



November 23, 2010

Ms. Deb Aja, Western District Supervisor
North Carolina Department of Environment and Natural Resources
Division of Waste Management
2090 U.S. Highway 70
Swannanoa, NC 28778

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SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

Reference: **WASTE MANAGEMENT PLAN**
Marshall Steam Station Flue Gas Desulfurization (FGD) Residue Landfill
Phase 1, Cell 1, Permit No. 18-09
Catawba County, North Carolina
S&ME Project No. 1411-09-097

Dear Ms. Aja:

On behalf of Duke Energy (Duke), S&ME, Inc. submits this Ten Year Waste Management Plan for the Marshall Steam Station Flue Gas Desulfurization (FGD) Residue Landfill (Permit No. 18-09) as required by GS 130A-309.09D.

If there are any questions regarding this report, please contact me at 828-687-9080, Ext. 315.

Sincerely,
S&ME, Inc.

William M. Miller, PE
Senior Project Engineer

Waste Management Plan
Marshall Steam Station
FGD Residue Landfill Permit 18-09

S&ME Project 1411-09-097
November 23, 2010

cc:

Duke Energy
PO Box 1006
Charlotte, NC 28201-1006
Attn: Andy Tinsley, Mail Code EC13K

Duke Energy
Marshall Steam Station
8320 East Highway 150
Terrell, NC 28682
Attn: Donna Burrell, Environmental Coordinator

Duke Energy
PO Box 1006
Charlotte, NC 28201-1006
Attn: Ed Sullivan, PE, Mail Code EC13K

Facility Name Marshall Steam Station Flue Gas Desulfurization (FGD)
Residue Landfill Phase 1, Cell 1
Permit # 18-09
Location Catawba County
Permit Issuance Date November 21, 2006. The permit is subject to review every five years.

Waste Management Plan Period

Phase 1, Cell 1 of the landfill has a design capacity of 608,472 tons based on a five (5) year planning period. The landfill was designed to receive 288,800 tons of waste per year (950 tons per day for 304 operating days per year). As the landfill is designed for a capacity of five (5) years at the design waste loading, the period of the Waste Management Plan presented is for a five year period.

Once the design capacity of the landfill is reached, the landfill will be closed and the wastes placed in this landfill will be disposed in the Marshall Industrial Landfill #1, Permit No. 18-12.

Description of Waste Disposed in Landfill

The landfill receives the following types of material:

- Marshall generated gypsum
- Marshall generated clarifier sludge
- Marshall generated flyash
- Marshall generated bottom ash
- Marshall generated C&D debris (see approved C&D-next page)
- Duke Energy Carolinas generated asbestos
- Plant Allen generated gypsum
- Plant Allen generated clarifier sludge
- Cliffside generated gypsum
- Cliffside generated clarifier sludge
- Marshall Mill Rejects (Pyrites)

Expected Annual Waste Quantities For Five year Phase

The expected annual quantities of waste to be placed in the landfill are 288, 800 tons per year. This is based on design waste receipts of 950 tons per day for 304 operating days per year. The quantities are indentified as actual or expected.

The yearly periods listed below correspond to the period July 1 through June 30 for the respective year.

Year	Period	Actual or Expected Annual Quantity
Year 1	2006-2007	2,548 tons (Actual)
Year 2	2007-2008	22,273.96 tons (Actual)
Year 3	2008-2009	30,937.12 tons (Actual)
Year 4	2009-2010	125,032.39 tons (Actual)
Year 5	2010-2011	288,800 tons (Expected)

Expected Years of Disposal Capacity

Phase 1, Cell 1 of the landfill has a design capacity of 608,472 tons for a five year planning period. The landfill was designed to receive 288,800 tons of waste per year (950 tons per day for 304 operating days per year).

As of June 30, 2010 the landfill had received 180,791.47 tons of material. The remaining capacity of the landfill is calculated below:

608,472 tons	Phase 1, Cell 1 Design Capacity
<u>-180,791 tons</u>	Waste Placed through June 30, 2010
427,681 tons	Phase 1, Cell 1 Remaining Capacity

Using the placement rate of 288,800 tons per year, the expected years of disposal capacity is calculated as follows:

Years of Disposal Capacity at Expected Annual Rate

$\frac{427,681 \text{ tons Remaining Capacity}}{288,800 \text{ tons/year Expected Annual Quantity}} = 1.5 \text{ Years of Disposal Capacity}$

The largest component of waste received by the landfill is gypsum produced by the FGD system. This material is produced at a fairly constant rate. This material is utilized in wallboard unless the market conditions for wallboard do not produce sufficient demand. Gypsum material not used by the wallboard manufacturer is disposed in the landfill. For example, in the July 1, 2008 to June 30, 2009 period 30,937.12 of tons of gypsum were disposed in the landfill. With depressed market demand for wallboard during the period July 1, 2009 to June 30, 2010, 125,032.39 tons were disposed in the landfill.

Years of Disposal Capacity at 2009-2010 Annual Rate

$\frac{427,681 \text{ tons Remaining Capacity}}{125,032 \text{ tons/year (2009-2010 Annual Rate)}} = 3.4 \text{ Years of Disposal Capacity}$

Options for Management and Reduction of Wastes

The largest component of waste received by the landfill is gypsum produced by the FGD system. The quantity of material produced is determined by the sulfur content of the coal burned to generate electricity and by how much electricity is generated by the station. Duke considers the sulfur content of coal when arranging fuel purchase contracts.

Marshall generates 2090 MW of electric power by combustion of coal, enough electricity to power over one and a half million homes. As the second largest coal facility owned by Duke Energy in the Carolinas, Marshall generates electricity, consuming coal and producing gypsum, on a continual basis.

Duke continues to diversify the mix of fuels it uses to generate electricity by making significant investments in renewable energy projects. In addition to solar, wind, and other renewables, Duke is testing the use of biomass mixed with coal at some of its traditional all-coal fired power plants.

The landfill was designed to receive 288,800 tons of waste per year. The use of the gypsum material in wallboard has resulted in a reduction of material placed in the landfill as calculated below:

1,155,200 tons	Design Waste Placement for Years 2006-2010
<u>-180,791 tons</u>	Waste Placed 2006 through June 30, 2010
974,409 tons	Waste Reduction Through Use in Wallboard

Waste Management Strategy – Plans for Waste Reduction and Disposal

Duke's plans for waste reduction for the FGD landfill are that an improving regional economy will increase the demand for gypsum, resulting in the use of this material as a wallboard product. Duke's By-Products Management Group was developed by Duke to seek markets and applications for use of coal combustion by products. This group continuously works toward maximizing the use of coal combustion by products, such as gypsum.

Duke's plans for disposal for the 5 year period (2006 – 2011) are:

- Continue to place material in Phase I, Cell 1 until capacity of this cell is reached.
- At completion of Phase I, Cell 1, the wastes will be placed in the Marshall Steam Station Industrial Landfill No. 1, Permit No. 18-12, currently under construction.