W. H. Weatherspoon Power Plant Ash Basin

Topographic Map and Discharge Assessment Plan

NPDES Permit NC0005363

December 30, 2014

DUKE ENERGY®

HDR

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List of Figures and Tables

Section 1 - Introduction

The purpose of this document is to address the requirements of North Carolina General Statute (GS)130A-309.210(a) *topographic map* and (b) *Assessment of Discharges from Coal Combustion Residuals Surface Impoundments to the Surface Waters of the State*, as modified by North Carolina Senate Bill 729, for the W. H. Weatherspoon Power Plant (Weatherspoon Plant) ash basin operated under National Pollutant Discharge Elimination System (NPDES) Permit NC0005363.

The following requirements are contained in General Statute (GS) 130A-309.210(a):

(1) The owner of a coal combustion residuals surface impoundment shall identify all discharges from the impoundment as provided in this subsection. The requirements for identifying all discharges from an impoundment set out in this subsection are in addition to any other requirements for identifying discharges applicable to the owners of coal combustion residuals surface impoundments.

(2) No later than December 31, 2014, the owner of a coal combustion residuals surface impoundment shall submit a topographic map that identifies the location of all (i) outfalls from engineered channels designed or improved for the purpose of collecting water from the toe of the impoundment and (ii) seeps and weeps discharging from the impoundment that are not captured by engineered channels designed or improved for the purpose of collecting water from the toe of the impoundment to the Department. The topographic map shall comply with all of the following:

a. Be at a scale as required by the Department.

b. Specify the latitude and longitude of each toe drain outfall, seep, and weep.

c. Specify whether the discharge from each toe drain outfall, seep, and weep is continuous or intermittent.

d. Provide an average flow measurement of the discharge from each toe drain outfall, seep, and weep including a description of the method used to measure average flow.

e. Specify whether the discharge from each toe drain outfall, seep, and weep identified reaches the surface waters of the State. If the discharge from a toe drain outfall, seep, or weep reaches the surface waters of the State, the map shall specify the latitude and longitude of where the discharge reaches the surface waters of the State.

f. Include any other information related to the topographic map required by the Department.

The following requirements are contained in General Statute (GS) 130A-309.210(b):

b) Assessment of Discharges from Coal Combustion Residuals Surface Impoundments to the Surface Waters of the State. The owner of a coal combustion residuals surface

impoundment shall conduct an assessment of discharges from the coal combustion residuals surface impoundment to the surface waters of the State as provided in this subsection. The requirements for assessment of discharges from the coal combustion residuals surface impoundment to the surface waters of the State set out in this subsection are in addition to any other requirements for the assessment of discharges from coal combustion residuals surface impoundments to surface waters of the State applicable to the owners of coal combustion residuals surface impoundments.

(1) No later than December 31, 2014, the owner of a coal combustion residuals surface impoundment shall submit a proposed Discharge Assessment Plan to the Department. The Discharge Assessment Plan shall include information sufficient to allow the Department to determine whether any discharge, including a discharge from a toe drain outfall, seep, or weep, has reached the surface waters of the State and has caused a violation of surface water quality standards. The Discharge Assessment Plan shall include, at a minimum, all of the following:

a. Upstream and downstream sampling locations within all channels that could potentially carry a discharge.

b. A description of the surface water quality analyses that will be performed.

c. A sampling schedule, including frequency and duration of sampling activities.

d. Reporting requirements.

e. Any other information related to the identification of new discharges required by the Department.

(2) The Department shall approve the Discharge Assessment Plan if it determines that the Plan complies with the requirements of this subsection and will be sufficient to protect public health, safety, and welfare; the environment; and natural resources.

(3) No later than 30 days from the approval of the Discharge Assessment Plan, the owner shall begin implementation of the Plan in accordance with the Plan's schedule.

The North Carolina Senate Bill 729 establishes the submittal date of this topographic map and Discharge Assessment Plan no later than December 31, 2014.

The topographic map, developed to satisfy the requirements of GS130A-309.210(a), was utilized as the basis for developing the assessment procedures presented in this plan, required by GS130A-309.210(b).

Section 2 - Site Background

2.1 Plant Description

The Weatherspoon Plant is a former coal-fired electricity-generating facility located in Robeson County, North Carolina, near the city of Lumberton (Figure 1). The location of the Weatherspoon Plant is shown on Figure 1. The Weatherspoon Plant started operations in 1949. Two additional units were added in the 1950s. Four oil and natural gas fueled combustion turbines were added in the 1970s. As of October 2011, all of the coal-fired units were retired. The four oil and natural gas fueled units continue to operate to meet peak demand. The facility is located southeast of Lumberton on the east side of North Carolina Highway 72. The topography around the property generally slopes downward toward the Lumber River.

The Weatherspoon Plant utilizes an approximate 225-acre cooling pond located adjacent to the Lumber River. The ash basin is located north of the cooling pond, northeast of the plant. The Weatherspoon Plant NPDES permit (NC005363) authorizes the discharge of recirculated cooling water, ash sluice water, domestic wastewater, chemical metal cleaning water, and low volume wastewater including reject water from a reverse osmosis water treatment unit from the cooling pond via Outfall 001 to the Lumber River under severe weather conditions and cooling pond maintenance.

2.2 Ash Basin Description

The plant, cooling pond, and ash basin are located on the east side of the Lumber River. The ash basin is located north of the cooling pond, northeast of the Weatherspoon Plant. The ash basin consists of approximately 65 acres. The 500-foot compliance boundary circles the ash basin.

The ash basin is impounded by an earthen dike. Ash generated from coal combustion was stored on-site in the ash basin. Overflow from the ash basin drains to the northeast corner of the cooling pond.

2.3 Site Geologic/Soil Framework

Geographically, the Weatherspoon Plant lies within the Coastal Plain Physiographic Province. The North Carolina Coastal Plain is approximately 90 to 150 miles wide from the Atlantic Ocean westward to its boundary with the Piedmont province (Winner, Jr. and Coble, 1989). Two natural subdivisions of the Coastal Plain were described by Stuckey (1965): the Tidewater region and the Inner Coastal Plain. The Weatherspoon Plant is located within the Inner Coastal Plain, which consists of the gently rolling land surface between the Tidewater region and the Fall Line (Winner, Jr. and Coble, 1989). The Weatherspoon Plant is located within a subdivision of the Inner Coastal Plain that is typified by swampy areas in the flat uplands between major river systems. The Weatherspoon Plant is located on the east side of the Lumber River.

The Coastal Plain comprises a wedge-shaped sequence of stratified marine and nonmarine sedimentary rocks deposited on crystalline basement. The sedimentary sequences range in age from recent to lower Cretaceous (Winner, Jr. and Coble, 1989). In this region, units of confined aquifers divided by confining layers overlay the crystalline bedrock. These confined aquifers

consist of laterally continuous silt and clay rich layers. The Lower Cape Fear and Upper Cape Fear aquifers are depicted as the lower-most marine sediment units in the Robeson County area (USGS 1989). The Upper Cape Fear aquifer is overlain by a semi-confining unit that separates the Upper Cape Fear aquifer from the overlying Black Creek aquifer. A semi-confining unit over the Black Creek aquifer separates the Black Creek aquifer from the overlying Peedee aquifer. In this region, the semi-confining unit between the Peedee aquifer and the overlying Yorktown and/or Coastal Plain deposits that comprise the surficial aquifer is discontinuous.

The surficial aquifer is Quaternary in age and primarily composed of sands with interbedded silts and clays. The Yorktown Formation is of the Tertiary Era and generally consists of fine-grained sands, shell material, and bluish gray silts and clays. The contact between the Yorktown and the underlying Peedee may represent an erosion unconformity. Cretaceous in age, the Peedee formation generally consists of gray or light brown, silty, fine to very fine grained quartz sand with traces of glauconite, phosphorite, oyster shells, and pyrite. The Black Creek Formation is also considered Cretaceous in age and generally consists of clay, gray to black, lignitic; contains thin beds and laminae of fine-grained micaceous sand and thick lenses of cross-bedded sand. Glauconitic, fossiliferous clayey sand lenses are also reported to exist in the upper part of the Black Creek Formation. The surficial aquifer is the saturated zone that underlies the land surface and is generally shallow in the region. It is the first aquifer to receive recharge from precipitation. This recharge water is stored in the surface aquifer as the groundwater migrates toward local discharge points (lakes, rivers, streams, etc.). A portion of the groundwater in the surficial aquifer migrates vertically to recharge deeper, confined to semi-confined aquifers. On average, only a fraction of the surficial aquifer recharge reaches the deeper aquifers (Giese et al., 1997). This finding is thought to reflect the influence of confining and semi-confining layers and the substantial amount of time it takes for groundwater to reach these deeper units.

In the Robeson County part of the North Carolina Coastal Plain, groundwater is obtained from the surficial, Peedee, Yorktown, and Black Creek aquifers. The Coastal Plain groundwater system consists of aquifers comprised of permeable sands, gravels, and limestone separated by confining units of less permeable sediment.

2.4 Topographic Map and Identification of Discharges

A topographic map is presented in Figure 2 to meet the requirements of GS 130A-309.210(a) in the identification of outfalls from engineered channels, as well as seeps and weeps.

Seepage is the movement of wastewater from the ash basin through the ash basin embankment, the embankment foundation, the embankment abutments, basin rim, through residual material in areas adjacent to the ash basin. A seep is defined in this document as an expression of seepage at the ground surface. A weep is understood to have the same meaning as a seep.

Indicators of seepage include areas where water is observed on the ground surface and/or where vegetation suggests the presence of seepage. Seepage can emerge anywhere on the downstream face, beyond the toe, or on the downstream abutments at elevations below normal

pool. Seepage may vary in appearance from a "soft," wet area to a flowing "spring." Seepage may show up first as only an area where the vegetation is lusher and darker green than surrounding vegetation. Cattails, reeds, mosses, and other marsh vegetation often become established in a seepage area. However, in many instances, indicators of seeps do not necessarily indicate the presence of seeps. Areas of apparent iron staining and/or excess iron bacteria may also indicate the presence of a seep.

Locations of seepage at the ground surface adjacent to the ash basin have been identified and are shown in Figure 2. These areas include the earthen embankments which impound the ash basin as well as adjacent areas where water from the ash basin may have infiltrated into the underlying residual materials and expressed as seepage.

2.4.1 Engineered Drainage System for Earthen Dam

Earth dams are subject to seepage through the embankment, foundation, and abutments. Seepage control is necessary to prevent excessive uplift pressures, instability of the downstream slope, piping through the embankment and/or foundation, and erosion of material by migration into open joints in the foundation and abutments. The control of seepage is performed by the use of engineered drains such as blanket drains, trench drains, and/or toe drains. In certain cases horizontal pipes may be installed into the embankment to collect and control seepage. It is standard engineering practice to collect the seepage and convey seepage away from the dam.

The Weatherspoon Ash Basin Dam was constructed with engineered drainage system features, such as toe drains, or outfalls, associated with the ash basin dam, which are shown as required by GS 130A-309.210(a)(2)(i) on Figure 2.

2.4.2 Non-Engineered Seep Identification

Topographic maps of the site were reviewed to identify regions of the site where there was a potential for ash basin related seepage to be present. These regions were determined by comparing ash basin full pond elevations to adjacent topography with ground surface elevations lower than the ash basin full pond elevation. Synterra staff performed site observations within these identified areas as part of NPDES inspections during the reapplication process during August 2014 and documented locations where seepage was apparent at the time of the site visit. These seeps are identified as required by GS 130A-309.210(a)(2)(ii) on Figure 2.

Section 3 - Discharge Assessment Plan

3.1 Purpose of Assessment

The purpose of the assessment is to determine whether existing, known discharges from toe drain outfalls, seeps, and weeps associated with the coal combustion residuals surface impoundment (ash basin) have reached the surface waters of the State and have caused a violation of surface water quality standards as required by North Carolina General Statute 130A-309.210(b).

Figure 2 and Table 1 present the background and downstream sampling locations to be considered as part of this Discharge Assessment Plan (DAP). These locations may be assessed by comparing surface water sampling analytical results of the associated background location with the corresponding downstream location. For discharges located at the toe of a dam, an upstream location within the channel may not have been possible to isolate for comparison given the proximity to the ash basin, which would have the same chemical composition as the discharge itself. As such, the upstream location was established upstream of the ash basin and is considered “background.” For discharges located a distance from the ash basin, an identified upstream, or “background” location for sampling may be compared to the downstream portion of the discharge channel. The background and downstream sampling locations are shown on Figure 2 with “B” and “D” identifiers, respectively, and the corresponding seep locations associated with the sampling locations are indicated on Table 1.

3.2 Assessment Procedure

The assessment procedure associated with the Weatherspoon Plant ash basin is provided within this section. In addition to the specific requirements for the assessment, Section 3.2 also provides the general requirements, the frequency of assessment, documentation requirements, and a description of the surface water quality analyses that will be performed.

3.2.1 General Assessment Requirements

Assessments are to be performed in three phases as follows:

- Observation and sampling (assessment site visit),
- Evaluation, and
- Assessment reporting.

The assessment site visit shall be performed when the background and downstream locations are accessible and not influenced by weather events. Locations on or adjacent to the ash basin embankments should be performed within two months after mowing, if possible. In addition, the assessment site visit should not be performed if the following precipitation amounts have occurred in the respective time period preceding the planned assessment site visit:

- Precipitation of 0.1 inches or greater within 72 hours or
- Precipitation of 0.5 inches or greater within 96 hours.

The assessments shall be performed under the direction of a qualified Professional Engineer or Professional Geologist on a semi-annual basis within two nonadjacent quarters. The date of the

initial assessment site visit shall be selected no later than 30 days from the approval of the Discharge Assessment Plan and should fall within one of the semi-annual timeframes. Additional seep locations that may have been identified and documented in an Identification of New Discharge report(s) shall be reviewed prior to performing an assessment site visit, if available.

3.2.2 Observation and Sampling

The initial assessment site visit should be performed to document baseline conditions of the discharge channel, including location, extent (i.e., dimensions of affected area), and flow of each discharge. Discharge channel background and downstream locations should be verified using a Global Positioning System (GPS) device. Photographs should be taken from vantage points that can be replicated during subsequent semi-annual assessments.

Initial and subsequent assessment site visits shall document a minimum of the following to respond to the requirements in 130A-309.210.1(b):

- Record the most recent ash basin water surface elevation and compare to the seep and outfall and associated discharge location surface water elevations.
- For each discharge channel, the observer shall note the following as applicable on the day of the assessment site visit:
    - Is the discharge channel flowing at the time of the assessment site visit?
    - Does the discharge channel visibly flow into a Water of the U.S. at the time of the assessment site visit?
    - How far away is the nearest Water of the U.S.?
    - Document evidence that flow has or could reach a Water of the U.S. (e.g., description of flow, including extent and/or direction) and describe the observed condition. Evidence that flow could or has reached a Water of the U.S. may be indicated by an inspection of the adjacent and downstream topographic drainage features.
    - Observe and document the condition of the discharge channel and outfall of the engineered channel or seep location with photographs. Photographs are to be taken from similar direction and scale as photographs taken during the initial assessment site visit.
- Record flow rate within the discharge channel, if measureable, using the following methods:
    - Timed-volumetric method: Collect a volume of water from the discharge of the PVC pipe directly into an appropriately sized container. Measure volumes (in mL) in the field utilizing a graduated container. Record the amount of time (in seconds) needed to collect the volume of water and calculate the flows (in MGD) for the timed-volume.

- A V-notch weir apparatus will be installed, if necessary, during the initial assessment site visit to impound seepage at locations with a defined channel. Once the impounded seep reaches equilibrium discharge, flows will be measured using the timed-volumetric method described above.
- Area-velocity method: Measure point velocities and water depth at a minimum of 20 stations along a transect setup perpendicular to the direction of flow using a Swoffer® 3000 flow meter mounted to a standard United States Geologic Survey (USGS) top-set wading rod. Utilize the average velocity and cross-sectional area of the wetted channel to calculate flows in MGD.

- Collect water quality samples using the following methods:
  - Collect background and downstream samples during a period with minimal preceding rainfall to minimize potential effects of stormwater runoff. Collect samples from the discharge channel at the flow measurement devices or directly from the discharge into sample bottles while minimizing disturbance and entrainment of soil/sediment. After collection, samples will be preserved and stored according to parameter-specific methods and delivered to the laboratory under proper Chain-of-Custody (COC) procedures.
  - Analytical parameters for analysis include: Fluoride, Arsenic, Cadmium, Copper, Chromium, Nickel, Lead, Selenium, and Mercury. This list includes all parameters previously identified for seep sampling at Duke Energy power plants for which relevant stream water quality standards are in place. (This list is responsive to the statutory requirement for the discharge assessment to allow determination whether discharges from toe drain outfalls, seeps, or weeps have reached surface waters and caused a violation of surface water quality standards.) Analyses shall be conducted by Duke Energy's Huntersville Analytical Laboratory (NC Wastewater Certification #248) and Pace Analytical Laboratories (NC Wastewater Certification # 12). Laboratory analytical methods used for each constituent are provided in Table 2.
  - Seep in-situ measurements: In-situ field parameters (temperature and pH) shall be measured utilizing calibrated field meters either at the discharge of the seep directly, at the discharge of the flow measurement devices, or in the water pool created behind the device, if sufficient water depth did not exist at the device discharge.
  - Lumber River and Ash Basin Sample Collection Method: Water quality samples and in-situ measurements from the Lumber River shall be collected at a location upstream and downstream of the ash basin. Additionally, water samples and in-situ measurements shall be collected from an in-process ash basin location. The grab samples shall be collected from the river and basin's surface (0.3 m) directly into appropriate sample bottles.

3.2.3 Evaluation

Evaluation of the data from the initial assessment site visit will establish baseline conditions and will serve as the basis for comparison for subsequent assessment site visit results. Evaluation of observations and sampling results shall include location, extent (i.e., dimensions of affected area), and flow of each discharge. The analytical results of the upstream and downstream locations shall be compared to the 15A NCAC 2B standards for surface water quality upon receipt to identify potential exceedances.

3.2.4 Assessment Reporting

Each assessment site visit shall be documented by the individual performing the assessment, as described in Section 3.2.2 to meet the requirements in 130A-309.210.1(b). The report should contain site background, observation and sampling methodology, and a summary of the observations and descriptions of the discharge channels observed, changes in observations compared to previous assessment events, estimates of flows quantities, and photographs of discharges and outfalls of engineered channels designed or improved for collecting water from the impoundment. Photographs are to be numbered and captioned. The flow and analytical results shall be recorded and presented in tables similar to the examples provided as Tables 1 and 3. The analytical results shall be compared to the 15A NCAC 2B standards for surface water quality and exceedances highlighted. This information shall be compiled, reviewed, and submitted to NCDENR within 90 days from the Observation and Sampling event.

Section 4 - References

Giese, G.L. Eimers, J.L., and Coble, R.W. 1997. Simulation of Ground-Water Flow in the Coastal Plain Aquifer System of North Carolina, United States Geological Survey Professional Paper 1404-M.

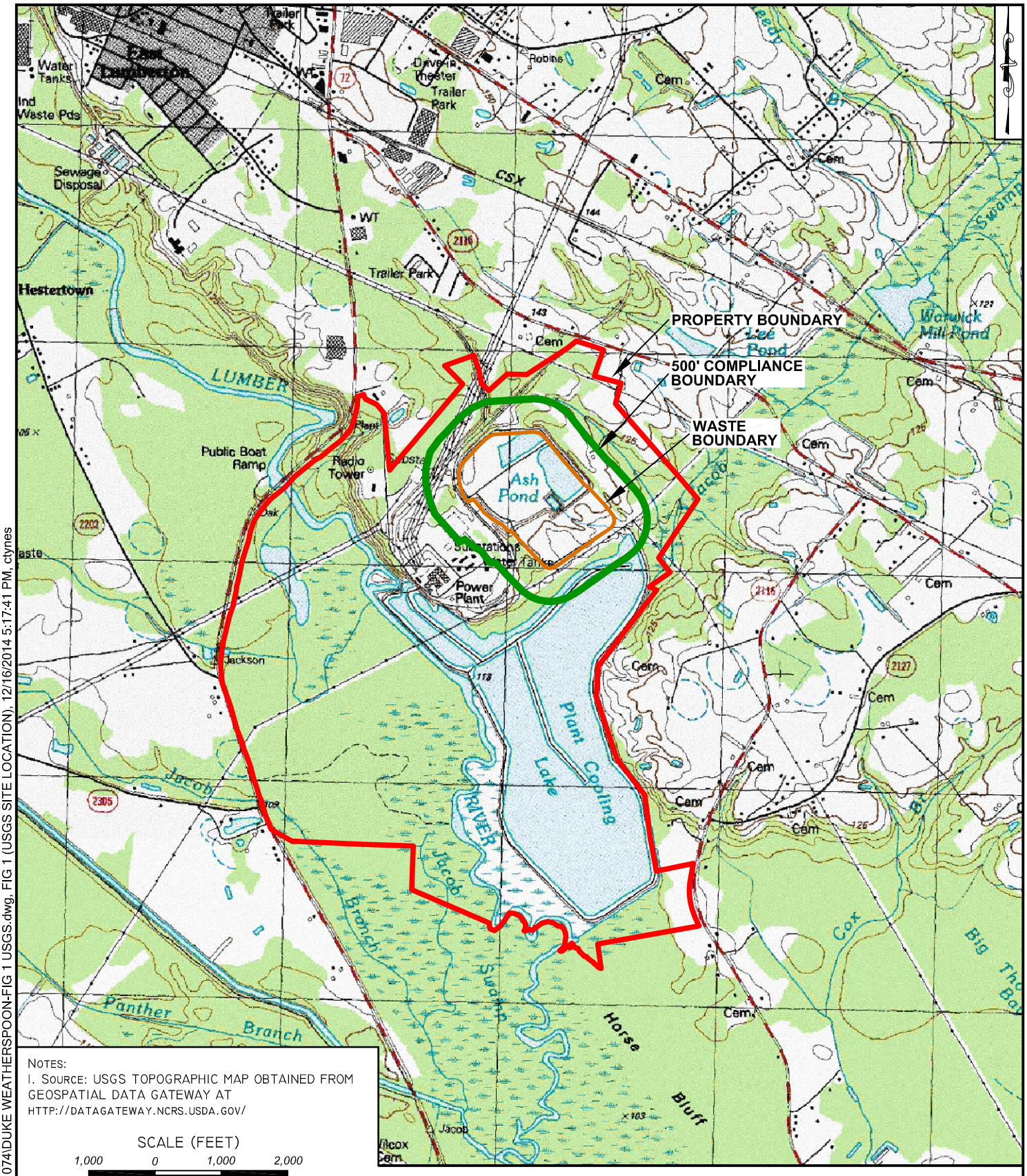
North Carolina Department of Environment and Natural Resources. 2007. *Dam Operation, Maintenance, and Inspection Manual*, North Carolina Department of Environment and Natural Resources, Division of Land Resources, Land Quality Division, 1985 (Revised 2007).

North Carolina Department of Natural Resources and Community Development. 1985. Geologic Map of North Carolina.

Stuckey, J.L. 1965. North Carolina: Its Geology and Mineral Resources, Raleigh, North Carolina Department of Conservation and Development, 550p.

Winner, M.D., Jr., and Coble, R.W. 1989. Hydrogeologic Framework of the North Carolina Coastal Plain Aquifer System: U.S. Geological Survey Open-File Report.

FIGURES AND TABLES



NOTES:
1. SOURCE: USGS TOPOGRAPHIC MAP OBTAINED FROM GEOSPATIAL DATA GATEWAY AT HTTP://DATAGATEWAY.NCRS.USDA.GOV/

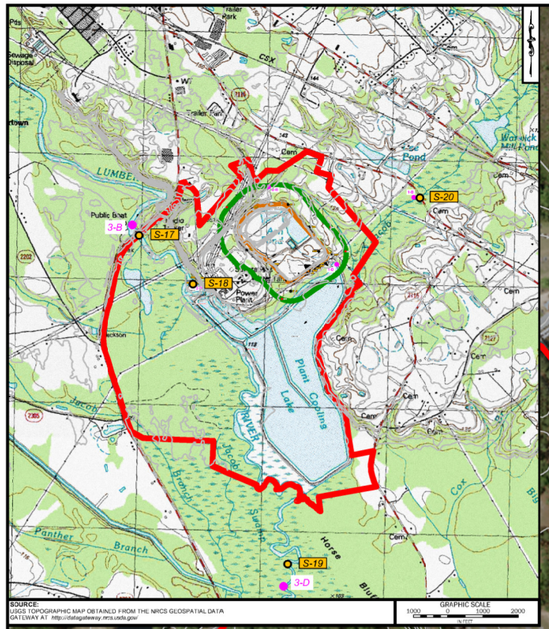
SCALE (FEET)
1,000 0 1,000 2,000

License Number: F-0116
440 South Church Street Charlotte, NC 28202

SITE LOCATION MAP
DUKE ENERGY PROGRESS
WEATHERSPOON POWER PLANT
NPDES PERMIT #NC0005363
LUMBERTON, NORTH CAROLINA

DATE
DEC. 16, 2014

FIGURE
1



Seep / Discharge ID	Location Coordinates (NAD 83) Latitude	Longitude	Flow Description	Flow Measurement (MGD) and Method	Background Location	Discharge Location and Discharge Sampling Location	Discharge Location Coordinates (NAD 83) Latitude	Longitude
S-01	34.593324	-78.973004	Continuous	NF	1-B	Discharged to Wastewater Effluent	-	-
S-02	34.593513	-78.969757	Intermittent	NS		Around riprap pile on northeast side of ash basin 1-D	34.589175	-78.965478
S-03	34.591892	-78.967913	Continuous	0.06172 area-velocity		At toe of dike on east side of ash basin 1-D		
S-04	34.589755	-78.966327	Intermittent	NS		Southeast face of ash basin dike 1-D		
S-05	34.589871	-78.965880	Continuous	0.01987 area-velocity		East side of ash basin at toe of dike 1-D		
S-06	34.593088	-78.973552	Continuous	NF	2-B	North of railroad tracks 2-D	34.587675	-78.978144
S-07	34.588211	-78.977747	Continuous	0.01267 timed-volumetric		48" concrete pipe flowing toward S-18 and -22 2-D		
S-08	34.588199	-78.977730	Continuous	0.00141 timed-volumetric		48" concrete pipe flowing toward S-18 and -22 2-D		
S-09	34.590244	-78.973407	Continuous	0.03016 area-velocity	1-B	Discharged to Wastewater effluent	-	-
S-10	34.589208	-78.971123	Intermittent	NS		Immediately at toe of dike face of west side of ash basin 1-D	34.589175	-78.965478
S-11	34.588537	-78.968071	Intermittent	NS		Western toe/engineered outfall from ash basin 1-D		
S-12	34.588729	-78.967785	Intermittent	NS		Second westernmost toe drain from ash basin 1-D		
S-13	34.588896	-78.967469	Intermittent	NS		Second easternmost toe drain from ash basin 1-D		
S-14	34.589052	-78.967185	Continuous	0.00061 timed-volumetric		Eastern toe drain from ash basin 1-D		
S-15	34.589240	-78.966433	Continuous	0.08781 area-velocity		Channel along south edge of ash basin; captures flows from S-10 to -14, 1-D		
S-16	34.587238	-78.969535	Continuous	0.02020 area-velocity		Discharged to Wastewater effluent	-	-
S-17	34.591216	-78.982946	Upstream Surface Water	NM	3-B	Just below public boat ramp 3-D	34.565589	-78.970033
S-18	34.587809	-78.978069	Continuous	0.01372 timed-volumetric	2-B	Concrete pipe downstream of S-07 and -08 2-D	34.587675	-78.978144
S-19	34.567428	-78.969752	Downstream Surface Water	NM	3-B	500 ft south of cooling pond 3-D	34.565589	-78.970033
S-20	34.593876	-78.958137	Upstream Surface Water	NF		Jacob Swamp water upstream from plant at Old Whiteville Road 3-D		
S-21	34.590123	-78.967084	Ash Pond Water	NF	1-B	Wastewater from southeast corner of ash basin 1-D	34.589175	-78.965478
S-22	34.587810	-78.978079	Intermittent	NS	2-B	Concrete pipe underneath old dike adjacent to Lumber River 2-D	34.587675	-78.978144

SOURCES:

1. 2010 HIGH RESOLUTION AERIAL PHOTOGRAPHS OBTAINED FROM NC ONE MAP AT *http://data.nconemap.com/geoportal/catalog/raster/download.page*
2. 2014 AERIAL PHOTOGRAPH WAS OBTAINED FROM WSP FLOWN ON APRIL 17, 2014.
3. DRAWING HAS BEEN SET WITH A PROJECTION OF NORTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3200 (NAD 83).

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TOPOGRAPHIC MAP WITH IDENTIFIED SEEPS AND OUTFALLS
DUKE ENERGY CAROLINAS, LLC
WEATHERSPOON POWER PLANT
NPDES PERMIT #NC0005363
LUMBERTON, NORTH CAROLINA

DATE
DECEMBER 2014

FIGURE
2

Table 1 – Weatherspoon Steam Station Ash Basin – Seep and Associated Discharge Locations and Descriptions

Seep / Discharge ID	Location Coordinates (NAD 83)		Flow Description	Flow Measurement (MGD) and Method	Background Location	Discharge Location and Discharge Sampling Location	Discharge Location Coordinates (NAD 83)	
	Latitude	Longitude					Latitude	Longitude
S-01	34.593324	-78.973004	Continuous	NF	1-B	Discharged to Wastewater Effluent	-	-
S-02	34.593513	-78.969757	Intermittent	NS		Around riprap pile on northeast side of ash basin 2-D	34.589175	-78.965478
S-03	34.591892	-78.967913	Continuous	0.06172 area-velocity		At toe of dike on east side of ash basin 2-D		
S-04	34.589755	-78.966327	Intermittent	NS		Southeast face of ash basin dike 2-D		
S-05	34.589871	-78.965880	Continuous	0.01987 area-velocity		East side of ash basin at toe of dike 2-D		
S-06	34.593088	-78.973552	Continuous	NF	2-B	North of railroad tracks 3-D	34.587675	-78.978144
S-07	34.588211	-78.977747	Continuous	0.01267 timed-volumetric		48' concrete pipe flowing toward S-18 and -22 3-D		
S-08	34.588199	-78.977730	Continuous	0.00141 timed-volumetric		48' concrete pipe flowing toward S-18 and -22 3-D		
S-09	34.590244	-78.973407	Continuous	0.03016 area-velocity	1-B	Discharged to Wastewater Effluent	-	-
S-10	34.589208	-78.971123	Intermittent	NS		Immediately at toe of dike face of west side of ash basin 2-D	34.589175	-78.965478
S-11	34.588537	-78.968071	Intermittent	NS		Western toe/engineered outfall from ash basin 2-D		
S-12	34.588729	-78.967785	Intermittent	NS		Second westernmost toe drain from ash basin 2-D		
S-13	34.588896	-78.967469	Intermittent	NS		Second easternmost toe drain from ash basin 2-D		

Seep / Discharge ID	Location Coordinates (NAD 83)		Flow Description	Flow Measurement (MGD) and Method	Background Location	Discharge Location and Discharge Sampling Location	Discharge Location Coordinates (NAD 83)	
	Latitude	Longitude					Latitude	Longitude
S-14	34.589052	-78.967185	Continuous	0.00061 timed-volumetric		Eastern toe drain from ash basin 2-D		
S-15	34.589240	-78.966433	Continuous	0.08781 area-velocity		Channel along south edge of ash basin; captures flows from S-10 to -14. 2-D		
S-16	34.587238	-78.969535	Continuous	0.02020 area-velocity		Discharged to Wastewater Effluent	-	-
S-17	34.591216	-78.982946	Upstream Surface Water	NM	3-B	Just below public boat ramp 4-D	34.565589	-78.970033
S-18	34.587809	-78.978069	Continuous	0.01372 timed-volumetric	2-B	Concrete pipe downstream of S-07 and -08 3-D	34.587675	-78.978144
S-19	34.567428	-78.969752	Downstream Surface Water	NM	3-B	500 ft south of cooling pond 4-D	34.565589	-78.970033
S-20	34.593876	-78.958137	Upstream Surface Water	NF		Jacob Swamp water upstream from plant at Old Whiteville Road 4-D		
S-21	34.590123	-78.967084	Ash Pond Water	NF	1-B	Wastewater from southeast corner of ash basin 2-D	34.589175	-78.965478
S-22	34.587810	-78.978079	Intermittent	NS	2-B	Concrete pipe underneath old dike adjacent to Lumber River 3-D	34.587675	-78.978144

Notes:

1. Flow description for each seep sample location is based on observation during site visits performed by Synterra in August 2014.

Table 2 – Laboratory Analytical Methods

Parameter	Method	Reporting Limit	Units	Laboratory
Fluoride (F)	EPA 300.0	1	mg/l	Duke Energy
Mercury (Hg)	EPA 245.1	0.05	µg/l	Duke Energy
Arsenic (As)	EPA 200.8	1	µg/l	Duke Energy
Cadmium (Cd)	EPA 200.8	1	µg/l	Duke Energy
Chromium (Cr)	EPA 200.8	1	µg/l	Duke Energy
Copper (Cu)	EPA 200.8	1	µg/l	Duke Energy
Lead (Pb)	EPA 200.8	1	µg/l	Duke Energy
Nickel (Ni)	EPA 200.8	1	µg/l	Duke Energy
Selenium (Se)	EPA 200.8	1	µg/l	Duke Energy

Table 3 – Weatherspoon Plant - Example Flow and Analysis Results Table

Parameter	Units	S-01	S-02	S-03	S-04	S-05	S-06	S-07	S-08	S-09	S-10	S-11
Fluoride	**mg/l**	< 0.1	NS	0.19	NS	0.23	< 0.1	< 0.1	< 0.1	< 0.1	NS	NS
Hg - Mercury (71900)	**µg/l**	< 1	NS	< 1	NS	< 1	< 1	< 1	< 1	< 1	NS	NS
As - Arsenic (01002)	**µg/l**	7.41	NS	292	NS	43.8	6.1	< 1	< 1	1.59	NS	NS
Cd - Cadmium (01027)	**µg/l**	< 1	NS	< 1	NS	< 1	< 1	< 1	< 1	< 1	NS	NS
Cr - Chromium (01034)	**µg/l**	< 1	NS	< 1	NS	< 1	1.72	< 1	< 1	< 1	NS	NS
Cu - Copper (01042)	**µg/l**	< 1	NS	< 1	NS	< 1	2.47	< 1	< 1	< 1	NS	NS
Pb - Lead (01051)	**µg/l**	< 1	NS	< 1	NS	< 1	2.39	< 1	< 1	< 1	NS	NS
Ni - Nickel (01067)	**µg/l**	< 1	NS	25.6	NS	18.0	6.73	< 1	< 1	2.22	NS	NS
Se - Selenium (01147)	**µg/l**	< 1	NS	< 1	NS	< 1	< 1	< 1	< 1	< 1	NS	NS
pH	**s.u.**	6.5	NS	7.3	NS	7.3	6.6	6.7	6.6	7.0	NS	NS
Temperature	**℃**	25	NS	25	NS	25	28	25	24	29	NS	NS
Flow	**MGD**	NF	NS	0.06172	NS	0.01987	NF	0.01267	0.00141	0.03016	NS	NS

Notes:
1. Flow measurements and analytical samples were collected on August 18-19, 2014.
2. NF – Stream flow not present during this sampling event or too low to be measured.
3. NS – No surface water present during this sampling event. Evidence of seasonal wetness.