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December 5, 2014

North Carolina Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section
2090 US Highway 70
Swannanoa, NC 28778

Attn: Mr. Bill Wagner (electronically submitted)

Subject: 10 Year Solid Waste Management Plans (3 Year Update)
Duke Energy Carolinas – Allen Steam Station
Retired Ash Basin (RAB) Ash Landfill, Permit No. 3612-INDUS-2008

Dear Mr. Wagner:

Attached you will find the 10-Year Solid Waste Management Plan for the Duke Energy Allen Steam Station RAB Ash Landfill (Permit No. 3612-INDUS-2008). This plan is being submitted as required by GS 130A-309.09D.

Respectfully submitted,

Sean DeNeale
Engineer II
Environmental Services

cc (via email):

Larry Frost, NCDENR
Don Scruggs, Duke Energy
Randy Gantt, Duke Energy

Attachment included:

Allen Steam Station (3612-INDUS-2008) RAB Ash Landfill SWMP – December 2014

Ten-Year Solid Waste Management Plan

Years 2014 to 2024

Allen Steam Station

Retired Ash Basin – Ash Landfill, Phase 1

Permit #3612

December 2014

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1.0 Background

North Carolina requires each generator of industrial solid waste that owns and operates an industrial solid waste facility to establish a Ten-Year Solid Waste Management Plan and to update the plan every three years. This Solid Waste Management Plan pertains to the Allen Steam Station Retired Ash Basin (RAB) Ash Landfill The initial permit to operate (PTO) for Phase 1 of the RAB Landfill, Permit #3612, was issued by the North Carolina Department of Environment and Natural Resources (DENR), Division of Waste Management (DWM), on December 9, 2009 and is subject to review every five years. DWM active PTO was issued on June 16, 2011 for the operation of Phase 1; Cells 1 and 2. An amendment for permit renewal for an addition 5 year operations cycle is currently in review with DENR.

The Allen Steam Station (Allen) is a five-unit coal-fired generating facility located on the Catawba River in Gaston County, North Carolina. It is one of Duke Energy Carolinas (Duke) oldest active coal-burning power plant in the Carolinas with a capacity of 1,140 megawatts.

This Waste Management Plan presented is for a 10-year period as required by GS 130A-309.09D. This period is from July 1, 2014 until June 30, 2024.

As described above, the landfill is currently operating in the permitted area of Phase 1; Cells 1 and 2. The currently operational phases of the RAB Landfill have adequate capacity to receive wastes beyond the scope of this plan based on historical average receipts of waste.

2.0 Landfill Description

The landfill is located on the eastern portion of the Duke Allen Steam Station property, approximately 0.25 miles south of the Allen Steam Station in the footprint of the RAB. The RAB is bound to the north, east, south, and west by earthen dikes. The Catawba River is located to the east. To the south of and adjacent to the RAB is the existing active ash basin, and to the west is a structural fill area. The landfill receives coal combustion residuals (CCR) including fly ash, bottom ash, boiler slag, mill rejects, and flue gas desulfurization (FGD) residue generated at the Allen Steam Station. The current PTO for the facility states that CCR generated from Allen may be accepted at the landfill. The amendment currently under view requests permission to accept CCR from other Duke Energy coal-fired plants in addition to Allen.

The landfill was designed and constructed with a double liner system, consisting of two geomembranes, with a leak detection system located between the two geomembranes. The landfill will be developed in two phases. The combined waste footprint of Phase 1 and Phase 2 is projected to be approximately 47 acres. The entire landfill facility, including the waste footprint, associated perimeter berms, ditches, stormwater management systems and roads, is projected to encompass an area of approximately 62 acres, when completed.

As of the date of this plan, only Phase 1 is operational. Phase 1 includes Cell 1 and Cell 2 and has a waste footprint of approximately 25 acres. Phase 1 is projected to reach its final capacity in approximately 2025. Duke has developed the design for Phase 2 of the landfill. Phase 2 would consist of two additional cells, Cell 3 and Cell 4, located adjacent to Phase 1. Permitting and construction of Phase 2 would be initiated prior to reaching the final capacity of Phase 1.

3.0 Expected Annual Waste Quantities for Ten-Year Period

Phase 1 has a permitted design volume of approximately 2,082,500 cubic yards of waste.[1] Thus the estimated capacity is approximately 2,500,000 tons with waste placed at an approximate unit weight of 2,400 pounds per cubic yard. As of April 2014, approximately 1,370,000 cubic yards of constructed airspace remains for disposal. Using the same projected density of the waste, the RAB Landfill has a remaining capacity of approximately 1,650,000 tons of waste.

A disposal rate of 150,000 tons per year is anticipated based on historical disposal averages. Phase 1 of the RAB Ash Landfill is projected to retain adequate disposal capacity through the current 10 year planning period without a need for the construction of Phase 2. In the event that these disposal projections change, or waste is disposed from other DEC facilities, Duke will permit and construct Phase 2 of the RAB Ash Landfill as needed.

The table below presents the quantities of waste that are expected to be placed in the RAB Ash Landfill. The yearly periods listed below correspond to July 1 through June 30 for the respective year.

Expected Annual Waste Quantities for Ten-Year Period

Year	Period	Phase 1 Projected Annual Quantity (tons)	Projected Remaining Capacity (tons)
Year 1	2014-2015	150,000	1,500,000
Year 2	2015-2016	150,000	1,350,000
Year 3	2016-2017	150,000	1,200,000
Year 4	2017-2018	150,000	1,050,000
Year 5	2018-2019	150,000	900,000
Year 6	2019-2020	150,000	750,000
Year 7	2020-2021	150,000	600,000
Year 8	2021-2022	150,000	450,000
Year 9	2022-2023	150,000	300,000
Year 10	2023-2024	150,000	150,000

4.0 Years of Disposal Capacity Remaining

As stated in the previous section, the remaining capacity of Phase 1 is approximately 1,370,000 cubic yards or 1,650,000 tons. Based on the table described above and an ongoing maximum disposal rate of 150,000 tons per year, Phase 1 of the RAB Landfill is expected to extend beyond 2024.

[1] *Permit to Operate*, Allen *Stream Station—Retired Ash Basin (RAB) Ash Landfill, Phases 1 – Cells 1&2, Permit #36-12*, Document ID No. 14135. June 16, 2011.

5.0 Waste Management Strategy—Plans for Waste Reduction and Disposal

Allen generates 1,140 megawatts of electric power by combustion of coal. As one of the older coal facility owned by Duke Energy in the Carolinas, Allen generates electricity, consuming coal and producing fly ash, typically in a reserve or peak demand capacity.

Fly ash generated at Allen is the largest component of the waste stream placed into the RAB landfill. The quantity of ash generated at Allen depends on factors such as the operation of the plant, use of ash in by-products, the BTU content of the coal, the ash content of the coal burned, and the quantity of coal burned. These factors typically will vary over the course of a single year, causing the quantity of ash produced to vary.

The Allen Steam Station provides electricity to the Duke Energy Carolinas electric system, along with other electrical-generating stations. Since Allen is part of a system, the operation of the station and the quantity of ash produced depends on the operation of the system as a whole.

Duke's Byproducts Management Group was developed to seek markets and applications for use of coal combustion byproducts. This group continuously works toward maximizing the use of coal combustion byproducts. The marketing of combustion byproducts is the primary waste reduction effort.

The rise in natural gas powered electricity generation has led to speculation that coal generation facilities such as Allen may see a more limited role in fulfilling the region's electricity demand during this planning period. This prediction, coupled with increasing strength in the ash reuse markets will increase the demand for ash used in byproducts, resulting in a decrease in the quantity of material disposed in the landfill.

Ash beneficial reuse at the Allen facility is mostly connected to the concrete industry, which can also be sensitive to economic conditions. These markets provide opportunities for beneficial reuse with the understanding that the market strength from year to year is uncertain.

The fuel chemistry at the Allen facility can also greatly impact the amount of waste produced at the station and the sales market is volatile due to numerous conditions. It is difficult to project each year the amount of material that will be disposed of in each of the on-site landfill facilities.

The goal for the stations reuse market is to increase sales by two percent each year, which would reduce the amount of waste going to the facilities if production rates were stable. This goal is attainable and will be the standard going forward at the Allen facility, but with uncertainties around the markets and production rates, the waste volume is unpredictable.

Duke continues to diversify the mix of fuels used to generate electricity in its system by making significant investments in renewable energy projects. As part of this diversification, Duke Energy launched its solar power initiative in North Carolina during 2009. The $42 million, 10-megawatt (MW) program is now among the nation's largest distributed generation demonstrations. With distributed generation, electricity is produced at many micro-generating sites rather than at a large, centralized, traditional power plant. In addition to solar, wind, and other renewable energy sources, Duke is testing the use of biomass mixed with coal at some of its traditional coal-fired power plants. Duke's increased use of renewable energy helps decrease CCR generation resulting from coal-fired generation.