCORDING TO THE DEFINITION FOUND IN 15A NCAC 02L .0107 (a).  
 LAKE WYLIE IS PART OF THE DUKE ENERGY'S CATAWBA-WATEREE PROJECT (FERC PROJECT #2232)

LAKE WYLIE  
 Duke Energy  
 Catawba-Waterree Project  
 FERC Project # 2232



| NO. | DATE | BY | DESCRIPTION |
|-----|------|----|-------------|
|     |      |    |             |
|     |      |    |             |
|     |      |    |             |
|     |      |    |             |

**PROPOSED MONITORING LOCATIONS**  
**ALLEN ASH BASIN**  
**DUKE ENERGY - ALLEN STEAM STATION**  
**GASTON COUNTY, NORTH CAROLINA**

|                            |                     |                    |
|----------------------------|---------------------|--------------------|
| DESIGNED BY:<br>R. FOWERS  | CHECKED BY:<br>JOF  | DATE:<br>2/26/2010 |
| DESIGNED BY:<br>LTA        | APPROVED BY:<br>LTA | DATE:<br>2/26/2010 |
| PROJECT NO:<br>1411-09-056 | SCALE:<br>1"=500'   | DATE:<br>2/26/2010 |
| <b>1</b>                   | <b>1</b>            | <b>1</b>           |



## DUKE MARSHALL STEAM STATION

### PERMIT NC0004987

#### GROUNDWATER MONITORING WELL CONSTRUCTION AND SAMPLING PLAN

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    - iv. The latitude and longitude of the established horizontal control monument.
    - v. The elevation of the top of the well casing (i.e., measuring point) relative to a common datum.
    - vi. The depth of water below the measuring point at the time the measuring point is established.
    - vii. The location of compliance and review boundaries.
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  - c. The measuring points (top of well casing) of all monitoring wells shall be surveyed to provide the relative elevation of the measuring point for each monitoring well. The measuring points (top of casing) of all monitoring wells shall be surveyed relative to a common datum.
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Division of Water Quality  
 Information Processing Unit  
 1617 Mail Service Center  
 Raleigh, North Carolina 27699-1617

4. **COMPLIANCE BOUNDARY.** The compliance boundary for the disposal system shall be specified in accordance with 15A NCAC 02L .0107(a). This disposal system was individually permitted prior to December 30, 1983; therefore, the compliance boundary is established at either 500 feet from the effluent disposal area, or at the property boundary, whichever is closest to the effluent disposal area. An exceedance of groundwater standards at or beyond the compliance boundary is subject to remediation action according to 15A NCAC 02L .0106(c) as well as enforcement actions in accordance with North Carolina General Statute 143-215.6A through 143-215.6C.

**ATTACHMENT 1 – GROUNDWATER MONITORING PLAN**

**Permit Number:** NC0004987

**Version** 1.0

| WELL<br>NOMENCLATURE  | PARAMETER DESCRIPTION |                 |                  |                    | FREQUENCY               |
|---|-----------------------|-----------------|------------------|--------------------|-------------------------|
| <b>Monitoring Wells:</b><br>MW-4, MW-4D, MW-10S, MW-10D, MW-11S, MW-11D, MW-12S, MW-12D, MW-13S, MW-13D, MW-14S, MW-14D | <b>Antimony</b>       | <b>Chloride</b> | <b>Manganese</b> | <b>Sulfate</b>     | January, May, September |
|   | <b>Arsenic</b>        | <b>Chromium</b> | <b>Mercury</b>   | <b>TDS</b>         |                         |
|   | <b>Barium</b>         | <b>Copper</b>   | <b>Nickel</b>    | <b>Thallium</b>    |                         |
|   | <b>Boron</b>          | <b>Iron</b>     | <b>Nitrate</b>   | <b>Water Level</b> |                         |
|   | <b>Cadmium</b>        | <b>Lead</b>     | <b>pH</b>        | <b>Zinc</b>        |                         |
|   |                       |                 | <b>Selenium</b>  |                    |                         |

Note 1: For locations of monitoring wells, see attached map.

Note 2: Monitoring revisions may be considered, as applicable, if there are no significant detections prior to permit renewal.



