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April 28, 2016

Jeffrey O. Poupart
Water Quality Permitting Section Chief
Division of Water Resources
Department of Environmental Quality
State of North Carolina
1617 Mail Service Center
Raleigh, NC 27699-1617

Subject: March 2, 2016 Insufficiency of Discharge Assessment Plans – Duke Energy Carolinas, LLC and Duke Energy Progress, LLC

Dear Mr. Poupart:

This responds to your letter of March 2, 2016 to Duke Energy Carolinas, LLC and Duke Energy Progress, LLC on March 2, 2016 regarding Duke Energy's proposed Discharge Assessment Plans.

With regard to your letter describing changes in *Section 3.2.2 Observation and Sampling:*

- *The discussion must include a statement noting that jurisdictional determinations regarding the extent of waters of the United States and their relationship with identified seeps at the subject facilities will be obtained from the United States Army Corps of Engineers (USA COE).*

Duke Energy does not yet have jurisdictional determinations from the US Army Corps of Engineers for the relevant areas at all of the twelve sites mentioned in your letter. We submitted applications for jurisdictional determinations in September, October, and November 2015 and have since worked with the Corps of Engineers to schedule site visits and provide draft plats for approval. Nonetheless, the timing of the approved jurisdictional determinations is up to the Corps and outside of Duke's control. To date, out of these twelve sites, only Buck has an approved jurisdictional determination, but we do not yet have the signed plats.

We will submit the maps you have requested for each site on a rolling basis, within a reasonable period after the jurisdictional determinations are complete. In order to address the changes described in your March 2, 2016 letter, we have added the following text at the start of Section 3.2.2.

> *Jurisdictional determinations regarding the extent of waters of the United States and their relationship with identified seeps at the subject facilities will be obtained from the United States Army Corps of Engineers (USA COE). Until jurisdictional determinations are finalized by USA COE, preliminary information will be used to evaluate the seeps as described in the section below.*

The second change in Section 3.2.2 described in your letter is as follows.

- *The schedule for water quality sampling of the seeps and related jurisdictional waters must be more frequent than the semi-annual basis stated in the proposed DAPs. DWR recommends a monthly monitoring schedule, consistent with the conditions described in the DAPs' general assessment requirements, for all identified seeps that will continue for twelve (12) months. After that time, monitoring may be reduced to a semi-annual basis until such monitoring becomes a requirement of the NPDES permit.*

We do not believe sampling monthly as part of a revised Discharge Assessment Plan is warranted. For the larger receiving waters, data is available from sampling associated with NPDES permits that demonstrates the lack of impact on the larger surface waters of the state. In addition, we are conducting weekly observations of all AOWs on a dam or dike slope, sampling any new seeps, and providing the analytical results to DEQ. We recommend the sampling frequency under the DAPs remain at twice/year with the weekly inspections of dam slopes for any new seeps with data provided to DEQ. We recommend that we collectively focus our resources on the completion of all of the NPDES Wastewater Permits for the Duke Energy sites and implement appropriate sampling frequency for each of the permitted seeps in that document .

However, in order to address the changes described in your March 2, 2016 letter, we have added the following text in Section 3.2.2.

> *In addition to sampling conducted with the semi-annual assessments, additional seep sampling will be conducted at locations and at a frequency as determined through discussions with NC DEQ personnel.*

We would like to work with DEQ to achieve alignment of the various (present and future) documents involving required seep activities including:

- Discharge Assessment Plans
- Discharge Identification Plans
- NPDES Wastewater Permits
- EPA requirements
- Any future legal agreements with either DEQ or EPA

Duke Energy is committed to providing the Department with additional information to facilitate the issuance of new NPDES Wastewater permits. The issues are complex and require special consideration, as illustrated by the time elapsed since the permit applications were submitted. We look forward to working with you further to resolve the issues identified here on a mutually acceptable schedule.

Sincerely,

Harry Sideris

Harry Sideris
Senior Vice President
Environmental, Health and Safety

Asheville Steam Electric Plant Ash Basin

Topographic Map and Discharge Assessment Plan

NPDES Permit NC0000396

April 29, 2016

Contents

Page

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 Asheville Steam Electric Plant (Asheville Plant) ash basin operated under National Pollutant Discharge Elimination System (NPDES) Permit NC0000396.

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 Asheville Plant is located near Asheville, in Buncombe County, North Carolina. The Asheville Plant began commercial operation in the 1960s, with additions in the 1990s and around 2000, and consists of two coal-fired units that primarily use bituminous coal. In addition to the coal-fired units, the Plant also has two combustion turbines. Coal combustion residues (CCR) have been managed in the Plant's on-site ash basins and used as beneficial fill at the nearby Asheville Airport.

Lake Julian was built for cooling water by damming the flow of Powell Creek on the north side of the plant. A large portion of Lake Julian borders the east side of the plant site. Surface water from the French Broad River is also pumped into Lake Julian as a supplemental water supply. The water from the French Broad River enters a stilling area of the lake on the north side of the plant. Heated water is discharged back into Lake Julian to the east of the plant. The French Broad River borders the west side of the property and flows south to north. Powell Creek also flows south to north prior to formation of Lake Julian. Powell Creek flows east to west from the Lake Julian Dam to the French Broad River.

2.2 Ash Basin Description

The plant and ash basins are located on the east side of I-26 and the French Broad River where the ash management system consist of a series of basins. The original 1964 ash basin, built during plant construction and expanded in the 1970s, is now overlain with wastewater treatment wetlands. The treatment wetlands basins are lined. The 1964 ash basin was replaced in approximately 1982 with a second ash basin, built to the south of the 1964 basin. The 1982 ash basin is now being dewatered, excavated, and transported to the Asheville Airport for structural fill. New ash, generated daily, is dewatered in concrete-lined basins located on a portion of the 1964 ash basin.

The ash basin system is part of the plant's wastewater treatment system; receiving inflows from ash transport water, coal pile runoff, storm water runoff, and various low volume wastes. The treated wastewater is permitted to discharge to the French Broad River permitted Outfall 001. A 500-foot compliance boundary circles the ash management area.

2.3 Site Geologic/Soil Framework

The Asheville Plant is located in the Piedmont Mountain region of North Carolina as described by LeGrand (2004). In general, the regional geology consists of overburden, also referred to as regolith, and metamorphic bedrock. In stream valleys, fluvial deposits, also referred to as alluvium, overlie the bedrock. The metamorphic rock, primarily schist and gneiss, tends to be exposed on the ground surface along topographic ridges, road cuts, and in stream or river valleys. Where the metamorphic bedrock has been weathered into unconsolidated material, silt, sand, and clay are found overlying the bedrock. The regolith tends to be composed of a shallow soil zone where the relict structure of the original bedrock material is no longer present. The soil zone transitions downward into saprolite, which is still unconsolidated material, but has the visual texture of the parent bedrock.

The geology across the site varies from mica gneiss and garnet mica schist in the upland areas (east of I-26) to alluvium along the French Broad River floodplain (west of I-26). The mica gneiss that underlies the majority of the site under the ash management area is described at a number of locations as containing pyrite, chlorite, and garnets. Mica schist is located in the vicinity of the compliance boundaries to the south and north of the site.

As discussed by LeGrand (2004), the French Broad River and its tributaries are groundwater discharge zones for the saprolite and bedrock aquifer at the site. The French Broad River creates a hydrogeologic boundary to the west of the plant site. The Powell Creek drainage feature creates a hydrogeologic boundary to the north side of the site. The unnamed tributary located along the southern property line creates a hydrogeologic boundary to the south of the site. Lake Julian is located upgradient of the ash management area and it, along with the Powell Creek drainage basin, form the eastern hydraulic boundary of the site. The general direction of groundwater flow in the saprolite aquifer is west, toward the French Broad River, with localized variations as the water table mirrors surface topography. The saturated saprolite aquifer feeds the underlying fractures within the upper bedrock aquifer. The direction of groundwater flow in the upper bedrock aquifer is also generally to the west, toward the French Broad River, with preferential flow paths toward the small tributaries and exposed outcrops along I-26 (localize discharge zones).

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 (NCDENR, 2007). 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 embankment(s) 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.

Drains at the base of the 1964 ash pond collect water into two PVC pipes where flow rates can be measured. A section of the 1964 dam seeps into a swale along the dam access road. The point where the seep is consolidated to flow under the road can be used to measure flow. The drains at the base of the 1982 ash pond are collected in a weir box. The drainage features, or outfalls, associated with the ash basin dam 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 June 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 Asheville 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

Jurisdictional determinations regarding the extent of waters of the United States and their relationship with identified seeps at the subject facilities will be obtained from the United States Army Corps of Engineers (USACE). Until jurisdictional determinations are finalized by USACE, preliminary information will be used to evaluate the seeps as described in the section below.

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. Sampling procedures should prevent the entrainment of soils and sediment in water samples that can result in analytical results not being representative of the flow. Because Areas of Wetness (AOWs)/seeps often have poorly defined flow channels and minimal channel depth, conventional grab samples collected directly into laboratory containers or intermediate vessels is not possible without disturbance and entrainment of soils and sediments. Further, many AOWs are contiguous with low-lying areas subject to surface water runoff and resulting heavy sediment loading during storm events or are near surface waters subject to flooding such that representative samples of the AOW cannot be obtained. If the facility is unable to obtain an AOW sample due to the dry, low flow or high flow conditions preventing the facility from obtaining a representative sample, a “no flow” result or “excessive flow” will be recorded.

  - 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.

- French Broad River and Ash Basin Sample Collection Method: Water quality samples and in-situ measurements from the French Broad River shall be collected at a location upstream (French Broad River-Upstream) and downstream (French Broad River-Downstream) of the ash basin (Figure 2). Additionally, water samples and in-situ measurements shall be collected from an in-process ash basin location (Figure 2). The grab samples shall be collected from the river and basin's surface (0.3 m) directly into appropriate sample bottles.

- In addition to sampling conducted with the semi-annual assessments, additional seep sampling will be conducted at locations and at a frequency as determined through discussions with NC DEQ personnel.

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

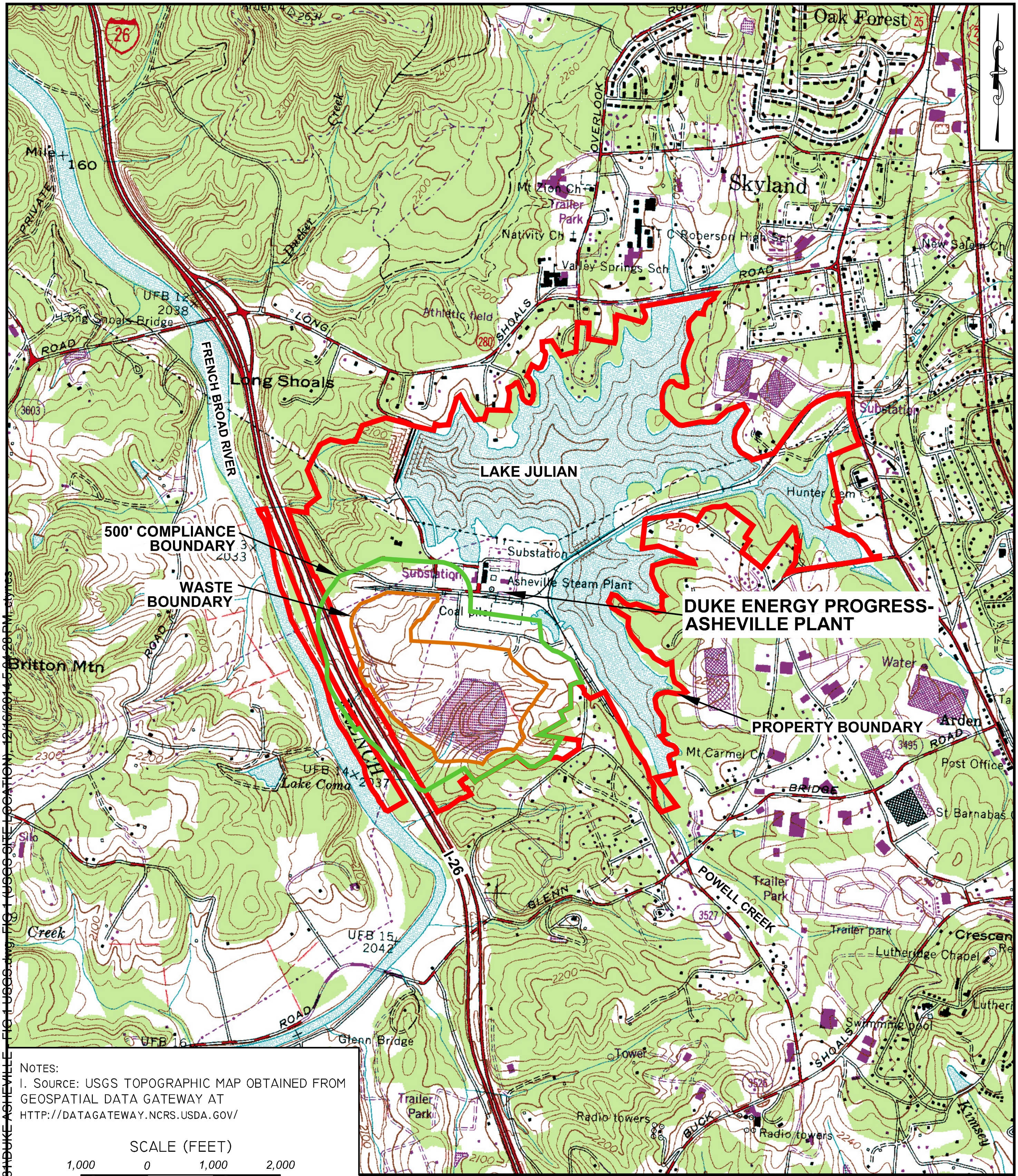
Each assessment site visit shall be documented by the individual performing the assessment, as described in Section 3.2.2 to meet the requirements in 130A-309.210.1(b). The report should contain site background, observation and sampling methodology, and a summary of the observations and descriptions 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 NC DEQ within 90 days from the Observation and Sampling event.

Section 4 – References

LeGrand, Harry, Sr. 2004. A Master Conceptual Model for Hydrogeological Site Characterization in the Piedmont and Mountain Region of North Carolina, North Carolina Department of Environment and Natural Resources.

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).

FIGURES AND TABLES



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

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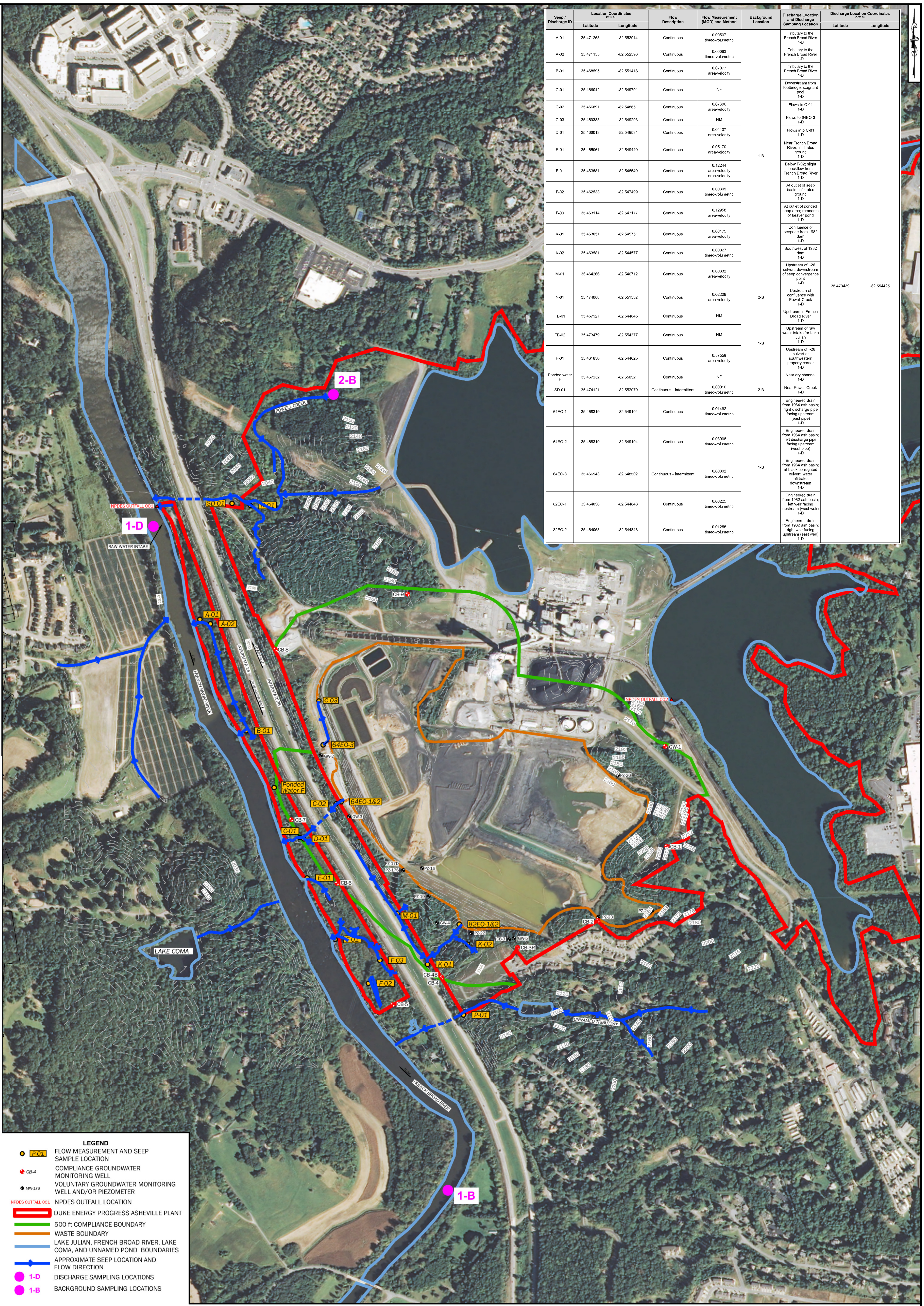
License Number: F-0116
440 South Church Street Charlotte, NC 28202

SITE LOCATION MAP
DUKE ENERGY PROGRESS
ASHEVILLE PLANT
NPDES PERMIT #NC0000396
ARDEN, NORTH CAROLINA

DATE
DEC. 16, 2014

FIGURE
1

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
A-01	35.471253	-82.552914	Continuous	0.00507 timed-volumetric		Tributary to the French Broad River 1-D		
A-02	35.471155	-82.552596	Continuous	0.00063 timed-volumetric		Tributary to the French Broad River 1-D		
B-01	35.468595	-82.551418	Continuous	0.07077 area-velocity		Tributary to the French Broad River 1-D		
C-01	35.466042	-82.549701	Continuous	NF		Downstream from footbridge; stagnant pool 1-D		
C-02	35.466891	-82.548651	Continuous	0.07606 area-velocity		Flows to C-01 1-D		
C-03	35.469383	-82.549293	Continuous	NM		Flows to 64EO-3 1-D		
D-01	35.466013	-82.549584	Continuous	0.04107 area-velocity		Flows into C-01 1-D		
E-01	35.465061	-82.549440	Continuous	0.05170 area-velocity	1-B	Near French Broad River; infiltrates ground 1-D		
F-01	35.463581	-82.548540	Continuous	0.12244 area-velocity area-velocity		Below F-02; slight backflow from French Broad River 1-D		
F-02	35.462533	-82.547499	Continuous	0.00309 timed-volumetric		At outlet of seep basin; infiltrates ground 1-D		
F-03	35.463114	-82.547177	Continuous	0.12958 area-velocity		At outlet of ponded seep area; remnants of beaver pond 1-D		
K-01	35.463051	-82.545751	Continuous	0.08175 area-velocity		Confluence of seepage from 1982 dam 1-D		
K-02	35.463581	-82.544577	Continuous	0.00027 timed-volumetric		Southwest of 1982 dam 1-D		
M-01	35.464266	-82.546712	Continuous	0.00332 area-velocity		Upstream of I-26 culvert; downstream of seep convergence point 1-D	35.473439	-82.554425
N-01	35.474088	-82.551532	Continuous	0.02208 area-velocity	2-B	Upstream of confluence with Powell Creek 1-D		
FB-01	35.457527	-82.544846	Continuous	NM		Upstream in French Broad River 1-D		
FB-02	35.473479	-82.554377	Continuous	NM	1-B	Upstream of raw water intake for Lake Julian 1-D		
P-01	35.461850	-82.544625	Continuous	0.57559 area-velocity		Upstream of I-26 culvert at southwestern property corner 1-D		
Ponded water F	35.467232	-82.550521	Continuous	NF		Near dry channel 1-D		
SD-01	35.474121	-82.552079	Continuous - Intermittent	0.00010 timed-volumetric	2-B	Near Powell Creek 1-D		
64EO-1	35.468319	-82.549104	Continuous	0.01462 timed-volumetric		Engineered drain from 1964 ash basin; right discharge pipe facing upstream (east pipe) 1-D		
64EO-2	35.468319	-82.549104	Continuous	0.03968 timed-volumetric		Engineered drain from 1964 ash basin; left discharge pipe facing upstream (west pipe) 1-D		
64EO-3	35.466943	-82.548502	Continuous - Intermittent	0.00002 timed-volumetric	1-B	Engineered drain from 1964 ash basin; at black corrugated culvert; water infiltrates downstream 1-D		
82EO-1	35.464058	-82.544848	Continuous	0.00225 timed-volumetric		Engineered drain from 1982 ash basin; left weir facing upstream (west weir) 1-D		
82EO-2	35.464058	-82.544848	Continuous	0.01255 timed-volumetric		Engineered drain from 1982 ash basin; right weir facing upstream (east weir) 1-D		



SCALE (FEET)
400' 0 400' 800'
1" = 800'

SOURCES:

1. 2012 AERIAL PHOTOGRAPH OBTAINED FROM NRCS GEOSPATIAL DATA GATEWAY AT *http://datagateway.nrcs.usda.gov/*
2. *2014 AERIAL PHOTOGRAPH WAS OBTAINED FROM WSP FLOWN ON APRIL 17, 2014.*

HDR

TOPOGRAPHIC MAP WITH IDENTIFIED SEEPS AND OUTFALLS
DUKE ENERGY CAROLINAS, LLC
ASHEVILLE PLANT
ARDEN, NORTH CAROLINA
NPDES PERMIT #NC0000396

DATE: DECEMBER 2014

FIGURE: 2

Table 1 – Asheville Plant 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
A-01	35.471253	-82.552914	Continuous	0.00507 timed-volumetric	2-B	Tributary to the French Broad River 6-D	35.473439	-82.554425
A-02	35.471155	-82.552596	Continuous	0.00063 timed-volumetric	2-B	Tributary to the French Broad River 6-D		
B-01	35.468595	-82.551418	Continuous	0.07077 area-velocity	2-B	Tributary to the French Broad River 6-D		
C-01	35.466042	-82.549701	Continuous	NF	2-B	Downstream from footbridge; stagnant pool 5-D		
C-02	35.466891	-82.548651	Continuous	0.07606 area-velocity	2-B	Flows to C-01 5-D		
C-03	35.469383	-82.549293	Continuous	NM	2-B	Flows to 64EO-3 5-D		
D-01	35.466013	-82.549584	Continuous	0.04107 area-velocity	2-B	Flows into C-01 5-D		
E-01	35.465061	-82.549440	Continuous	0.05170 area-velocity	2-B	Near French Broad River; infiltrates ground 5-D		
F-01	35.463581	-82.548540	Continuous	0.12244 area-velocity area-velocity	2-B	Below F-02; slight backflow from French Broad River 4-D		
F-02	35.462533	-82.547499	Continuous	0.00309 timed-volumetric	2-B	At outlet of seep basin; infiltrates ground 4-D		
F-03	35.463114	-82.547177	Continuous	0.12958 area-velocity	2-B	At outlet of ponded seep area; remnants of beaver pond 4-D		
K-01	35.463051	-82.545751	Continuous	0.08175 area-velocity	2-B	Confluence of seepage from 1982 dam 2-D		
K-02	35.463581	-82.544577	Continuous	0.00027 timed-volumetric		Southwest of 1982 dam 3-D		
M-01	35.464266	-82.546712	Continuous	0.00332 area-velocity		Upstream of I-26 culvert; downstream of seep convergence point 2-D		
N-01	35.474088	-82.551532	Continuous	0.02208 area-velocity	3-B	Upstream of confluence with Powell Creek 7-D		
FB-01	35.457527	-82.544846	Continuous	NM	1-B	Upstream in French Broad River 1-D		
FB-02	35.473479	-82.554377	Continuous	NM	3-B	Upstream of raw water intake for Lake Julian 7-D		
P-01	35.461850	-82.544625	Continuous	0.57559 area-velocity	2-B	Upstream of I-26 culvert at southwestern property corner 2-D		
Ponded water F	35.467232	-82.550521	Continuous	NF		Near dry channel 6-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
SD-01	35.474121	-82.552079	Continuous - Intermittent	0.00010 timed-volumetric	3-B	Near Powell Creek 7-D		
64EO-1	35.468319	-82.549104	Continuous	0.01462 timed-volumetric	2-B	Engineered drain from 1964 ash basin; right discharge pipe facing upstream (east pipe) 5-D		
64EO-2	35.468319	-82.549104	Continuous	0.03968 timed-volumetric		Engineered drain from 1964 ash basin; left discharge pipe facing upstream (west pipe) 5-D		
64EO-3	35.466943	-82.548502	Continuous - Intermittent	0.00002 timed-volumetric		Engineered drain from 1964 ash basin; at black corrugated culvert; water infiltrates downstream 5-D		
82EO-1	35.464058	-82.544848	Continuous	0.00225 timed-volumetric		Engineered drain from 1982 ash basin; left weir facing upstream (west weir) 3-D		
82EO-2	35.464058	-82.544848	Continuous	0.01255 timed-volumetric		Engineered drain from 1982 ash basin; right weir facing upstream (east weir) 3-D		

Notes:
1. Flow description for each seep sample location is based on observation during site visits performed by Synterra in June 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 – Asheville Steam Electric Plant – Example of Surface Water/Seep Monitoring Flow and Analysis Results Table

Parameter	Units	A-01	A-02	B-01	C-01	C-02	D-01	E-01	F-01	F-02	F-03	K-01
Fluoride	**mg/l**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hg - Mercury (71900)	**µg/l**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
As - Arsenic (01002)	**µg/l**	< 1	< 1	< 1	1.38	3.15	< 1	< 1	1.21	< 1	< 1	1.50
Cd - Cadmium (01027)	**µg/l**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cr - Chromium (01034)	**µg/l**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cu - Copper (01042)	**µg/l**	< 1	< 1	< 1	< 1	< 1	1.41	< 1	< 1	< 1	< 1	< 1
Pb - Lead (01051)	**µg/l**	< 1	< 1	< 1	< 1	< 1	2.0	< 1	< 1	< 1	< 1	< 1
Ni - Nickel (01067)	**µg/l**	< 1	< 1	1.57	9.3	12.5	3.42	< 1	2.78	< 1	< 1	1.16
Se - Selenium (01147)	**µg/l**	3.63	< 1	< 1	1.95	2.51	< 1	1.64	< 1	< 1	< 1	< 1
pH	**s.u.**	5.9	5.7	6.1	6.9	6.5	6.2	6.6	5.9	6.3	6.4	6.2
Temperature	**°C**	22	25	21	21	19	24	24	20	21	21	22
Flow	**MGD**	0.00507	0.00063	0.07077	NF	0.07606	0.04107	0.05170	0.12244	0.00309	0.12958	0.08175

Notes:

1. Flow measurements and analytical samples were collected in June 2014.