



Duke Energy  
410 S. Wilmington Street  
Raleigh, NC 27601

October 12, 2017

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Water Quality  
Permitting Section

Bob Sledge  
NC Division of Water Resources  
1617 Mail Service Center  
Raleigh, NC 27699-1617

Subject: Submittal of engineering reports  
SOC application  
Duke Energy Facilities

Dear Mr. Sledge,

Attached please find the third party engineering reports referenced in Duke Energy's application for Special Order by Consent dated September 28, 2017.

If there are any questions about this matter please feel free to contact me at (919) 546-2439 or [shannon.langle@duke-energy.com](mailto:shannon.langle@duke-energy.com).

Sincerely,

A handwritten signature in blue ink that reads "Shannon Langley". The signature is written in a cursive, flowing style.

E. Shannon Langley  
Lead Environmental Specialist

Enclosures

**COAL COMBUSTION RESIDUALS (CCR) ANNUAL SURFACE IMPOUNDMENT REPORT  
JUNE 2017 INSPECTION**

**ASHEVILLE PLANT**  
200 CP&L Drive  
Skyland, North Carolina 28704

**Prepared For:**

**Duke Energy Carolinas, LLC**  
400 South Tryon Street  
Charlotte, North Carolina 28202

**Prepared By:**

**Amec Foster Wheeler**  
**Environment & Infrastructure, Inc.**  
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Charlotte, North Carolina 28208  
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Registered in North Carolina  
Engineering and Land Surveying License No. F-1253

**August 17, 2017**

**Amec Foster Wheeler Project No.: 7810-17-0842**

**COAL COMBUSTION RESIDUALS (CCR)  
ANNUAL SURFACE IMPOUNDMENT REPORT  
JUNE 2017 INSPECTION**



**ASHEVILLE PLANT**

1964 Ash Pond Dam (BUNCO-097)  
1982 Ash Pond Dam (BUNCO-089)  
Duke Energy Carolinas, LLC  
200 CP&L Drive  
Skyland, Buncombe County, North Carolina

**Inspection Date:** 6/7/2017  
**Report Date:** 8/17/2017

**Amec Foster Wheeler Project No.:** 7810-17-0842

<b>Inspection Team:</b>	Timothy Quigley, P.E. Adam Steurer, E.I. Matt Pickett, P.E. Mike Clough, P.E. Tim Goforth, E.I.	Senior Engineer, Amec Foster Wheeler Technical Professional, Amec Foster Wheeler Duke Energy Duke Energy Duke Energy
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### Summary

Amec Foster Wheeler has been retained to conduct the 2017 annual inspection (under the reporting requirements of 40 C.F.R. § 257.83 (b)) for the coal combustion residuals (CCR) surface impoundments at the Asheville Plant. *This annual dam/CCR Surface Impoundment Inspection Report meets the requirements of 40 C.F.R. § 257.83 (b)(1) and (2) and to meet the requirements of the North Carolina Coal Ash Management Act (Session Law 2014-122) Part V, Section 10 (amending G.S. 143-215.32 (inspection of dams)).* This annual inspection focused primarily on (i) the structural stability of the CCR surface impoundment; (ii) the integrity of any hydraulic structures passing underneath the CCR surface impoundment or through the dike of the unit; and (iii) ensuring that the construction, design, operation, and maintenance of the CCR surface impoundment is in accordance with recognized and generally accepted good engineering standards.

The purpose is to provide an engineering opinion as to whether the impoundment is structurally sound and that the design, operation, and maintenance of the impoundment are in accordance with generally accepted engineering standards.

In summary, no conditions were observed during this field inspection nor identified by existing engineering analyses that represent an unsafe structural stability concern requiring immediate attention. Amec Foster Wheeler concludes that the construction, design, operation, and maintenance of the CCR surface impoundment have been sufficiently consistent with recognized and generally accepted engineering standards for protection of public safety.





Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.

  
Timothy P. Quigley, P.E.  
Senior Engineer  
Registered North Carolina 034969



  
Carl D. Tockstein, P.E.  
Principal Engineer  
Registered North Carolina 022847

  
Adam A. Steurer, E.I.  
Technical Professional

**Asheville Plant  
Annual CCR Surface Impoundment 2017 Inspection Report**

**August 17, 2017**

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**1. Design / Geometry of the Impounding Structure**

Based on the data reviewed and the visual inspection, modifications to the geometry of impounding structures have been made since our previous annual inspection on May 11, 2016. The following geometry data was obtained from information provided by Duke Energy.

**a. 1964 Ash Pond Dam (BUNCO-097):**

Modifications since 2016 annual inspection: Rip rap has been placed on the divider dike's downstream slope into 1982 Ash Pond Dam Basin. Excavation and removal of the temporary ash stack constructed within the basin is currently in progress.

Dam Length: 2100 feet

Maximum Dam Height: 100 feet

Crest Elevation: 2157.5 to 2157.8 feet

Crest Width: 12 feet

Approximate Pond Area: 21 acres (at 2157.3 feet), includes Duck Pond.

**b. 1982 Ash Pond Dam (BUNCO-089):**

Changes in geometry since 2016 annual inspection: Dam decommissioning and grading activities within the basin are currently in progress. Crest road has been removed and crest has been lowered approximately 35 feet. Erosion control measures have been installed on the downstream slope. Ash has been removed from the upstream slope and within the basin.

Dam Length: 1500 feet

Maximum Dam Height: 58 feet (approximately - near middle of lowered crest)

Crest Elevation: 2129 feet

Crest Width: 180 feet (approximately)

Approximate Pond Area: 20 acres (at 2129 feet)

**2. Existing Instrumentation and Maximum Readings**

Monitoring equipment/devices observed at the Asheville Plant include piezometers and flow measurement devices at the outlet structures. Slope Indicators, settlement monuments or seismic instrumentation are not located at this site. Station personnel take monthly water level readings and report the readings to Duke Energy CCP Engineering. The data collected is analyzed by CCP Engineering for any changes or anomalies. Below is a summary based on our review of the data provided since the 2016 annual inspection.

**Table 1: Asheville Plant Piezometer Data**

<b>Location</b>	<b>Piezometer</b>	<b>Maximum Recorded Elevation (feet)</b>
1964 Ash Pond Dam Latitude: 35.1707616° Longitude: -82.5481657°	B-1	2092.80
1964 Ash Pond Dam Latitude: 35.4681927° Longitude: -82.5486419°	B-1-A	2103.80
1964 Ash Pond Dam Latitude: 35.4686671° Longitude: -82.5489264°	B-2	2096.78

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<b>Location</b>	<b>Piezometer</b>	<b>Maximum Recorded Elevation (feet)</b>
1964 Ash Pond Dam Latitude: 35.4682478° Longitude: -82.5484299°	B-3	2097.23
1964 Ash Pond Dam Latitude: 35.4682553° Longitude: -82.5484565°	B-4	2094.26
1964 Ash Pond Dam Latitude: 35.4682553° Longitude: -82.5484565°	B-4-A	2113.81
1964 Ash Pond Dam Latitude: 35.4676310° Longitude: -82.5480683°	B-5	2072.22
1964 Ash Pond Dam Latitude: 35.4675925° Longitude: -82.5480891°	B-6	2086.29
1964 Ash Pond Dam Latitude: 35.4671795° Longitude: -82.5478066°	B-7	2074.69
1964 Ash Pond Dam Latitude: 35.4671740° Longitude: -82.5478463°	B-8	2092.80
1982 Ash Pond Dam Latitude: 35.464684° Longitude: -82.544762°	PZ1*	Dry
1982 Ash Pond Dam Latitude: 35.464584° Longitude: -82.544731°	PZ2*	Dry
1982 Ash Pond Dam Latitude: 35.464359° Longitude: -82.544090°	PZ3*	2075.77
1982 Ash Pond Dam Latitude: 35.464172° Longitude: -82.544174°	PZ4*	Dry
1982 Ash Pond Dam Latitude: 35.4644849° Longitude: -82.5438866°	P100**	2084.28
1982 Ash Pond Dam Latitude: 35.4647490° Longitude: -82.5445729°	P101**	2073.55
1982 Ash Pond Dam Latitude: 35.4664878° Longitude: -82.5446865°	P102***	2118.85
1982 Ash Pond Dam Latitude: 35.4671736° Longitude: -82.5440893°	P103***	2115.48

\* = Piezometer abandoned as part of dam decommissioning in March 2017.

\*\* = Piezometer abandoned as part of dam decommissioning in November 2016.

\*\*\* = Piezometer considered part of 1964 Ash Pond Dam in March 2017.

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**Table 2: Asheville Plant Toe Drain Flow Data**

<b>Location</b>	<b>Toe Drain Outlets</b>	<b>Maximum Recorded Reading (GPM)</b>
1964 Ash Pond Dam Latitude: 35.468° Longitude: -82.549°	AOW 64E0-1 (Flow Meter)	39.98
1964 Ash Pond Dam Latitude: 35.468° Longitude: -82.549°	AOW 64E0-2 (Flow Meter)	16.50
1982 Ash Pond Dam Latitude: 35.464° Longitude: -82.545°	AOW 82E0-1 (V-Notch Weir)	0.01
1982 Ash Pond Dam Latitude: 35.464° Longitude: -82.545°	AOW 82E0-2 (V-Notch Weir)	4.5

**Table 3: Asheville Plant Station Discharge Outflow Rate Data**

<b>Location</b>	<b>Flow Meter</b>	<b>Maximum Recorded Reading (GPM)</b>
Stilling Basin	Outfall 001	7860

**3. Approximate Depth & Elevation of the Impounded Water and CCR**

The data presented is based on information provided by Duke Energy and observations during the 2017 annual inspection.

**a. 1964 Ash Pond Dam (BUNCO-097):**

Minimum depth: Dry

Maximum and Present depth: Areas impounding water include the Duck Pond, which is approximately three acres in size and the settling basin at end of concrete lined rim ditch approximately two acres in size by 20 feet in depth.

The Duck Pond located in the northeast portion of the basin receives water from plant processes and stormwater runoff from the plant area and 1964 basin. Water in the Duck Pond is pumped to the rim ditch which then discharges to the stilling basin north of the dam for final treatment before discharge to the French Broad River. Ash stacked in place for temporary storage in the northwest portion of the basin is currently being excavated and removed.

**b. 1982 Ash Pond Dam (BUNCO-089):**

Minimum depth: Dry

Maximum depth: Dry

Present depth: Dry

Basin receives surface water runoff which is pumped, as necessary, to the Duck Pond during construction activities within basin. The basin no longer receives or impounds CCR and is receiving structural soil fill as part of dam decommissioning. Once the dam is breached in the near future in accordance with the approved 1982 Dam Decommissioning Plans, it will no longer act as an impounding structure.



#### **4. Storage Capacity of Impounding Structure at the Time of the Inspection**

The data presented is based on information provided by Duke Energy. Volumes of impounded water and CCR inventory within the basins are valid as of April 27, 2017 and June 1, 2017, respectively.

**a. 1964 Ash Pond Dam (BUNCO-097):**

Approximate Storage Capacity: 182 acre-feet (at 2157.3 feet).

**b. 1982 Ash Pond Dam (BUNCO-089):**

Approximate Storage Capacity: 329 acre-feet at crest elevation 2129 feet. The PMP design storm volume is 258 acre-feet, which leaves approximately 71 acre-feet of freeboard. This crest elevation will be held at 2129 feet until 71 acre-feet of structural fill (approximately 114,000 cubic yards) is placed in the impoundment in accordance with the approved 1982 Dam Decommissioning Plans. Once this fill is placed, the dam will be breached and the 1982 Ash Basin will no longer act as an impounding structure.

#### **5. Approximate Volume of the Impounded Water and CCR at the Time of the Inspection**

The data presented is based on information provided by Duke Energy.

**a. 1964 Ash Pond Dam (BUNCO-097):**

Approximate Volume: 2,728,600 tons of ash. The temporary ash stack is currently being excavated and removed. Approximately 2.6 million gallons of water (does not include interstitial water contained within in-place ash) is impounded within the Duck Pond and the settling basin at end of concrete lined rim ditch.

**b. 1982 Ash Pond Dam (BUNCO-089):**

Approximate Volume: 0 tons of ash, no ponded water in basin, just stormwater runoff. CCR within the basin has been excavated and the basin no longer receives or impounds additional CCR.

#### **6. Existing Conditions That Are Disrupting or Have Potential to Disrupt the Operation and Safety of the CCR Unit and Appurtenant Structures**

Timothy Quigley and Adam Steurer of Amec Foster Wheeler inspected the 1964 Ash Pond Dam (BUNCO-097) and 1982 Ash Pond Dam (BUNCO-089) on June 7, 2017. Based on the inspection and review of available documents, no actual structural weakness were identified. However, the following items were noted due to relevance and potential structural impacts:

**a. 1964 Ash Pond Dam (BUNCO-097):**

- A pipe video assessment was performed on March 23, 2017. The pipe and riser structure appeared to be in good condition and no deficiencies were observed. Duke Energy continues to perform annual inspections on the pipe and riser.
- Surficial erosion was observed along the south abutment road to toe. Per Duke, this area is continually maintained with erosion repaired as necessary under Duke Work Order # 9583222-3.

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- Two small holes were observed on the north end of dam on crest road near upstream slope side. These areas will be repaired under Duke Work Order # 9583222-3.

**b. 1982 Ash Pond Dam (BUNCO-089):**

- Large erosion rills/water breaks were observed on the crest and upstream slope of the dam. Minor surficial erosion observed along upper portion of left abutment toe road. These issues are related to the dam decommissioning project and are monitored on a weekly basis.
- High grass vegetation on the upper portion of the downstream slope of the dam between erosion and sedimentation control measures limited observations of downstream slope surface. These measures were implemented as part of the dam decommissioning project and are monitored on a weekly basis.

**7. Maintenance**

Duke Energy has developed an Operations and Maintenance (O&M) Manual to instruct operation and engineering personnel the proper procedures for operating and maintaining the Ash Basin System. The System Owner and Station Environmental Coordinator operate and maintain the impoundment facility in a safe and regulatory-compliant manner such as meeting State and Federal laws along with company guidelines without interruption to the station's generation of electricity. The O&M manual provides the necessary information in a concise and comprehensive manner and assists those responsible for operating and maintaining the ash impoundment facility and associated support features.

Observations during this 2017 inspection indicate that Duke is adequately maintaining the facility.